

The Paradoxical Nature of Optimism, Resilience, and Health Anxiety in Relation to COVID-19

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Abstract

The COVID-19 pandemic has changed the lives of individuals across the globe. As physical health was the main concern of experts, a mental health crisis has become apparent within the United States. Previous research has shown a drastic increase of anxiety when it comes to health, contagion, accessing healthcare, and in general. The question is how the paradoxical nature of resilience and optimism interacts with health anxiety within individuals from the United States in the context of the COVID-19 pandemic. A total of 160 participants were analyzed through crosstabulation to discover the paradoxical nature of the highlighted concepts through empirical data. Results indicated the existence of paradoxical nature between optimism, resilience, and health anxiety then with post-behaviors, xenophobia, and COVID-19 beliefs. The finding of this research study would be beneficial to those in the psychopathology and healthcare fields, patients, and family of those who are struggling with anxiety in relation to COVID-19 by providing support and tailoring a treatment plan.

Keywords: optimism, resilience, health anxiety, paradox, COVID-19

Current Research

The World Health Organization announced the world was under the surge of the COVID-19 pandemic on March 11th, 2020, that has continued up to this point in time claiming millions of lives (World Health Organization, 2020). Lockdown orders, mask mandates, and vaccine mandates have been implemented to promote public health and safety of individuals by experts across numerous countries. However, over the course of the COVID-19 pandemic, there have been growing concerns about mental health, especially for college students, in the United States with an increase of depression and anxiety. 71% of students reported increased anxiety and stress due to the COVID-19 pandemic with multiple comorbid stressors causing these spikes such as fear for the health of themselves and family (Son et al., 2020).

Experts and programs have been incredibly focused on physical health causing researchers and health professionals to neglect COVID-19's impact on mental health and further develop into a grave risk (Son et al., 2020). A prime factor of concern is the fear of contagion by those with whom one interacts, susceptibility (Yang et al., 2021). A positive correlation between stress and the pandemic along with a negative correlation between the pandemic and psychological and physical health has been discovered. Von Sommaruga Howard (2021) vocalized the feelings of great fear verging into terror in relation to COVID-19 which is relatable to individuals across the United States.

Due to the recency of the COVID-19 pandemic, there is a great need for research upon health anxiety affected by the paradoxical nature of resilience and optimism in context of the initiation of the COVID-19 pandemic and longitudinally. The purpose of this current study is to contribute to the literature gap between optimism, resilience, and health anxiety. The additional

variables of COVID-19 beliefs, post-behaviors, and xenophobia could give insight into an explanation of the paradoxes. Understanding these paradoxes could give researchers and medical professionals insight into the background of mental health implications at the root of the pandemic and how to approach those who have experienced associated distress.

Resilience is the process of successfully adapting mentally, emotionally, and behaviorally to difficult traumatic experiences throughout life. (American Psychological Association). Angle (2016) also defines resilience to be an individual's ability to return to pre-traumatic functioning after a traumatic event (Angle, 2016). While previous literature has mainly revealed the benefits of resiliency upon mental health, an individual can create an illusion they have become more resilient, while they have not (Amundsen, 2012). Research has shown that there is a dark side to resilience which is conceptualized through the resilience paradox (Bonanno, 2021). Researchers apply the levels of certain variables (i.e., resilience and optimism) in a binary approach; however, that is not how it is practically applied in everyday life. In actuality, it can be at an individual's disadvantage to either be too resilient or lack resilience, which creates the paradox. When an individual is too resilient, they can become overconfident, maladaptive, too tolerant of adversity, induce "false hope syndrome", and optimistic to an unhealthy degree (Chamorro-Premuzic & Lusk, 2017). However, it can be dangerous if a person lacks resilience which can lead to adverse mental health conditions and learned helplessness (Bonanno, 2021). It is also important to note that once an individual reaches a certain point for their level of resilience, they can plateau demonstrating no true growth possible.

Optimism can be defined as the positive attitude that good things will occur and an individual's aims will be fulfilled (American Psychological Association). Hopefulness is heavily associated with optimism along with no correlation to the absences of pessimism. Surprisingly,

research has discovered that the lack of pessimism is correlated with better health rather than the presence of optimism (Scheier et al., 2021). An optimism paradox has been discovered through previous research, where too much optimism or too little optimism is detrimental to a person, while a medial level is ideal. When optimism is too high, an individual could possess impractical expectations and overconfidence which blocks clear judgement that results in poor outcomes (Chamorro-Premuzic & Lusk, 2017). A connection between resilience and optimism can be seen when an individual possesses high resilience that could lead to an unhealthy [high] amount of optimism creating a vicious cycle of disadvantages for the effected individual.

