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The Link Between Cognitive Difficulty, Mental Health Issues, and Poverty: A Comparison
Between the United States and Spain



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THE LINK BETWEEN COGNITIVE DIFFICULTY, MENTAL HEALTH CONDITIONS, AND
POVERTY: A COMPARISON BETWEEN THE UNITED STATES AND SPAIN

by

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I hereby recognize and pledge to fulfill my responsibilities as defined in the Honor Code and to maintain the integrity of both myself and the College as a whole.

Natasha Rosa

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ABSTRACT

Throughout the years 2015-2020, there is a lack of existing evidence and literature that reveal a distinguished relationship between the topics of mental health and poverty. In the United States, public data from the Integrated Public Use Microdata Series (IPUMS) displays that a significant amount of Americans suffer from some form or another of cognitive difficulty and mental health conditions. This study attempts to hypothesize that there is a clear correlation between these demographic variables and poverty. Through the process of extracting data about the United States from IPUMS, the methodology of the research requires a regression analysis, including a variety of explanatory variables, yet only two of which will be expanded upon in depth: Diffrem, signifying cognitive difficulty, and Diffcare, signifying mental health conditions. This research also features a literary case study on possible relationships on related topics that exist in Spain, and a comparison of both countries in regard to the correlations between

independent and dependent variables. The results for the United States. prove that all of the predictive variables are statistically significant at the 99% confidence level, which supports the hypothesis that there is a direct positive relationship between cognitive difficulty and poverty, as well as mental health conditions and poverty. Similarly, in Spain, there is a comparable relationship between variables, much like that in the United States, but it is not proven by data and is instead suggested by the collected literature and personal experiences.

CHAPTER 1: INTRODUCTION

Cognitive difficulty and mental illness are factors that are likely to influence poverty, yet such links are not well documented in the existing literature. This research paper explores the relationship between cognitive difficulties, mental health conditions, and poverty rates in the United States, and compares these findings to the possible relationships that exist in Spain. Comparing relationships between countries is critical in the process of analysis, in order to add clarity to the depths of the issues surrounding the prevalence and stigma of mental health conditions and poverty. For the United States, this paper presents a regression analysis using data from the Integrated Public Use Microdata Series (IPUMS), for the years 2015-2020; IPUMS is a database that consists of individual-level population census records. These years were selected in light of changing recent economic activity, such as the recession that struck the United States economy during the COVID-19 pandemic, which began in March 2020. Within this research, it is possible that the data for the year 2020 could be skewed due to the prevalence of the pandemic and the unknown implications the pandemic had on the United States economy.

As for Spain, however, due to the lack of accessible international data, only a literature-based case study has been constructed. All of the literature used for the case study of Spain has been published within the same time frame of the data used to analyze the United States, to ensure the comparison will be as accurate as possible. The hypothesis is as follows: I expect that there will be a direct relationship between the chosen demographic variables and poverty. The variables that are being expanded upon are cognitive difficulty and mental health conditions, while there are multiple others that could also predict poverty scores. Individuals

who suffer from a cognitive difficulty or a mental health condition that impairs daily functioning are predicted to receive an income that is closer to their personalized poverty threshold, as compared to an individual who does not identify with either of these conditions. The other explanatory variables that are displayed in the regression are Sex, Age, Race, Educational attainment (Educ), Employment status (Employment status), and Total Income (Inctotscale).

In order to examine these relationships, existing literature is used on the subjects of cognitive difficulty, mental health and mental illness, and poverty, to create a thorough picture of how these different factors interact within the United States. I estimate the extent to which these factors influence poverty by using a regression model. While searching for literature in regards to mental health conditions and poverty rates in Spain, I collected information from each of the literary works detailed below, which is useful to construct one big case study on what the relationship looks like in Spain between the demographic variables that are being expanded upon in depth in this study. The results of this study reveal that there is a direct relationship between the chosen explanatory variables and poverty, which supports the hypothesis of the experiment. The regression output table reflects that each of the independent variables is statistically significant at the 99% confidence level for each year, yet the R-squared values were comparatively low. Another finding is that there are signs of heteroskedasticity in each year's data set, so robust standard errors were placed into the regression equations to account for this issue. The last finding, but possibly one of the most critical to the model, is the F-statistic. It is displayed also on the regression output table, as a value of 0.000. This demonstrates that the model has no predictive power, which is very interesting because it can occur due to multiple reasons.

