Final Project Initial Report

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Abstract

Please write a brief summary (no more than 250 words) of your report that provides the following information: (1) Motivation for your study, and crisp specification of the research question posed by your project; (2) Methodological approach, including which sources of data you used and which variables were used to operationalize the constructs mentioned in your research question, as well as your statistical analysis approach; (3) Key results; (4) Broader implications.

Psychiatric symptoms currently constitute a significant issue as recent research suggests they contribute to sharp declines in quality of life and life expectancy, so any indication of helpful approaches to this issue is exciting–something which is clearly communicated in the literature. However, there does appear to be some dearth of studies examining the harm potential of psychedelic compounds, especially regarding exacerbation of psychiatric symptoms. We therefore wanted to examine whether relationships exist between use of psychedelics and mental health outcomes. Specifically, we wanted to know if individuals experiencing psychiatric distress are motivated to use psychedelic compounds despite their legal status, if positive media coverage or changes in public attitudes play a role in this motivation, and if this results in better or worse mental health outcomes. This was accomplished by replicating the findings of Matzopoulos et al. (2022) and conducting novel analysis on the relationships between variables like psychiatric symptoms, media or word-of-mouth information they have recently received regarding psychedelics, mental health outcomes, and self-reported PM use. We found[.....results here.....]. These results indicate a measured path forward regarding the application of psychedelic substances to psychiatric symptoms. It appears that people experiencing psychiatric symptoms are likely to use PMs to self-medicate, particularly when exposed to information about their potential benefits. This has broad consequences for society as legalization of these substances would likely increase this using behavior and, without randomized controlled trials in human populations elucidating any harmful side-effects, these may become apparent in the population without a corrective mechanism or responsible disclaimer. More research needs to be done regarding the potential of PMs to exacerbate psychiatric symptoms, as well as

Motivation

Please write a short paragraph describing the motivation for your study, including any necessary *background information for a general reader to understand about the phenomenon you are investigating. : The last few decades have seen a marked change in scholarly research and public attitudes surrounding "psychedelic" compounds. These compounds are a diverse class, but are largely constituted by serotonergic hallucinogens. Changes in drug policy following randomized, controlled clinical trials have rendered certain psychedelic compounds prescribable for treatment-resistant psychiatric disorders (Daly et al., 2018). Moreover, a complete reversal of the prevailing attitude toward these compounds in media and public consciousness, as well as publication of hundreds of papers on topics ranging from their molecular characterization to their potential for*

treatment of psychiatric symptoms constitute what some are calling a "Renaissance" (Sessa, 2018). Moreover, evidence suggests that these compounds have been used for hundreds of thousands of years (Rodríguez Arce & Winkelman, 2021), and recreational or illegal use of these compounds persists around the world with psychedelic mushrooms (PM) being one of the most logstanding psychedelic substances consumed by humans. Despite these changes in attitude, documentation that PMs are well-tolerated physiologically (Tylš et al., 2014), and although human consumption of psychedelics is not new, little scientific research has investigated their psychological effects and potential as therapeutics. Widespread recreational use may imply that data on the relationship between psychedelics and psychiatric symptoms exists outside of randomized controlled trials, a fact of which which our target article (Matzopoulos et al., 2022) made use. We are thus motivated to examine the data collected in the target article to see if relief from psychiatric symptoms drives recreational use of PMs, if promotion in media contributes to this phenomenon, and if there is any cause for concern regarding mental health outcomes resulting from PM use.

Research questions

Here you will write the crisply stated research questions that are the focus of our study. Please refer to the underlying constructs that you aim to understand with this research, even if they are not exactly the same as the variables you have measured. Each of these questions sets up a specific element of our analysis plan below.

1. **Our first question: Do individuals experiencing psychiatric symptoms use PMs at a higher rate than those who are not?**
2. **Our second question: Does positive media coverage or word-of-mouth communication on the benefits of PMs for psychiatric symptoms increase their use among individuals?**
3. **Our third question: Is PM use affected by potential interactions between different psychiatric symptoms?**

Hypotheses

Here you will lay out different concrete possible outcomes that pertain to our first research question above, and state what each outcome would imply. Note that you do not need to commit to a particular belief about what you expect or "want" to find; it is sufficient to demonstrate that you understand what various outcomes would imply with respect to your research questions above.