In general, anxiety is excessive worrying with at least three of the following symptoms: restlessness, easily fatigued, irritability, muscle tension, difficulty with concentration, and disturbance of sleep (SAMHSA, 2016). A variety of events and activities can trigger anxiety. Within this study, health anxiety will be examined. Health anxiety is defined as the degree of being prone to feeling anxious in relation to the individual's health and wellbeing specifically (American Psychological Association). The misinterpretation of symptoms and hypochondriasis are related to this particular type of anxiety. The pre-existing research is inspiring to look further into how paradoxical relationships affect health anxiety in the context of the COVID-19 pandemic.

In order to investigate the paradoxical nature of resiliency, optimism, and anxiety, the current study focuses on the three additional variables of xenophobia, COVID beliefs, and precautionary behaviors. Xenophobia is defined as hostile attitudes towards those of other ethnicities or nationalities (American Psychological Association). In the present study, the xenophobia against those of Chinese descent will be examined. Discrimination must not be confused with xenophobia. For discrimination is the differential treatment towards those of a

different ethnicity, nationality, or religion that manifests itself through prejudice (American Psychological Association). Rhodes et al. (2022) discovered xenophobia predicts both state anxiety and health anxiety as significant predictors but not trait anxiety; while discrimination was significantly predicted by health anxiety but not state anxiety and trait anxiety.

Within this research study, the participants' perception of severity of the coronavirus will also be examined to understand the role health anxiety plays in their post-behavior and COVID-19 beliefs. Previous research has interestingly indicated a difference between the measures of perceived susceptibility and severity in those with psychiatric disorders (i.e., anxiety) and concluded that the perceived susceptibility, not severity made a difference in their behavior (Imai & Furukawa, 2021).

The current study strives to fill in the gaps of psychopathological research to discover the effects of anxiety plays within the population of individuals in the United States regarding the paradoxical nature of optimism and resilience during the COVID-19 pandemic. There is no research with the combination of words as follows: (1) “resilience, anxiety, optimism, paradox” and (2) “resilience, anxiety, optimism, paradox, COVID-19”. The importance of investigating the paradoxical influence between the three concepts of anxiety, resilience, and optimism is to provide insight to psychopathological experts on the connections in the context of the COVID-19 pandemic. Being able to understand the paradoxical nature will allow those in academia to identify the optimal level a person should possess for each variable. Also, due to the recent political and social climate within the past three years, it is important to examine xenophobia in the United States.

Purposes, Aims, & Hypotheses

Introduction

Due to the COVID-19 pandemic, there have been a number of aspects of individuals' lives that have been affected positively, negatively, or not at all. In this thesis project, the paradoxical nature of various variables, which may have been affected by the pandemic, were examined through the analysis of previously collected data of a longitudinal study, *Reactions to COVID-19*, from March 2020 and April 2020. The selected variables that were investigated are optimism, resilience, health anxiety, post-behaviors, the COVID-19 beliefs, and xenophobia.

Purposes and Aims

1. To investigate if the paradoxical nature of optimism, resilience, and health anxiety would be observed within the interaction between each other in context of the COVID-19 pandemic.
2. To investigate the extent which post-behaviors, COVID-19 beliefs, and xenophobia reflects paradoxical interactions with optimism, resilience, and health anxiety within the recent social climate of the United States.

Hypotheses

1. Less than fifty percent of the sample will demonstrate the paradoxical nature of optimism, resilience, and health anxiety in relation to each other; however, resilience and health anxiety will demonstrate over fifty percent of paradoxical nature.
2. Over fifty percent of the sample will demonstrate the paradoxical nature of optimism in relation to the levels of the post-behaviors, xenophobia, and COVID-19 Inventory.
3. Over fifty percent of the sample will demonstrate the paradoxical nature of resilience in relation to the levels of post-behaviors, xenophobia, and COVID-19 Inventory.

4. Over fifty percent of participants will demonstrate the paradoxical nature of health anxiety in relation to post-behaviors and COVID-19 Inventory; however, only about twenty-five percent of participant will demonstrate paradoxical nature between healthy anxiety and xenophobia.