Literature Review

Is an individual with cognitive difficulty prone to falling into the poverty threshold because of that impairment, or is an individual who grew up in poverty more likely to develop such a cognitive condition? Fry et al. (2016) found that youth who have experienced poverty compared to those who have not, showed poorer performances on cognitive tasks. These cognitive tasks they tested on the youth reflected weaknesses in working memory, attention, and executive functioning. Fry's study suggests that there is a direct relationship between mental health conditions and lower levels of cognitive functioning. The connection between mental health issues, cognitive difficulty or lack of functioning, and reflection of poverty will be demonstrated in my regression results to confirm the findings of this study.

In a review of the mental illness symptoms in the midst of the COVID-19 crisis in Spain, Richard Z. Chen et al. (2021) assessed the prevalence of various mental illnesses such as anxiety and depression in the general population of Spain. They were able to collect data from PubMed, Embase, PsychINFO, and Web of Science from 2020 to 2021, the exact time period in which COVID-19 struck the world. Their study, which contained data from 38 samples and 28 articles, totaling a sample of 86,323 adults in a single year of the COVID-19 pandemic, focused on the difference between the prevalence of mental illnesses within the general population, frontline healthcare workers, and adult students. As a result, they found that frontline healthcare workers and students reflected higher rates of mental health symptoms than the general population. They found that in the sample, the prevalence of anxiety was 34%, with the prevalence of depression symptoms amounting to 36%, and the prevalence rate of insomnia symptoms at 52% (Chen et al., 2021). The meta-analysis also revealed that students in Spain suffered higher rates of mental

illness symptoms during COVID-19 with a significantly higher rate than other countries, such as China, but the authors do not describe the likely cause for this higher rate. Overall, the researchers found that people in Spain were experiencing psychological and emotional distress during COVID-19 at a greater magnitude than other, closely-related countries.

In a Lancet article, a graphic outlined the number of individuals, male versus female, that suffered from poor mental health before and during the COVID-19 pandemic. It is clear from this study that there was an increase in the prevalence of mental illness in young women that was more apparent than in the male group (The Lancet, 2021). Also, the data revealed that the younger generation of individuals experienced more issues related to mental illness than older participants of this study; there appears to be a spike around age 24-25. This led me to confirm my hypothesis that COVID-19 did have a great impact on mental health conditions as well as poverty that was discussed earlier.

The regression in this paper uses a model similar to the structure that Rebecca Westbrook used in her statistical analysis, including Poverty scores as the dependent variable. The structure of her research is something this paper mimics for accuracy and organizational purposes, while adding to the collection of independent variables to include cognitive difficulties and mental health conditions, the two main variables that my research will expand upon in the most depth. The regression also includes a variety of other demographic variables that are predicted to have an effect on poverty.

CHAPTER 2: METHODOLOGY

This data was collected from IPUMS, a database providing census and survey data from all over the world. In IPUMS, there are two possible variables to explain categories related to the overall well-being of individuals, which is the main focus of the regression, and the topics that are expanded upon in the most depth. The variable Diffrem describes individuals in the sample that struggle with a cognitive difficulty of some type. The definition of this variable, taken directly from the description in IPUMS, indicates whether or not the respondent struggles with “learning, remembering, concentrating, or making decisions because of a physical, mental, or emotional condition.” (IPUMS.) The second variable of substantial importance is Diffcare, which is defined as “whether respondents have any physical or mental health condition that has lasted at least 6 months and makes it difficult for them to take care of their own personal needs.” (IPUMS.) Both of these variables were required for the model, in order to capture all of the individuals in the database that suffered from one form or another of a mental health condition or cognitive difficulty.

