



How Terpenes and CBD Enhance Prosocial Behaviors

A Study By Abstrax and
Western Washington University





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Researchers at Western Washington University have partnered with Abstrax Tech to study how terpenes can be used to enhance social interactions and ease anxiety for those with autism.

While many are familiar with the benefits of cannabidiol (CBD), the spotlight is now on terpene blends – especially those mirroring the composition of cultivars like OG Kush, Blue Dream, and Do-Si-Do. Notably, these specific blends showcased their prowess not just when paired with CBD but also on their own, **indicating a stand-alone potential of terpenes in enhancing social behaviors.**

The results? A promising hint that both CBD and terpenes could be game-changers in addressing challenges faced by those on the autism spectrum. Let's delve deeper into how Western Washington University arrived at these compelling findings.

Study Overview

In this research, scientists closely observed BTBR mice, a strain of mouse specifically bred for insights into Autism Spectrum Disorder (ASD). The study aimed to understand how terpenes and cannabinoids influence ASD-related behaviors. To achieve this, the mice were exposed to controlled inhalable vapors with varied mixes of CBD and terpenes. Following this, the team meticulously recorded the mice's social and anti-social activities, capturing the nuances of their interactions. This data was then subjected to rigorous statistical analysis, ensuring the validity and significance of the results.

BTBR mice show **autism-like deficits** in social interaction, play, vocalization, and grooming as well as repetitive behaviors.



BTBR mice have very dark brown/black fur with a light brown underside

The **hippocampal commissure**, connecting the two halves of their hippocampus, is much smaller than normal.



The **corpus callosum**, the main bundle connecting the two hemispheres of the brain, is missing in all individuals of this strain.



Cannabinoid Ratios

To begin, the research team sought a consistent and reliable CBD product to prepare the vape oil for their study. After evaluating several commercial CBD products, they selected one containing **24.26 milligrams of CBD per milliliter**. This chosen CBD product was then mixed with a blend of propylene glycol and vegetable glycerin, commonly known as the *vehicle mixture*, in the subsequent ratios:

1.
Undiluted
CBD Oil

1 part CBD
Oil to 2 parts
Vehicle

Undiluted
Vehicle

Equal parts
CBD Oil and
Vehicle

2 parts
Vehicle to 1
part CBD



Terpene Ratios

Abstrax Tech supplied terpene blends that mirrored the natural terpene composition of renowned cannabis cultivars: Blue Dream, OG Kush, and Do-Si-Do. All vape oil mixtures were formulated to have a terpene concentration of 5%. This approach allowed the study to replicate the effects of strain-specific cannabis products using a typical ratio of flavor to cannabinoid. **The research also ventured into exploring vape oils made purely of terpenes, without any cannabinoids, to gauge the standalone impact of terpenes on social behaviors.** Furthermore, the effects of individual terpenes, isolated in vape oil preparations, were examined.



5% Terpene concentration



Behavior Assessment

First, the mice were exposed to metered puffs of vapor from the meticulously crafted vape oils. In one session, they inhaled an amount equivalent to taking 6 puffs from a vape pen, spread over 30 minutes. It was estimated that each puff delivered 0.51 milligrams of CBD to the mice. After this exposure, the concentration of CBD in the mice's bloodstream was measured. Interestingly, only female mice were chosen for the study, as male mice showed inconsistent reactions to the basic vape oil.

To gauge their social behaviors post-exposure, the mice were subjected to two distinct social evaluation setups: the "Elevated Plus Maze" and the "Three Chamber Test of Social Interaction."

Within the **Elevated Plus Maze**, mice could freely explore various "arms" of the structure. One arm, bordered by transparent glass, allowed them to gaze beyond the maze and socialize. In contrast, other arms, enclosed by opaque glass, provided a secluded space, shielding them from social interactions.



FIGURE 1. Elevated Plus Maze

The **Three-Chamber Test** gave the mice an option to interact with an unfamiliar mouse or to hide alone in a safe, secluded chamber. Researchers note the time the test mouse spends in the chamber with the stranger mouse versus the empty chamber. A preference for the chamber with the stranger mouse indicates sociability.

By observing where the mice preferred to spend their time in these assessment tools, the researchers could collect data regarding the impact of different vape oil preparations on the social tendencies of the mice. With statistical analysis of these patterns, the researchers were able to determine the significance and applicability of their findings.