Methodology

Participants

Participants were recruited for the *Reactions to COVID-19* study. The study sent out two surveys to collect data on various variables on March 30th, 2020, and April 27th, 2020. The purpose of this two-time longitudinal study is to examine the public relations to the COVID-19 pandemic including emotional, behavioral, physical, and cognitive reactions. Written informed consent was obtained from all participants. Participant requirements were 18 years and older, fluent in English, lived at least part time in Michigan as of March 3rd, 2020, and have internet access with a valid email.

A total of 603 participants were recruited in the initial Time 1 survey on March 30th, 2020. Within this current study, Time 2 will not be included in the data analysis. After filtering the invalid surveys, 160 valid participants remained. These initial participants involved 95 males and 61 females from 19-years-old to 71-years-old ($M = 30.18$, $SD = 10.66$); race of 81.3% White, 3.1% Asian, 7.5% Black, and so on; and political affiliation of 23.1% republican, 40% democrat, and 27.5% independent. Participants were asked whether they normally receive an annual flu shot. Results indicated with the majority stating “yes” at 63.1% and 36.9% for “no”. On March 23, 2020, Governor Whitmer implemented an executive order to dictate which jobs were “essential”. Participants were about evenly split with 47.8% yes, 49.7% no, and 2.5% unsure.

Measurements

Demographics. The demographics assessed were age, class-standing, highest education level, gender, political affiliation, and race. Information was collected relating to the participant's views on vaccinations. The items included "Do you normally get a flu shot every year?", "Did you get the 2019/2020 flu shot?", and "If a vaccination for COVID-19 became available, would you get it?". Information including participants' travel habits and where they obtain information about COVID-2019 during the pandemic.

Optimism. Optimism was measured on the Revised Life Orientation Test (Scheier et al., 1994) by ten items on a 5-point Likert scale from "Strongly Disagree" to "Strongly Agree". Participants had to select the degree to which they agree or disagree to items such as "In uncertain times, I usually expect the best". Cronbach's alpha for the current study was 0.585. There were three items recoded to reverse the scoring points. The recoded items are as follows: "If something can go wrong for me, it will", "I hardly ever expect things to go my way", and "I rarely count on good things happening to me".

Resilience. Resilience was measured by five items on a 5-point Likert scale from "Strongly Disagree" to "Strongly Agree" created by the researchers. Items included states such as "I tend to bounce back quickly after hard times". Cronbach's alpha for the current study was 0.431. There were two items recoded to reverse the scoring points. The recoded items are as follows: "I have a hard time making it through stressful events" and "It is hard of me to snap back when something bad happens".

Health Anxiety. Health anxiety was prompted by "In respect to the COVID-19 pandemic" and measured through a 16-item scale on a 5-point Likert Scale from "Definitely yes" to

“Definitely not”. An example item would be “Do you ask your doctor to do medical tests in order to be sure” even if the doctor is not otherwise inclined to order such tests. Cronbach’s alpha for the current study was 0.917.

Post-behaviors. The post-behaviors were precautionary behaviors that an individual exhibited in everyday life during the outbreak of Covid-19. Behaviors included those such as ‘Avoid large crowds’ or ‘Spent time watching/reading the news’. The nine items were ranked on a four-point Likert scale of 1=Never to 4=Often. Cronbach’s alpha for the current study was 0.575. There were two items recoded to reverse the scoring points. The recoded items are as follows: “Drink alcohol” and “Use drugs”.

COVID-19 Inventory. The COVID-19 Inventory questionnaire gave insight into the individual’s beliefs relating to the coronavirus. An example question is “To what extent are you concerned about COVID-19?” where they would have to select their belief on a five-point Likert scale of 1=Not at all to 5=A lot. Cronbach’s alpha for the current study was 0.786.

Xenophobia. The xenophobia scale was prompted by the following statement: “Imagine a peer made a series of statements about people from China. Rate how much you agree with each statement keeping in mind the current COVID-19 pandemic.” An example statement is “They abuse the health system and fill up our emergency rooms”. The measurement was seven items on a six-point Likert scale from 1= Strongly Disagree to 6= Prefer not to answer. Cronbach’s alpha for the current study was 0.554. There were three items recoded to reverse the scoring points. If the participant selected the Likert point 6=Prefer not to answer was selected, the input was recoded to be considered a missing value. The recoded items are as follows: “They enrich our society culturally”, “They are hard workers”, and “They help our economy grow”.

Results

Descriptive statistics

Descriptive statistics from Time 1 were analyzed with the appropriate filters to ensure the validity of the surveys. After summarizing descriptive statistics for each of the study variables, each hypothesis was tested accordingly. The statistical program, IBM SPSS, was used for data analysis.

