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Undergraduate

Analysis of Addiction and Habits in Relation to Goal-Directed Behavior  
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## Abstract

Habits and addiction have various commonalities, but there are differences; not just in terms of intensity, but also in how they affect individuals and interact with our motivational processes. While motivation is often a driving force behind the development of habits and addiction there are other factors such as psychological and biological influencers, which have been shown to be deeply tied to the development of addiction and habitual responses. This literature review aims to determine how and in what ways addiction relates to and compare to habits in terms of motivation and goal specific behavior, which also entails looking at factors such as desire and goals.

### **Motivational ties to Habits and Addiction**

Habits and addiction are deeply rooted in motivation, which tends to be a driving force behind various forms of addiction and habitual mechanisms due to the similarity in their formation (Baker, 1988). These behaviors tend to persist through displeasing situations to achieve whatever goal is being sought, until an external stimulus that is considered unbearable to the individual is introduced (Legrand, Beileke, Gollwitzer, & Mignon, 2017). Motivation can lead to the development of habits, which often take the form of goal directed behaviors; this means that goals and desires can not only influence our behavior by subconsciously activating these habitual response, but that these automatic habitual responses largely depend on the presence of an active goal (Aarts & Dijksterhuis, 2000). Similarly, we see that addiction develops in a comparable manner. Addiction is typically considered to reference a dependence of some illicit substance or

drug. However, it has traditionally been used to show a fervent passion for a subject or object, but seeing as how ubiquitous the colloquial term for it has become most research focusing on addiction uses this newer definition of the term (Alexander & Schweighofer, 1988). While motivation does play a large part in the development of addictive behavior there is also the effect of other factors such as stress and sensitization, which lead to a shift from goal-specific behavior to a more compulsive nature of behavior that largely characterizes addiction (Schwabe, Dickinson, & Wolf, 2011). Habits, addiction, and motivation are all interconnected, and while they are typically looked at in some combination they typically aren't looked at as related processes, but through the review of this research the similarities in the developmental framework between addiction and habits in relation to motivation become much more

perceptible. This will allow for the development of new research focusing on the connections between habits and addiction and how they interact with

### **Habits and Goal-Directed Behavior**

Habitual behavior is deeply tied to goal-directed behavior. While our knowledge of habits largely stems from the work of Watson and Skinner and other behaviorists of the time, there has been great strides in our understanding the framework behind habits (Wood & Neal, 2007).

Habits are essentially behaviors that are repeated in various contexts, but one thing not typically considered is the motivational, psychological, and neurophysiological framework behind them. These behaviors begin as actions that are repeated in the context of achieving a specific goal, and these goals are achieved through the influence of our desires and goals on our actions (Wood & Neal, 2007). This idea supports the concept that habits represent goals through the formation of mental associations between the goal and our actions leading to automatic behavioral responses (Aarts & Dijksterhuis, 2000). To determine whether the formation of these mental links between a specific goal and action, otherwise known as implementation intentions, serve as a catalyst for the development of goal-specific behavior, Legrand, Bieleke, Gollwitzer, and Mignon (2017) conducted a series of experiments designed to observe and identify any possible associations between goal-

physiological and cognitive processes tied to motivation as current research focuses on one or the other.

directed behavior and costs of various tolerability such as white noise and excessive effort through the use of card matching trials aimed to create habitual responses. They found that for the most part goal-directed behavior will persist through most unpleasant situations, but once the cost became excessively unbearable to the participants the frequency of the behaviors began to dwindle.

While this experiment seemed to be well controlled, there is the issue that it was held in a lab setting. When dealing with something like habitual response that may preclude more naturalistic responses from the participants so having done the experiment in such a controlled setting may have influenced the results (Legran et al., 2017). Another issue was that there was quite a bit of information concerning the methodology of the second experiment they conducted in comparison to the detail provided for the two other experimental trials held. Although the setting may affect the validity of the piece there was also an issue of there being no methodology section for their second experiment, which brings about a lack of a framework to replicate the experiment putting doubt in its reliability. However, there is other research that supports their findings.

Leventhal and Avis (1976)

observed the smoking patterns of students on their campus who reported smoking at least 10 cigarettes a day and had the participants record their reasoning for smoking during the trial. They did this to determine if specific emotional responses had any impact on the decision to smoke cigarettes or if they were a significant factor in the development of smoking habits. They found that anxiety and pleasure were significantly cited reasons behind smoking and that other factors such as deprivation periods didn't affect whether or not the smoking behavior would continue to persist. One issue with this experiment was that they only made use of people who smoked at near compulsive rates, which may not give an accurate representation of all university students, or even all college aged smokers. Pleasure and anxiety were mentioned as being significant predictors for smoking, and it was found that when looking at consistent exercise, which is composed of elements of habitual framework and deliberate action, that to maintain a consistency there must be adequate levels of motivation and self-perceived reward in order to develop these habitual mechanisms, which bears many similarities to the initial development of addiction (Phillips, Chamberland, Hekler, Abrams, & Eisenberg, 2016).