1. **We hypothesize that there are correlations between self-reported PM use (or any psychedelic use) and an individual's mental health status indexed by self-reported anxiety, depression, insomnia or scores on different psychiatric evaluations such as the CCI, GAD-7, PHQ-9, MCS-12, and VR6D, as well as self-reported intentions to use PMs to relieve psychiatric symptoms. Finding significance in a multivariate linear regression between these variables and their interactions would suggest a relationship between PM use and an individual's mental health status.**
2. **We hypothesize that positive media coverage or word-of-mouth communication about PMs is positively correlated with individuals' motivatio to use them. Finding a significant positive correlation between PM use and hearing positive things about PM use, especially regarding use for psychiatric conditions and well being would suggest that there is a relationship between a person hearing positive things about using PMs and deciding to use them despite their legal classification**
3. **We hypothesize PM use correlates with exacerbation of psychiatric symptoms. We will compare the CCI, GAD-7, PHQ-9, MCS-12, and VR6D scores for two populations, both**

experiencing psychiatric symptoms, but one which uses PMs and one which does not. Finding significantly higher scores on these measures for one population indicates a relationship between PM use or abstinence and exacerbation of symptoms.

4. **We hypothesize that a model which predicts PM use predicated on mental health status variables such as the dependent variables in our first hypothesis will better fit the target data than a model which is predicated on a model which predicts PM use predicated on a desire for general well-being or personal development. If MANOVA comparison of the two models reveals that the variables and interactions in hypothesis 1 account for more of the variance in the data than the variable in the second model above described, we may conclude that those variables are more predictive of PM use.**

Methods

Study type

Is this study employing experimental or observational data?: Our target study employs observational data obtained through a national (US) online study operative from November 2020 - March 2021.

Independent variables

If you are working with experimental data, precisely define any variables you plan to manipulate, including the levels and whether the manipulation will be between or within participants. If you are working with observational data, please define which predictor variables you will be analyzing.

We will be analyzing four classes of predictor variables:

1. Demographic information (Age, Sex,)

Dependent variables

Please indicate a single outcome variable of interest. Past-year psychedelic mushroom use.

Data preprocessing

What kinds of transformations will you need to apply to your data before you can fit a statistical model to them? What is your plan for handling missing data? How will you determine which data points or samples (if any) to exclude from your analyses? How will outliers be handled? Will you use any awareness or attention check?

The dataset from Matzopoulos et al. (2022) was mostly well curated, except for the missing data regarding participants' education level and employment status. For the dependent variable, there are three variables in the dataset regarding past-year psychedelic use that must be aggregated into a single variable, wherein any indication of past-year psychedelic use is recorded. For the independent variables, the dummy code in the current dataset must be transformed into factors according to the attached code book.

Results

Data visualizations

Please include at least one polished data visualization that visualizes the relationship between your independent and dependent variables. Please choose a graph type that makes it easy for your viewer to extract true and

meaningful information about this relationship. Please visualize uncertainty in any point estimates (e.g., error bars or bands representing confidence intervals). Please ensure that the labels for all axes are legible, and that the axis limits make sense. Please provide a title for your visualization. Please use color only as needed in order to help communicate the key message your data visualization is intended to convey.