Crosstabs analysis

The variables that were analyzed were optimism, resilience, health anxiety, post-behaviors, COVID-19 beliefs, and xenophobia. To examine paradoxical relations between the selected variables, each variable was formed into two groups of high and low. The mean score was obtained for each variable, which was used as the separating factor for the high and low groups (i.e., high optimism versus low optimism). Those who possessed a sum below the mean were categorized in the ‘low’ group, while those who possessed a higher sum were categorized in the ‘high’ group. There were 160 valid cases utilized in the series of analysis. However, if the individual possessed the mean value of the selected variable, they were excluded from the high or low groups. The means of the selected variables are shown in Table 1.

All hypotheses were tested by a crosstabs analysis to discover the relations between the variables along with chi-square tests for significance. The Cramer’s V was used to measure the strength of the association between the selected categorical variables. The results for crosstabulation analysis are presented in Tables 2 through Table 13. To confirm the validity of measurement items, an independent t-test was conducted. Confirmed all significant items for the

scales of optimism, resilience, health anxiety, xenophobia, COVID-19 beliefs, and post-behaviors.

Hypothesis 1 tested less than fifty percent of the sample that will demonstrate the paradoxical nature of optimism, resilience, and health anxiety in relation to each other; however, resilience and health anxiety will demonstrate over fifty percent of paradoxical nature. Hypothesis 2 tested for over fifty percent of the sample will demonstrate the paradoxical nature of optimism in relation to the levels of the post-behaviors, xenophobia, and COVID-19 Inventory. Hypothesis 3 tested for over fifty percent of the sample will demonstrate the paradoxical nature of resilience in relation to the levels of post-behaviors, xenophobia, and COVID-19 Inventory. Hypothesis 4 tested fifty percent of the paradoxical nature of health anxiety in relation to post-behaviors and COVID-19 Inventory; however, only about twenty-five percent of participant will demonstrate paradoxical nature between healthy anxiety and xenophobia. Although the percentage is small, the paradoxical nature will be seen despite the lack of previous empirical data.

Hypothesis 1

A significant relationship was discovered between optimism and resilience through crosstabulation and chi-square testing. High optimism and high resilience observed 47 participants which was 33.8% of the sample. High optimism and low resilience observed 37 participants, which was 26.6% of the sample. Low optimism and high resilience observed 20 participants, which was 14.4% of the sample. Low optimism and low resilience observed 35 participants, which was 25.2% of the sample. In sum, 40% of the sample displayed the paradoxical nature between optimism and resilience, because low-low and high-high indicates

non-paradoxical nature, whereas low-high and high-low indicates paradoxical nature. The chi-square test of independence demonstrated a significant association between optimism and resilience, $X^2 (1, N = 139) = 5.11, p = .02$. Cramer's V value of 0.19 with the approximate significance of 0.02.

Optimism and health anxiety observed a nearly expected count for each category. High optimism and high health anxiety observed 41 participants, which was 29.5% of the sample. High optimism and low health anxiety were observed 43, which was 30.9% of the sample. Low optimism and high health anxiety were observed by 30 participants, which was 21.6% of the sample. Low optimism and low health anxiety were observed by 25 participants, which was 18.0% of the sample. 47.5% of the sample population showed paradoxical nature. The chi-square test of independence showed that there was no significant association between optimism and health anxiety, $X^2 (1, N = 139) = .44, p = .51$. Cramer's V value of 0.06 with the approximate significance of 0.51.

Resilience and health anxiety did not obtain significant results from the crosstabulation and chi-square tests, since the counts were evenly distributed between groups. High health anxiety and high resilience observed 40 participants, which was 25% of the sample. High health anxiety and low resilience observed 39 participants, which was 24.4% of the sample. Low health anxiety and high resilience observed 32 participants, which was 20% of the sample. Low health anxiety and low resilience observed 49 participants, which was 30.6% of the sample. 55.6% of participants in the sample showed paradoxical nature. The chi-square test of independence showed that there was no significant associate between resilience and health anxiety, $X^2 (1, N = 160) = 2.0, p = .16$. Cramer's V value of 0.11 with the approximate significance of 0.16.