In a graphic taken from the website of the National Institute of Mental Health, the prevalence of mental illnesses in the year 2020 is reflected among adults in the United States. (National Institute of Mental Health, 2023) On the X axis, the demographics are split into three categories: Sex, Age, and Race/Ethnicity. It is clear that all of the demographic variables play a significant role in the percent of past year prevalence of any mental illness among American adults. Looking at Sex, over 25% of females were reported to have suffered from a mental illness in the year 2020, yet only 15.8% of males were reported to have suffered from the same issue.

For Age, individuals between the ages of 18 and 25 experienced the largest percent prevalence of mental illness, whereas ages 50 and older displayed the least reported number of individuals who struggled with a mental condition.

Data Description

In order to clean up the data set and exclude sample variables that IPUMS automatically adds to the extract, many variables that would not be useful in this regression have been dropped. The only variables that are kept and used in the regression are Sex, Age, Race, Educational Attainment (Educ), Employment Status (Empstat), Total Income Scaled (Inctotscale), Cognitive Difficulty (Diffrem), and Mental Health Condition (Diffcare). Total Income is scaled for the purpose of keeping the range of numbers consistent across the set of variables. Categorical variables, also known as dummy variables, only take on values of 0, 1, or 2 in this data set. These variables are Sex, Cognitive Difficulty, Race, and Employment status. A few of the variables have been re-coded to only take on a value of 0 or 1.

The variables that are not dummy variables take on a wide range of numerical values that correspond with different categories. These variables include Race, Employment Status, Educational Attainment, and Total Income. The descriptions of each variable are taken directly from the given descriptions on IPUMS. The dependent variable (Y) is Poverty, or a family's total income as a percentage of the poverty threshold. The poverty threshold is based on a matrix that varies by demographics, such as family size, number of children, etc (Institute for Research on Poverty, 2023). For this threshold, there is no geographic variation across states in the United States. The results of the different codes of Poverty reflect that each person's poverty threshold is

unique and specific to their living situation. The scores take on values of 001 to 501 or more. Lower numbers correspond with households that receive incomes closer to their particular poverty threshold, whereas the larger number scores indicate that the household income is greater than their respective poverty threshold. For example, if an individual's income is \$30,000 for that year and the poverty threshold assigned to them is \$15,000, then the Poverty score for that person is $(30,000) / (15,000) \times 100 = 200$. This means that the person's income is 200% of their respective poverty threshold. Relating to the data set, after accounting for observations that had a county fips code of zero, meaning the county is not identifiable, the total number of observations is reduced significantly for each sample year, and then reduced further due to other categories that appeared not applicable. Each regression is a cross-sectional panel regression, indicating that it is focused on millions of data points from one period in time, t , which is the range of years 2015-2020.

Below is the generalized regression equation for each year:

$$POVERTY_i = \beta_{0i} + \beta_1 SEX_i + \beta_2 AGE_i + \beta_3 RACE_i + \beta_4 EDUC_i + \beta_5 EMPSTAT_i + \beta_6 INCTOT_i + \beta_7 DIFFREM_i + \beta_8 DIFFCARE_i + \epsilon_i$$

For ; $t = 2015-2020$

In the year 2020, which was a devastating year for the entire world based on the prevalence of the COVID-19 pandemic, the population of individuals over the age of 18 in the United States was 258.3 million (Ogunwole et al., 2021). According to the National Institute of Mental Health, the number of Americans over the age of 18 that were diagnosed with a mental illness for the year 2020 was 52.9 million; 20.48% of adults in the year 2020 were struggling

with a mental illness (National Institute of Mental Health, 2023). It is clear that there was a relationship between mental illness during the time period of COVID-19, which is why the data was collected through 2020. Based on the literature and assumptions that have been collected in depth, there are multiple variables that are predicted to have an effect on the dependent variable, Poverty, whether the effect is positive, negative, or no effect. On the following page, a chart of predictions for the independent variables' impact on the dependent variable is displayed.