### **Addiction and related factors**

One model of addiction states that alcohol and drugs are sought for their ability to reduce anguish and increase pleasure, but the incentive-sensitization theory suggests that there are distinct differences between wanting motivation and liking it,

and that through the repeated use of drugs or alcohol our motivational behavior and cognitions shift from liking to wanting (Ostafin, Marlatt, & Troop-Gordon, 2010). This coincides with ideas put out by Jonkman in *Sensitization facilitates habit formation: Implications for addiction* (2006) that drug addiction is driven by compulsion, and that it develops through rigid habitual patterns of drug abuse. In a similar manner, sensitization is marked by the devaluation of a stimulus due to a change in dopamine striatal systems, increases the rate at which habits develop. Thusly, sensitization is an important factor that could lead to drug abuse and addiction. When looking at wanting and liking in relation to sensitization we see that conscious influencers, such as goals and pleasure, can slowly subvert our wanting and liking systems, which are unconscious, subcortical processes that go on to create and guide motivated behavior, which are used to seek a suitable reward (Anselme & Robinson, 2016). This is a key notion behind the incentive-sensitization theory as it shows how these addictive behaviors form, and provides an explanation as to why they begin to form. In Ostafin, Marlatt, and Troop-Gordon's *Testing the incentive-sensitization theory with at-risk drinkers: Wanting, liking, and alcohol consumption* (2010) they discuss an experiment they conducted where they took 85 at-risk drinkers and monitored the differences between the participants' wanting and liking motivation for alcohol. This was done by measuring

their wanting motivation before a trial of free-drinking and their liking motivation after the drinking task. They found that wanting motivation predicted consumption at a more reliable rate than liking, that a longer drinking was associated with a lower relation between liking motivation and consumption, and that the longer experience had no significant relation to wanting motivation and consumption. These results only partially fall in line with the incentive-sensitization theory, but this may be due to the fact that they only used at-risk drinkers rather than circumstantial, moderate, or compulsive drinkers so that may have affected the results of this experiment. That being said, it still remains evident that there is a direct connection between the shift from liking motivation and wanting motivation and the development of addictive behavior. These findings provide a framework for the development of sensitization based theories as it explains from a motivational perspective how this shift caused by the devaluation of the stimulus leads to a shift from liking motivation to desiring, or wanting motivation (Ostafin et al., 2010).

Despite sensitization garnering large amounts of attention due to findings based in the causes of addiction there are other influencing factors. Environment has been known to be a big influencer on the development of addictions and habitual behavior, and yet it's been often overlooked. It's been noted that addiction and habits have a fundamental relationship with motivation, but due to outside

variables within a person's environment there have been recorded issues with dependence, relapse, and craving in relation to addiction and consecutively for habitual behavior (Baker, 1988).

Moreover, we see Everitt, Dickinson, and Robbins corroborate this notion by their conceit that while drug addiction typically begins because of goal seeking actions that there are specific environmental stimuli that also provoke the development of these behaviors as described in their paper *The neuropsychological basis of addictive behaviour* (2001). As a result, it is important to take environment into account when trying to determine the effects on motivational processes.

Environmental stimuli such as setting and specific people may be just as influential in the development of habits and addiction related behavior as sensitization has (Everitt, Dickinson, Robbins, Trevor, 2001).

### **Biological framework**

While the formation of addictive or habitual behaviors are deeply tied to motivation there are also physiological factors to take into consideration. Due to how various regions of the brain have been shown to overlap with disorders like addiction there has been research meant to decipher the connection between our neural mechanisms. Simply put, addiction could be seen as being caused by normal learning and memory structures, specifically the limbic cortical-ventral striatal systems (Everitt et al., 2001). In the case of drug addictions, once these systems have been disrupted through chronic drug use, we see an increase in

drug-seeking habits, which are further enhanced by motivational processes. Similarly, we see other factors can lead to shift in our cognitions and behavior as outlined by Ostafin et al. (2010) in their discussion of wanting and liking motivation and their influence on addiction, with one such factor being stress. It has been suggested that stress can lead to changes in the neural circuits that regulate behavior, which then causes a transition from circumstantial use of a substance to a more compulsive, and obsessive use (Schwabe et al., 2011). This shift demonstrates the change from goal-directed behaviors to those associated with addiction, which shows how similar the formation of addictive patterns are to habits as they both can have roots in goal-directed behaviors, that often are deeply tied to motivation.