Hypothesis 2

Optimism and post-behavior did not demonstrate a significant relationship. High optimism and high post-behaviors observed 61 participants, which was 43.9% of the sample. High optimism and low post-behavior observed 23 participants, which was 16.5% of the sample. Low optimism and high post-behavior observed 40 participants, which was 28.8% of the sample. Low optimism and low post-behaviors observed 15 participants, which was 10.8% of the sample. 45.3% of the sample showed the characterized paradoxical nature. The chi-square test of independence did not demonstrate a significant association between optimism and post-behavior, $X^2 (1, N = 139) = .00, p = .99$. Cramer's V value of 0.001 with the approximate significance of 0.99.

No significant relationship was found between optimism and COVID-19 beliefs. High optimism and Strong COVID-19 beliefs observed 50 participants, which was 36% of the sample. High optimism and weak COVID-19 beliefs observed 34, which was 24.5% of the sample. Low optimism and strong COVID-19 beliefs observed 26 participants, which was 18.7% of the sample. Low optimism and weak COVID-19 observed 29 participants, which was 20.9% of the sample. 56.9% of the sample showed paradoxical nature between the two concepts. The chi-square test of independence demonstrated a significant association between optimism and COVID-19 beliefs, $X^2 (1, N = 139) = 2.01, p = .16$. Cramer's V value of 0.12 with the approximate significance of 0.16.

Optimism and xenophobia did not demonstrate a significant relationship through crosstabulation and chi-square tests. High optimism and high xenophobia observed 50 participants, which was 37.6% of the sample. High optimism and low xenophobia observed 30

participants, which was 22.6% of the sample. Low optimism and high xenophobia observed 27 participants, which was 20.3% of the sample. Low optimism and low xenophobia observed 26 participants, which was 19.5% of the sample. 57.1% showed paradoxical nature between optimism and xenophobia. The chi-square test of independence did not demonstrate a significant association between optimism and xenophobia, $X^2 (1, N = 133) = 1.75, p = .186$. Cramer's V value of 0.12 with the approximate significance of 0.19.

Hypothesis 3

High resilience and high post-behaviors observed 52 participants, which was 32.5% of the sample. High resilience and low post-behaviors observed 20 participants, which was 12.5% of the sample. Low resilience and high post-behaviors observed 61 participants, which was 38.1% of the sample. Low resilience and low post-behaviors observed 27 participants, which was 16.9% of the sample. 50.6% of the sample's population showed paradoxical nature. The chi-square test of independence did not demonstrate a significant association between resilience and post-behaviors, $X^2 (1, N = 160) = .16, p = .69$. Cramer's V value of 0.03 with the approximate significance of 0.69.

Through crosstabulation and chi-square testing, resilience and COVID-19 beliefs did not observe a significant relation. High resilience and Strong COVID-19 beliefs observed 34 participants, which was 21.3% of the sample. High resilience and weak COVID-19 beliefs observed 38 participants, which was 23.8% of the sample. Low resilience and strong COVID-19 beliefs observed 50 participants, which was 31.3% of the sample. Low resilience and weak COVID-19 observed 38 participants, which was 23.8% of the sample. 45.1% of the total sample population showed paradoxical nature between the concepts. The chi-square test of independence

did not demonstrate a significant association between resilience and COVID-19 beliefs, $X^2 (1, N = 160) = 1.46, p = .23$. Cramer's V value of 0.10 with the approximate significance of 0.28.

A strong significant relationship was demonstrated between resilience and xenophobia. High resilience and high xenophobia observed 56 participants, which was 36.6% of the sample. High resilience and low xenophobia observed 14 participants, which was 9.2% of the sample. Low resilience and high xenophobia observed 29 participants, which was 19.0% of the sample. Low resilience and low xenophobia observed 54 participants, which was 35.3% of the sample. 72.1% showed paradoxical nature between resilience and xenophobia. The chi-square test of independence demonstrated a significant association between resilience and xenophobia, $X^2 (1, N = 153) = 31.23, p = <.001$. Cramer's V value of 0.43 with the approximate significance of <.001.

Hypothesis 4

High health anxiety and high post-behaviors observed 43 participants, which was 26.9% of the sample. High health anxiety and low post-behaviors observed 36 participants, which was 22.5% of the sample. Low health anxiety and high post-behaviors observed 70 participants, which was 43.8% of the sample. Low health anxiety and low post-behaviors observed 11 participants, which was 6.9% of the sample. 66.3% of the sample population showed the paradoxical nature of conflicting behavior. The chi-square test of independence demonstrated the relation between health anxiety and post-behaviors with the significance of $X^2 (1, N = 160) = 19.72, p = <.001$. Cramer's V value of 0.35 with the approximate significance of <.001.