TABLE 2.1: PREDICTED IMPACTS ON THE DEPENDENT VARIABLE¹

Variable	Description	Predicted Impact on the Dependent Variable
Sex	Male or female (1 if Male, 2 if female)	Positive (female only)
Age	Person's age in years	Positive
Race	Race provides the full detail given by the respondent and/or released by the Census Bureau; White takes a value of 1, Black/African American takes a value of 2, etc.	Negative if Race $\neq$ 1
Educ	Educational attainment; measured by the highest year of school or degree completed	Negative
Empstat	Whether the respondent is employed, unemployed, or not in the labor force	Negative
Inctot	Total pre-tax personal income or losses from all sources from the previous year	Negative
Diffrem	Whether or not the respondent has cognitive difficulties because of a physical, mental, or emotional condition	Positive
Diffcare	Whether or not the respondent has any physical or mental health condition that impairs functioning or taking care of physical needs	Positive

¹ Although these are the predicted variables that play a role in determining Poverty, only two relationships will be explored further: Diffrem and Diffcare. These are the dummy variables that signify cognitive difficulty and mental health conditions.

CHAPTER 3: ANALYSIS

Out of the entire sample of observations for the year 2015, there were 99,258 individuals who responded to the IPUMS survey and indicated that they suffer from cognitive difficulty, which is approximately 5.2% of the sample. In addition, there were 61,437 people who reportedly experienced a physical or mental health condition that impaired their daily functioning, which is coded in the data set as the variable Diffcare. The data reveals that over three percent of the sample from 2015 suffers from physical or mental health conditions. To overview the supplementary demographic variables, as for the coding of Sex, the value of 1 corresponds with the male sex, and the value of 2 corresponds with the female sex. In the sample, 51.43% of the sample is female, and 71.84% of the sample is White. In addition, 11.73% of the sample is Black or African American, which leaves 16.43% of the sample that identifies as a different race. Another trend within the data is that approximately 73% of the total sample is older than the age of 21, which is the majority; however, it indicates that not all of the participants are considered a head of household, and it reflects a leftover percentage of individuals that are legally children.

The most important result that this research focuses on is the relationship between cognitive difficulty, mental health conditions, and poverty. One interesting thing to note is that the median income in the United States in 2015 was \$55,775 (Census, 2015) and in this data set for the same year, before dropping any observations that were not applicable to the standards for the model, 685,458 citizens received a salary greater than the median income, which is only approximately 36.1% of the original sample. The regression reveals that for each year, there is a

distinct direct relationship between Diffrem and Poverty, and Diffcare and Poverty, which means that as an individual takes on a value of 1 for either of these variables, meaning that they suffer from the respective condition, it is expected that the individual will receive an income that is closer to their poverty threshold. The relationship can also be interpreted literally, as the Poverty output reflects a score, indicating that a lower poverty value corresponds with an individual's income being expected to decrease in the following year, and become closer to their unique poverty threshold. In this sense, as an individual submits a value of 1 for Diffrem or Diffcare, their poverty score is expected to decrease, signifying an indirect relationship. The regression output table is displayed in the chart on the following page, consisting of the variable names, their corresponding coefficients, the R-squared values, F statistic values, and number of observations for each sample year.

TABLE 3.1: REGRESSION OUTPUT²

Sample Year	2015	2016	2017	2018	2019	2020
Independent variables	Coefficients					
Sex	4.26	4.50	4.28	3.39	3.50	2.31
Age	0.86	0.77	0.73	0.72	0.72	0.56
Race	-3.03	-3.22	-2.74	-2.32	-1.95	-2.67
Educ	14.59	13.94	13.57	13.47	13.27	12.48
Empstat	-14.99	-15.40	-15.69	-16.40	-14.76	-14.54
Inctotscale ³	0.78	0.74	0.72	0.65	0.61	0.61
Diffrem	-38.02	-39.08	-38.54	-43.73	-43.92	-45.79
DiffCare	-21.50	-20.91	-20.96	-24.75	-23.52	-25.12
R-Squared	0.27	0.26	0.26	0.25	0.24	0.24
F-stat	0.00	0.00	0.00	0.00	0.00	0.00
Number of observations	610,241	612,820	614,082	613,269	616,127	550,747

² Although these are the predicted variables that play a role in determining Poverty, only two relationships will be explored further, Diffrem and Diffcare. These are the dummy variables that signify cognitive difficulty and mental health conditions.

³ Inctotscale is a generated variable from the original variable, Inctot, which was scaled by 1,000 in order to match the scale of the rest of the data.