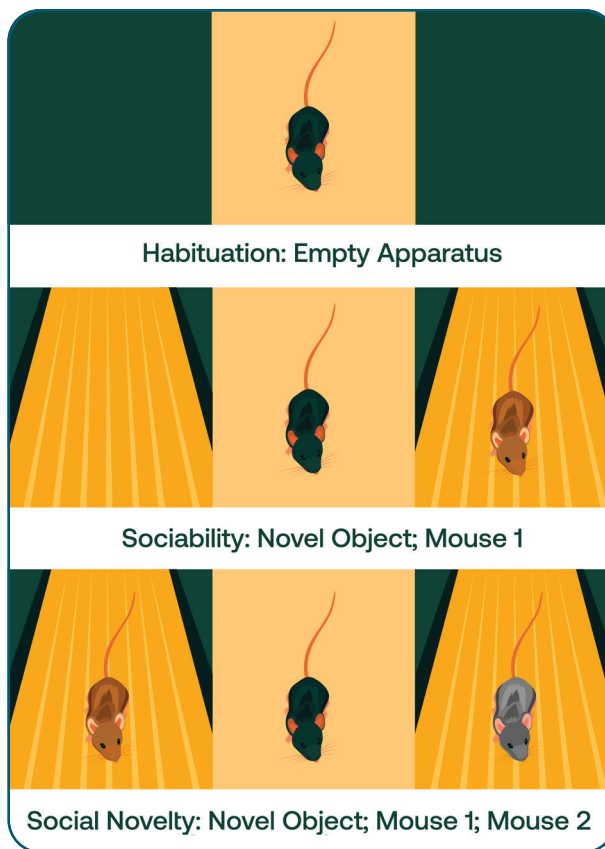


FIGURE 2. Three-Chamber Test

Discussion

The research underscored two pivotal findings: First, while commercial CBD-rich cannabis products can indeed foster more social interactions, **terpenes alone also enhance such behaviors**. Impressively, this prosocial impact is amplified when terpenes are paired with cannabinoids, giving further weight to the “Entourage Effect”. The study also revealed that a blend of terpenes, rather than a singular isolated terpene, produced the most pronounced social benefits. Vape oils with just one isolated terpene didn’t influence social behavior, but specific terpene combinations did elevate social interactions.

A notable observation was the minimal dosage required to elicit these positive effects in the BTBR mice. The CBD concentration in the mice’s blood was modest, approximately 5 to 15 nanograms per milliliter. This indicates that **even low doses might improve social interactions in ASD patients**, a stark contrast to the much higher doses required for seizure relief.

Uniquely, this study emulated a common method of cannabis consumption in humans: inhalation.

While many preliminary cannabis studies involve methods like oral ingestion of cannabidiol oil, many people consume cannabis through smoking. Hence, this research offers a more relatable insight into real-world cannabis use.



Synergistic Effects of CBD and Terpenes

While both CBD and terpenes individually promoted prosocial behaviors, their combined administration yielded the most pronounced effects. This synergistic behavior underscores the potential benefits of full or broad-spectrum CBD products containing a range of terpenes.

Importance of Terpene Combinations

The study found that the combination of multiple terpenes was crucial for the observed prosocial benefits. Terpene isolate preparations did not yield the same results, highlighting the importance of the Entourage Effect, where multiple cannabis compounds work together to enhance outcomes.

Conclusion


In conclusion, strain-specific terpene blends from Abstrax Tech are empowering research entities like Western Washington University to make groundbreaking discoveries about the interplay between cannabis and Autism Spectrum Disorder (ASD). **These pivotal findings suggest that terpenes could be helpful for individuals grappling with social anxiety and ASD symptoms.**

Comprehending how terpenes interact with our physiological systems is crucial for unlocking the full potential of cannabis.

For instance, the calming aroma of lavender, rich in the terpene Linalool, is well-known for its anxiety-reducing effects. However, deciphering the complex synergy of terpenes within cannabis necessitates targeted studies like this one. This research accentuates the importance of a terpene “entourage” for anticipating effects. Moreover, it scrutinizes the impact of heating terpenes through vaporization - a factor often overlooked but highly relevant to contemporary cannabis consumption.

This study is a cornerstone in the broader landscape of cannabis research, hinting at the myriad of ways cannabis, or cannabis ingredients, could enhance the quality of life.

The collaboration between Western Washington University and Abstrax Tech not only made this impactful research possible but also shines a light on the fruitful partnerships that can be cultivated between academia and cannabis product innovators.



While the medicinal attributes of terpenes within cannabis are still a burgeoning field of study, this research unequivocally demonstrates that terpenes alone can offer significant life improvements.

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