Through crosstabulation and chi-square testing, health anxiety and COVID-19 beliefs observed a significant relation. High health anxiety and Strong COVID-19 beliefs observed 30 participants, which was 18.8% of the sample. High health anxiety and weak COVID-19 beliefs

observed 49 participants, which was 30.6% of the sample. Low health anxiety and strong COVID-19 beliefs observed 54 participants, which was 33.6% of the sample. Low health anxiety and weak COVID-19 observed 27 participants, which was 16.9% of the sample. 64.2% of the sample population showed paradoxical nature of attitudes and behaviors. The chi-square test of independence demonstrated a significant association between health anxiety and COVID-19 beliefs, $X^2 (1, N = 160) = 13.20, p = .001$. Cramer's V value of 0.29 with the approximate significance of $<.001$.

Health anxiety and xenophobia demonstrated an extremely significant relationship through the crosstabulation test. High health anxiety and high xenophobia observed 60 participants, which was 39.2% of the sample. High health anxiety and low xenophobia observed 14 participants, which was 9.2% of the sample. Low health anxiety and high xenophobia observed 25. participants, which was 16.3% of the sample. Low health anxiety and low xenophobia observed 54 participants, which was 35.3% of the sample. 25.5% showed paradoxical nature between health anxiety and xenophobia. The chi-square test of independence demonstrated a significant association between health anxiety and COVID-19 beliefs, $X^2 (1, N = 153) = 37.82, p = <.001$. Cramer's V value of 0.50 with the approximate significance of $<.001$.

Discussion

To find the paradox through crosstabulation, the current study determined the inconsistencies between the selected concepts. An example would be if the high health anxiety group showed high post-behavior, it would follow the expected norm; yet if the high health anxiety group displayed low post-behavior, it would be paradoxical. Another situation would be if the high optimism group would believe they are unlikely to get COVID-19, so they would

show low levels post-behaviors or xenophobia as follow the expected trend. However, if the high optimism group demonstrated high levels of post-behaviors or xenophobia, it would be considered paradoxical in nature.

Hypothesis 1 was fully supported. The paradoxical nature between optimism and resilience along with optimism and health anxiety demonstrated less than fifty percent of the sample. Thirty-seven-point five percent of the sample demonstrated the paradoxical nature between optimism and resilience within the high optimism-low resilience and low optimism-high resilience groups. Forty-seven-point five percent of the sample demonstrated the paradoxical nature between optimism and health anxiety in the high optimism-high health anxiety and low optimism-low health anxiety groups. Resilience and health anxiety demonstrated over fifty percent of paradoxical nature with fifty-five-point six percent of the sample by the high resilience- high health anxiety and low resilience-low health anxiety groups. Each of these groupings demonstrate the inconsistency of attitudes which are considered paradoxical, since nature is against the expected norm.

Hypothesis 2 was partially supported. Optimism and post-behaviors demonstrated less than fifty percent with forty-five-point three percent between the groupings of high optimism-high post-behaviors and low optimism-low post-behaviors. Optimism and xenophobia along with optimism and COVID-19 Beliefs demonstrated over fifty percent of paradoxical nature within the sample. Optimism and xenophobia demonstrated fifty-six-point nine percent paradoxical nature in total of the high optimism-high xenophobia and low optimism-low xenophobia groups. While optimism and COVID-19 beliefs demonstrated fifty-seven-point one percent paradoxical nature within the groups of high optimism-strong COVID-19 beliefs and low optimism-weak COVID-19 beliefs. When it comes to optimism, the high-high and low-low groupings

demonstrated the paradoxical nature of concepts in the range of fifty percent with variance of seven-point one percent.

Hypothesis 3 was fully supported. Resilience and post-behaviors, xenophobia, and COVID-19 Beliefs demonstrated paradoxical nature in more than fifty percent of the sample. Resilience and post-behaviors demonstrated fifty-point six percent within the groups of high resilience-low post-behaviors and low resilience-high post-behaviors. Resilience and xenophobia demonstrated fifty-five-point one percent paradoxical nature by the groups of high resilience-high xenophobia and low resilience-low xenophobia. While resilience and COVID-19 beliefs demonstrated forty-five-point one percent paradoxical nature in the groupings of high resilience-strong COVID-19 beliefs and low resilience-weak COVID-19 beliefs. The pair of high resilience and weak COVID-19 beliefs could also not be considered truly paradoxical in nature when accounting for other potential operant definitions of paradox. The illusion of resilience, false hope syndrome, and overconfidence could have factored into the relation between these concepts (Boehm-Tabib & Gelkpof, 2021; Chamorro-Premuzic & Lusk, 2017).