Both of the variables that are being focused on in depth, Diffrem and Diffcare, are found to be statistically significant at the 99% confidence level, because their corresponding p-values equal 0. For each year's regression, the R-squared values reveal that only a low percentage of the variability within the model is explained by the variability in the independent variables. I assume there will be an increase in each R-squared value as more related variables are added to the model that would have predictive power.

Using a range of years in this specific experiment is critical to create a sample that reflects a non-biased set of data that would be more representative of the entire population over decades. All the variables are held constant throughout each regression, yet one thing to be aware of is the presence of the COVID-19 pandemic in the year 2020. I expected the results from 2020 to contrast from the results of the other models the most dramatically, due to this occurrence. However, the regression output table does not reflect any outliers in the coefficients or any drastic changes in other aspects of the model. Nonetheless, there are minor differences between the sample years 2015 and 2020 that are worth noting. The pandemic had an effect on Poverty, as well as mental health throughout the world, and it is reflected in the regression results for the year 2020. The finding that displays this most clearly is reflected by the coefficients of Diffrem and Diffcare. In the 2015 data set, the coefficient for Diffrem equals -38.02, and for 2020 it equals -49.79. The interpretation of this result indicates that someone who is diagnosed with cognitive difficulty will receive a lower poverty score, meaning that their income for that year is closer to the poverty threshold that is unique for their particular living situation. As a coefficient becomes more negative, it generates a smaller poverty score. It is possible that the reason why the coefficient for Diffrem decreased from 2015 to 2020 is due to the existence of COVID-19.

As for Diffcare, the coefficient also becomes more negative over the six year timeline, beginning in 2015, the coefficient equals -21.50, and ending in 2020, the coefficient equals -25.12. The Diffcare interpretation remains consistent with that of Diffrem.

The primary findings of each regression model are as follows: Throughout the six years of data collected, the number of observations range from 550,747 to 616,127. In the regressions for each year, the coefficients of Diffrem and Diffcare are consistently negative, signifying a direct relationship between each explanatory variable and poverty, which leads me to fail to reject the null hypothesis of my research. Another finding displayed in the regression analysis is that all of the independent variables are proven to be statistically significant at the 99% confidence level, according to each of their P-values. In general, the R-squared values in each sample year range from 0.24-0.27, which reflects a lack of explained variability in the dependent variable by the independent variables, and, moreover, the F statistic in each regression is found to equal 0. This is a surprising and concerning result, because the F statistic displays the sum of the predictive power for all of the independent variables. Although each of the independent variables reflects an extreme level of statistical significance, the value for the F statistic could be a sign demonstrating that jointly, the variables are not statistically significant. This is concerning in terms of the validity of the model, because it reflects little to no predictive power. However, it is a favorable result that each R-squared value reveals a number greater than 0.

After analyzing these results, it is important to check for heteroskedasticity in the model. Heteroskedasticity occurs when there is a lack of constant variance among the residuals. This makes the model less dependable, and is typically caused by a presence of outliers in the data, or in rare cases, due to omitted variable bias, which could be the issue that this model reflects. One

way to test for heteroskedasticity is to generate the Breusch-Pagan test in Stata. In this instance, the null hypothesis is that there is constant variance among the residuals. Unfortunately, I found that in each sample year's regression model, heteroskedasticity is present due to the p-value, which corresponds to the Chi-Square test statistic being less than 0.05. This leads me to reject the null hypothesis and conclude that heteroskedasticity is present in each model. The presence of the issue means that the standard errors shown on the output table of the regression are unreliable, so it is necessary to correct for it. The solution presented is adding robust standard errors to the regression. The reason for incorporating this into the model is to obtain unbiased standard errors and correct for the heteroskedasticity that is present in each year.