Another theory suggests that goals and desires based on drugs, or drug related reward stimuli, are arbitrated by our goal-specific behaviors and habitual controllers, and typically when initially coming into contact with some drug there is an overvaluation due to our goal-directed behavior unlike typical habit formation (Hogarth & Chase, 2011). Hogarth and Chase (2011) demonstrated this through a set of two experiments designed to evaluate student smoker responses regarding devaluation and pleasure to do this they placed the participants in various

choice based situations designed to measure how two different variables, being cigarettes and chocolate, are valued after numerous devaluation trials. It was found that having a hyper valuation of drugs is associated with a significant vulnerability to dependence of said drugs, which also supported previous research done on rats. Ultimately, we see that the development of these dependent responses and addictive behaviors are deeply tied to motivation. These results show many similarities to the concept that due to a devaluation of a stimuli there is an increase in the desire for the motivational response induced by the stimuli, which demonstrates the development of dependence and how the transition from liking motivation and wanting motivation can occur (Ostafin et al., 2010). Overall the design of this study was sound as the ensured that the participants all fell within the same general demographics and maintained a balanced ratio males to females, while also maintaining respectable sample sizes of 64 and 92. On another note, it has been shown that in relation to self-control, addiction, and that the results for treatments for addiction are deeply tied to our cognitive control and conflict monitoring regions, and because of this there has been an increase in treatments aiming to include this knowledge in their methodology (Brewer, Elwafi, & Davis, 2013).

There are a multitude of treatments attempting to remedy addiction of various sorts. When looking at treatments for addiction there are also numerous models, but some of the most basic and most used

## **Treatment strategies and concepts**

models would those based off behavioral therapy and those based off intervention. The theory behind using interventions to facilitate behavior change stems from the notion that intentions have a relatively small effect on behavior, so interventions are used to bolster these intentions and gradually change our cognitive structures (Papies, 2016). Like the intervention method there is the treatment methodology used by Alcoholics Anonymous (AA), which treats alcoholism as a disease, but there are opposing views such as that of behavioral therapy, which views alcoholism as a habit-disorder (McCrary, 1994). In McCrary's review of these two styles in her article *Alcoholics anonymous and behavior therapy: Can habits be treated as diseases? Can diseases be treated as habits?* (1994) she mentions how while there are some distinct differences between the two styles that there are substantial overlaps between the treatment processes, and that while both methods have been found to have success the most effective methodology to treat alcoholism requires integrating the two methods and tailoring them to the patient's specific needs. Typically, there is not considered to be a need to look into the treatment for standard habitual behavior, but research covering behavior modification related to habits dealing with disrupting habit cueing has been used as a component for various addiction treatments as a way to avoid situational stimuli like specific environments and people that might trigger those drug related goal-specific behaviors (Wood & Neal, 2007). Many of these models do share points of overlap, but at

they're core there are distinct differences, but recent treatment strategies based off mindfulness training (MT) show overlap with concepts such as operant conditioning, which is remarkable in a sense as MT has its roots in ancient Buddhist concepts of human suffering (Brewer et al., 2013). Also, MT has been shown to have various advantages over other treatments for addiction due to its scope; mindfulness training incorporates treatment plans based off biological framework models along with the behavioral, but due to this being a relatively new field of study there still needs to be more research to determine the true effectiveness of this treatment style (Brewer et al., 2013). Overall, there is vast amount of information regarding the pathological and maladaptive forms of habit development, like addiction, which is why enactment and patient profiling will be a key focus of future treatment plans, but this will be difficult without a clear understanding of the motivational constructs that are associated with these habitual patterns found in drug addiction (Sjoerds, Luigies, Van, Denys, & Yücel, 2014). While these motivational underpinnings are fully understood, we do know that habits often emerge due to the gradual cognitive processing of associations amongst contextual stimuli, which trigger a habitual response, which when taken into account along with knowledge of habitual cues we can see the implication for treatment models based on habitual change and self-regulation (Wood & Rüniger, 2016).

## **Conclusion**



Through the information reviewed we can see that not only can various behaviors become automatic in response to our goals or desires, but also that once sensitization and environment are considered as added stimuli, we begin to see addictions to form. There are numerous underlying mechanisms involved when looking at addiction, habits, and motivation, but these processes haven't been extensively researched. The bio neurological framework behind habits and motivation is much less developed than that of addiction, and yet there is still a lot left to be learned about these underlying mechanisms in terms of addiction as well. Also, there is a lack of substantial information regarding how some habits can develop into addictions, in Schwabe, Dickinson, and Wolf's *Stress, habits, and drug addiction: A psychoneuroendocrinological perspective* (2011) they touch upon the subject

upon the subject by talking about the shift between habitual drug use to addiction, but there is not much research linking motivation and addiction in a manner such as this where they look at the reasoning behind this change. This is an issue because there are observable similarities between addiction and habits especially in terms of how they form and in their relation to motivation. Ways to further expand on this research can include experiments designed to test differences between smokers in terms of intensity. This would be done to differentiate between habitual, or situational smokers, and compulsive, or addicted smokers. Similar to the Leventhal and Avis experiments outlined in *Pleasure, addiction, and habit: Factors in verbal report or factors in smoking behavior?* (1976) there would also be questionnaires meant to measure factors such as motivation for smoking, frequency, and emotional responses.

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