Hypothesis 4 was fully supported. Health anxiety with post-behaviors and xenophobia, demonstrated more than fifty percent, while health anxiety and COVID-19 beliefs demonstrated about twenty-five percent. Health anxiety and post-behaviors demonstrated sixty-six-point three percent of paradoxical nature between the groups of high health anxiety-low post-behaviors and low health anxiety-high post-behaviors. Health anxiety and COVID-19 beliefs demonstrated sixty-four-point two percent paradoxical nature within the groupings of high health anxiety-weak COVID-19 beliefs and low health anxiety-strong COVID-19 beliefs. While health anxiety and xenophobia demonstrated twenty-five-point five percent paradoxical nature between the high health anxiety-low xenophobia and low health anxiety-high xenophobia groups. Even though the

percentage of paradoxical nature is small between health anxiety and xenophobia, the empirical data proves the existence of the concerning inconsistency of attitudes and behaviors.

The Merriam-Webster definition of paradox was used to formulate the operant definition of paradoxical nature along with previous research. Paradoxical nature is the contradictory statements, behaviors, qualities, or phases an individual can demonstrate (Merriam-Webster) or the inconsistencies of behavior and attitudes. This definition can limit those categorized within the determined 'paradox' groups as discussed previously. Each case also must be considered due to the potential confounding variables such as personality characteristics, personality disorders, and coping mechanisms which were not collected within the *Reactions to COVID-19* study.

Various fields have conducted research upon paradoxical nature; however, other methodologies were used that produced qualitative results rather than quantitative. Methodologies included narratives, interviews, literature reviews, and reflections upon observed behaviors and words of participants. Within this current study, empirical data was utilized to strive for the usage of quantitative data to demonstrate and prove the existence of the paradoxical nature between various concepts.

Another potential limitation would be in relation to the concept of the Simpson's Paradox equation, which addresses the association between two variables in a population that can either emerge, disappear, or reverse when subgroups are created (Sprenger & Weinberger, 2021). For example, a variable could present itself as independent when divided into subgroups; however, when two variables are compared in the general population, they could exhibit a negative or positive relationship. The association may have been skewed after the classification into 'high' and 'low' groups. To limit the implications of Simpson's Paradox, the dividing factor of groups

was the calculated mean for each variable. However, the examination of paradoxes, this methodology has great implications due to the reliance on probabilities within the current study by 2x2 contingency tables with the 4-dimensional vector. The current study strived to find correlation rather than casual, which made the paradoxical nature able to be observed.

Limitations are particularly drawn from the nature of the study due to the online survey. With online surveys, there is a great chance of spam surveys which significantly increase the number of invalid surveys. The original data collection had 603 surveys in Time 1; however, after validity sorting, 160 surveys were not invalid. Only 26.5% of the surveys from Time 1 were available for data analysis. Once the participants were divided based on the mean values of the selected variables, those who were of the mean value were excluded from the groups.

Racial diversity was another limitation for an overwhelming majority of participants were of white at 79.5% with 20.5% remaining for the other races (i.e., Asian). The second highest percentage was 7.8% of the sample being African American or Black. The study was also limited to those who lived at least part-time within Michigan by March 3rd, 2020. Gender, however, was relatively even between males and females with age distributed over a great range of 19 to 71 years old.

The timing of the study at Time 1 and Time 2 on March 30th, 2020, and April 27th, 2020, could have limited the significance of particular variables as well. Due to the recency of the pandemic at Time 1 and Time 2, different results could have been collected later especially for the variable of xenophobia. At California State University, the Center for the Study of Hate and Extremism (2021) released a study indicating a 149% surge in anti-Asian hate crimes despite a general decline of overall hate crime of 7% in 2020. Another survey could have been released at

a later date of 6-months, one year, and so on after the initiation of the COVID-19 pandemic. However, another limitation would be the attrition rate between the time frames which was apparent even in the Time 1 to Time 2 surveys.

Future directions could release a new round of surveys, since the pandemic started three years ago as of March 2023. Attitudes and responses could demonstrate a shift. The new study could even ask the participants about their beliefs at different points through the past three years. Additional measures could be added to collect data upon personality, narcissism, pessimism, and coping mechanisms. Specific groups could also be targeted such as those who have or have not had COVID-19 along with those who received the COVID-19 vaccination (i.e., vaccinated versus non-vaccinated).