CHAPTER 4: CASE STUDY (SPAIN)

During a personal experience studying abroad in Seville, Spain, for nearly five months, I noticed that there appeared to be a significant difference between the prevalence of mental health in Spain as compared to the United States, as well as the stigmas surrounding each topic. By experiencing the culture first hand, I found that neither mental health nor poverty had ever come up in conversation with native Spaniards. I lived in a local homestay for over four months, in which we talked daily about life and problems that the family I lived with encountered. Due to the fact I am not a fluent Spanish speaker, there may have been nuances to the conversation that I did not understand. This led me to begin thinking about whether or not Spain struggled with poverty issues as intense as the United States does. It appeared to me that most local citizens in Seville existed within the same socio-economic status: middle class. There were rarely any sightings of homeless or unemployed people, and there was not an obvious gap between the middle and upper economic and social classes. After noticing this difference, whether it be causality or coincidence, I also noted that there was a miniscule amount of conversation around mental illness. Although I was only privy to a sample of the population of Spain, this was my main takeaway from the city of Seville, and the topics of conversation of the native population.

During my time in a Communications class at the University of Pablo Olavide in Seville, I partook in many discussions comparing and contrasting the United States and Spain, specifically conversing about topics surrounding social and cultural norms. The class consisted of both American students and Spanish students, which cultivated unbiased discussions

containing multiple perspectives on both countries. One major difference between the countries that our class concluded was that in Spain, it is typical that people “work to live,” whereas, in the United States, we tend to “live to work.” This contrast is apparent in everyday life, in simple cultural practices such as a Siesta, which is a critical part of Spanish culture. A Siesta essentially prioritizes mental and physical rest, by taking a break from afternoon work each day of the work week, between the hours of 2pm and 4pm, in order to spend time with family and relax; hence, “work to live.” Siestas are a universal practice throughout Spain, which reflect how they construct their culture in a way that attempts to keep mental health in a positive light, minimizing anxiety, stress, and any other mental conditions that might accrue throughout a person's life.

According to recent data collected on both countries by Worlddata.info, on a scale from 0 (bad) to 100 (very good), consisting of different subcategories under the category “quality of life,” Spain currently received a value of 87. In this same category, the United States only received a value of 71. This numeric difference in measuring the quality of life in Spain, as compared to the United States, was reflected in my anecdotal experience. The results were surprising because the average income of Spain in 2020, when the currency is converted to USD, was approximately \$29,000, yet the average income in the United States more than doubled that statistic in the same year, reaching approximately \$72,000 (Statista, 2021). Although the cost of living in the United States is known to be significantly higher than most countries, these statistics reflect the possibility of poverty in Spain when taking the average income into account.

After reflecting in depth on my observations thus far, it piqued my interest to inquire about the similarities and differences between the stigma surrounding mental health in both countries, and a possible relationship with Poverty. Although many times mental illness is unable

to be seen from an outsider's perspective, it appeared to me that it is not as prevalent in Spain as it is in the United States, due to the lack of conversation surrounding mental illness. An interesting finding by Parks (2022) is that one in ten citizens in Spain over the age of 15 were diagnosed with a mental health problem in 2022, while one in five Americans living in the United States are likely to experience a mental illness within a given year (cdc.gov, 2021). A major difference between the two countries' policies with mental illness is that if a person works and lives inside the country of Spain, they automatically receive access to free state healthcare, which includes mental health services. This could be a possible reason why the issue of mental illness is not commonly talked about or brought to the public's attention.

After Navarro-Mateu et. al (2015) conducted research on the prevalence of mental disorders in a portion of Spain during the years of 2010-2012, a critical finding was that during the economic crisis, which many European countries experienced beginning in 2007, mental disorders in the adult population in Spain were significantly more prevalent than in previous years. Furthermore, it was found that the prevalence was associated with stressors that stemmed from the economic crisis. Spain was recorded to be one of the countries most dramatically affected by the economic crisis, where the unemployment rate increased from eight percent in 2007 to over 24% in 2014; this rate was the second highest in Western Europe. Therefore, the researchers discovered a clear and direct relationship between economic instability and mental health issues.

Observing the populations of each country is necessary when dealing with statistical comparisons, in order to be as accurate as possible. The population of Spain in 2015 was approximately 46.4 million, and the population of the United States was 320.7 million, which is,

on average, 6.4 million inhabitants per state. The population size of Spain is comparable to relatively only 7.2 American states combined. In 2015, the poverty rate in Spain was 3.2% , which was a 0.3% increase from the previous year (Macrotrends, 2023). Out of the 46.4 million inhabitants of Spain, over one million individuals fell within the poverty threshold. According to the United States Census from 2015, the poverty rate reached over 13% that year, which totaled 43.1 million impoverished people (Proctor, 2021). However, it is possible that the reason why these statistics are dramatically different is due to the varying poverty thresholds within each country.