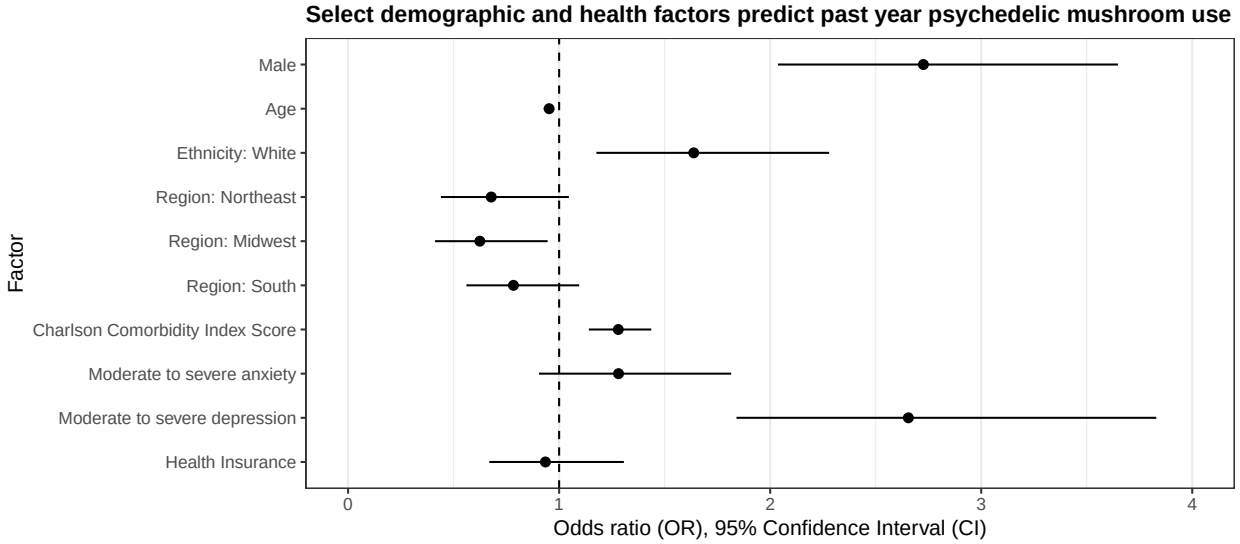

Figure 1: Odd ratios of past-year psychedelic mushroom use predicted by demographic and health factors. Odd ratios above 1 indicates that the factor is predictive of past-year psychedelic mushroom use, odd ratios below 1 indicates that the factor is predictive of non-psychedelic use.

Statistical modeling

Please define at least one ***COMPACT MODEL*** *and one* ***AUGMENTED MODEL*** *to compare.*

** COMPACT MODEL:

$PM = Error$ **

** AUGMENTED MODEL:

$PM = Sex + Age + Ethnicity + Region + Co-morbidity + Anxiety + Depression + Insurance + Error$ **

** HEALTH-INTERACTION MODEL:

$PM = Sex + Age + Ethnicity + Region + (Co-morbidity * Anxiety * Depression) + Insurance + Error$**

Summary of findings

Please write a few sentences to explain what you can infer from your statistical analyses. Please report both inferential statistics (e.g., F-stat, p-values) pertaining to model comparisons. In addition, please write a few sentences that provide interpretation for what your modeling results mean, by converting the values in the table into understandable statements about how changes in key independent variables affect the dependent variable in units that will be meaningful to your reader.

Select demographic and health factors are predictive of past-year psychedelic mushroom use. Particularly, past-psychedelic mushroom use is associated with being male (OR = 2.73, 95% CI = [2.04, 3.65]), white (OR = 1.64, 95% CI = [1.18, 2.28]), higher co-morbidity (OR = 1.28, 95% CI = [1.14, 1.44]), and having moderate to severe depression (OR = 2.65, 95% CI = [1.84, 3.83]). Conversely, non-psychedelic use is associated with

increased age (OR = 0.95, 95% CI = [0.94, 0.96]) and being from the Midwest (OR = 0.62, 95% CI = [0.41, 0.95]).

Health factors like co-morbidity, anxiety, and depression do not significantly interact with each other (OR = 1.43, 95% CI = [0.56, 3.65]), but in an exploratory analysis, demographic factors like sex and age do significantly interact with each other (OR = 1.03, 95% CI = [1.01, 1.06]), where older men are more likely to use psychedelic mushrooms than older women. Additionally, when the interaction between sex and age is taken into account, past-psychedelic mushroom use becomes no longer significantly associated with being male (OR = 0.83, 95% CI = [0.35, 2.01]). It is reasonable that the association between past-psychedelic mushroom use and being male is qualified by this interaction between sex and age.

[Analysis on hypothesis 2 on hold...]

We also note that the augmented model (AIC = 1788.5) improved model fit over the compact model (AIC = 2021.1). The health interaction model (AIC = 1789.9) that takes into account interactions between co-morbidity, anxiety, and depression does not improve model fit, but the sex and age interaction model (AIC = 1782.6) improved model fit over the augmented model.

Discussion

Please write a few sentences about the broader implications of this research. Please also note any methodological limitations or other open questions for future research to address.

References

Please provide a list of APA-formatted references, including references associated with data sources, you used for your project.