Olivia-Moreno et al. (2008) estimated the direct medical and non-medical costs, and the loss of labor productivity caused by mental illness in Spain in 2002. Furthermore, the authors emphasized the socioeconomic effects that mental illness can have on a country. Underlying mental disorders that the authors discussed are depression, bipolar disorder and schizophrenia. They also discussed that the vast majority of the causes of suicides are related to these disorders. The research for this study found that nearly 15,000 deaths were due to mental illness in Spain in 2002, which ultimately resulted in economic costs of more than 500 million euros due to premature death. Mental illness related social costs in Spain totaled more than seven billion euros that same year, and over 42% of the total costs to the economy were due to loss of labor productivity. Factoring in all of their findings, it was apparent that mental illness had an effect on the Spanish economy in 2002, specifically relating to loss of labor productivity, which can ultimately stunt the GDP or economic output of the country, reflecting low labor productivity, further causing an increase in poverty.

Cristiano Codagnone et al. (2020) examines the economic consequences of COVID-19

and mental health problems associated with economic vulnerability and negative economic shock in Spain. In the discussion portion of the scholarly journal, the authors found that, “economic vulnerability is associated with a strong risk of stress and worsening mental health” (Codagnone et al., 2020). The authors analyzed the results of the hypothesized relationships, stating that the consequences of economic downturn may be much worse in developing countries than in countries considered to be developed. It was estimated that over 42% of the population is at risk of stress and poor mental health, due to the negative shocks and economic vulnerability that they were facing during the time period of COVID-19. One thing to note that is significant about this research is that the authors acknowledge that a main limitation of this study and measuring mental health is the fact that respondents self-report. Self-reported levels of mental health conditions are not the most accurate or reliable way to track the data of the observations in the sample, and the questions that were selected to give out to the participants in their respective countries did not represent medical data, due to the nature of the qualitative and subjective questions of a self report. Along with this limitation, another downfall of the research is their methodology to track these participants over time. The random sample was restricted to ages 18-75, excluding the age group 16-18, which is a large range of teenagers that could also be struggling with mental health problems but were not able to participate in this study. In this sense, the age limit does not provide accurate data to be analyzed, and the sample appears biased and not representative of the entirety of the population.

Crespo (2008) offers reflections on the negative stigma surrounding mental illness in Spain, and how it not only has an effect on individuals with severe mental illness, but also on society. Along with this stigma, an individual with a diagnosed mental illness can experience

social and economic effects of their condition, such as a loss of opportunities resulting from prejudices and stereotypes. Taking another approach, Alonso et al. (2016) found that in Spain, cognitive impairment was discovered to be more frequent among women than men, and it increases exponentially with age. This is supported in a graphic outlining the global prevalence of mental illness in men and women based on age, where it is clear that in 2020, women reflected a more drastic increase in the prevalence and burden of mental disorders (TheLancet, 2021). Overall, it is clear to me after using research to expand upon my observations, that citizens of Spain suffer from poverty and mental health issues similar to those in the United States; however, it is not as apparent at the conversational level. This could be due to a higher prevalence in Spain of stigmas surrounding mental illness, poverty, or because of the social norms and cultural expectations of the policies that Spaniards abide by, to minimize the effects of these issues on society from an outsider's perspective. Overall, it was most interesting to me that issues of mental illness and poverty are almost invisible, which is an immense difference between cultures, which is visible through the Spanish “work to live” mentality, and the omitted conversational topics.

CHAPTER 5: CONCLUSION

My hypothesis, that cognitive difficulty and mental health conditions will be statistically significant to some extent, as they relate to poverty, whether that be at the 90% confidence level, 95%, or 99%, is supported. Both demographic variables were statistically significant at the 99% confidence level due to their P-values, for all of the sample years presented. This is a critical finding of my research because these significant variables prove that they are accurate predictors of the dependent variable in the model, Poverty. Among the selected variables, only two were expanded upon in more depth: Diffrem, which represents a cognitive difficulty, and Diffcare, which represents a mental health condition. The relationships were reflected by the negative coefficients of these variables on the regression output table. Negative coefficients offer the interpretation that someone who suffered from a cognitive difficulty or a mental health condition, within the respective year, will receive a smaller poverty score. After discovering on IPUMS that each person in the sample is given a unique poverty threshold that reflects their particular living situation, smaller poverty scores signify that the individual's income for that year is closer to their personalized poverty threshold. This result is exactly as I predicted in my hypothesis of the model, and it is confirmed by the regression output. This leads me to fail to reject the null hypothesis.

After testing for heteroskedasticity in the model using the Breusch-Pagan test, the presence of an inconsistent variance among the residuals led me to reject the null hypothesis and conclude that heteroskedasticity is present in each year of the model. Heteroskedasticity makes the model less dependable, and it typically occurs due to the presence of outliers, or most likely

in this case, omitted variables. It is possible that this model reflects omitted variable bias, such as other demographic variables that could be accurate predictors of poverty, but were left out of the regression due to restrictions. However, this issue is corrected by incorporating robust standard errors into each regression for the years represented.

In summary, incorporating the case study about Spain and the possibility of similar relationships between variables existing in a foreign country was very enlightening. At first glance, and living there for nearly five months, it appeared to me that there was little or no discussion surrounding the topics of mental health and poverty. However, after compiling a list of literary works that went in depth into each aspect of these topics, this paper presented the finding that there is, in fact, a similar relationship between demographics and poverty in Spain, as in the United States. Although it is hard to decipher the extent to which those relationships are prevalent, due to a limitation on data, the literature was able to reflect a sufficient amount of information that proves there is a direct relationship between cognitive difficulty, mental health, and poverty.

Limitations

Due to the collection of data from IPUMS, this sample of United States citizens is not representative of the entire population of the country. The data on the individuals is extracted from surveys, which is why the sample size for each year only ranges from about 550,000-617,000 observations. IPUMS lacks clarity on how it discovers whether or not an individual has a cognitive impairment or mental health condition, which leads me to assume that there may be forms of self-reporting on the surveys. With that said, relating back to the research

conducted by Cristiano Codagnone et al. (2020), self-reporting is not the most accurate or reliable source of data. In this context specifically, if a condition is not diagnosed, yet the individual identifies as having a condition, it can skew the data. Another major limitation of this model is the low R-squared values for each year's regression, which can be caused by omitted variable bias. There are many other demographic variables that most likely have an effect on poverty, yet this model only reflects a few of those predictive demographics, due to time constraints. In a further study, expanding upon the list of variables in order to increase the R-squared and create a more predictive model would be interesting to analyze. Relationships between variables, such as those displayed in this research, are not always linear, yet this model is only able to analyze a potential linear relationship. Lastly, it is important to note that correlation does not always imply causation, meaning that we cannot assume that these demographics cause someone to receive an income associated with their unique poverty threshold, but only that there is a clear correlation between the independent variables and poverty.

For a follow-up study, one aspect of the model that would be interesting to expand upon is the presence of COVID-19, and how the pandemic could have had an effect on mental illness and poverty all over the world, not only the two countries that this paper focused on. On IPUMS, there is a section of variables that suggests the use of experimental weights to correct for the effects of COVID-19 on the year 2020, which would be simple and interesting to account for in future research. Another aspect of this study that lacks depth comes from the results of the case study. I think it would be fascinating to look into why Spain has different stigmas surrounding mental health and poverty, and what that may look like for generating policies by the Spanish

government. The Spanish government, along with many other countries' governments, declares that citizens receive free state healthcare and mental health services if they live and work within the country. This policy is a major contrast from policies in the United States, and perhaps could be a reason for such differences in social topics and public conversation. Spain operates in a mixed capitalist economy, and going into further research surrounding the types of governments and economies that both countries practice would reflect greater clarity between the relationships surrounding mental health and poverty. While the rich may be getting richer, the poor may be getting mentally ill.

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Once a gator, always a gator!