The clinical implications will be beneficial to those within the healthcare field from the practitioners, patients, caregivers, and support system of the affected individuals. Healthcare professionals are more likely to associate anxiety as a symptom, thus negative to be controlled for; however, there are various types of anxiety that must be recognized as their own condition to fix the root of the issue. Treatment plans will be able to adapt to the individual's needs more effectively. The current study also suggests that just because an individual has high health anxiety does not mean that they will demonstrate xenophobia, concerns pertaining to COVID-19, or low resilience or optimism. Whether the percentage of people who display paradoxical nature is big or small, individuals should be aware of it. Awareness can bring about change within the field of psychopathology, healthcare, and the social climate of the United States.

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Biographical Note

Isabelle Teasel is a fourth-year undergraduate student at Oakland University. She is currently earning a bachelor's degree in psychology with a concentration in pre-medical along with a minor in Middle Eastern Studies: Arabic Language. She will be graduating in the Winter of 2023. Afterward, she will be continuing her education to obtain a Master of Science in Cardiovascular Perfusion. Once the degree is obtained, Isabelle will clinically practice along with furthering her involvement in the field of perfusion through administration, research, or education. Her current research is relevant as it deals with the psychopathology (i.e., anxiety), resilience, and optimism of individuals in response to the initiation of the COVID-19 pandemic. Patients continue to struggle from the psychopathological and physical effects of the pandemic which could be a factor into predisposed or induced conditions and treatment plans.

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Appendix

Table 1.

Mean and SD of the Study Variables

	Min	Max	Mean	Std. Deviation
Xenophobia	2.00	5.00	3.43	.66
Resilience	1.60	4.80	3.23	.58
Optimism	1.50	4.60	3.30	.50
Post behaviors	1.50	4.00	2.65	.53
COVID-19 Belief	1.91	4.90	3.47	.61
Health Anxiety	1.06	4.63	2.92	.75

Table 2.

Crosstabulation of Optimism and Resilience

			Resilience Groups	
			Low Resilience	High Resilience
Optimism Groups	Low Optimism	Count	35	20
		% of Total	25.2%	14.4%
		Standardized Residual	1.2	-1.3
	High Optimism	Count	37	47
		% of Total	26.6%	33.8%
		Standardized Residual	-1.0	1.0
Total	Count		72	67
	% of Total		51.8%	48.2%

Table 3.

Crosstabulation of Optimism and Health Anxiety

			Optimism Groups	
			Low Optimism	High Optimism
Health Anxiety Groups	Low Health Anxiety	Count	25	43
		Expected Count	26.9	41.1
		% of Total	18.0%	30.9%
		Standardized Residual	-.4	.3
	High Health Anxiety	Count	30	41
		Expected Count	28.1	42.9
		% of Total	21.6%	29.5%
		Standardized Residual	.4	-.3
Total	Count		55	84
	% of Total		39.6%	60.4%

Table 4.

Crosstabulation of Resilience and Health Anxiety

			Resilience Groups	
			Low Resilience	High Resilience
Health Anxiety Groups	Low Health Anxiety	Count	49	32
		Expected Count	44.6	36.4
		% of Total	30.6%	20.0%
		Standardized Residual	.7	-.7
	High Health Anxiety	Count	39	40
		Expected Count	43.5	35.6
		% of Total	24.4%	25.0%
		Standardized Residual	-.7	.7
Total	Count		88	72
	% of Total		55.0%	45.0%

Table 5.

Crosstabulation of Optimism and Post-Behavior

			Post-Behaviors Groups	
			Low Post-Behaviors	High Post-Behaviors
Optimism Groups	Low Optimism	Count	15	40
		% of Total	10.8%	28.8%
		Standardized Residual	.0	.0
	High Optimism	Count	23	61
		% of Total	16.5%	43.9%
		Standardized Residual	.0	.0
Total			Count	38
			% of Total	27.3%

Table 6.

Crosstabulation of Optimism and COVID-19 Beliefs

			COVID-19 Beliefs Groups	
			Weak COVID-19 Beliefs	Strong COVID-19 Beliefs
Optimism Groups	Low Optimism	Count	29	26
		% of Total	20.9%	18.7%
		Standardized Residual	.8	-.7
	High Optimism	Count	34	50
		% of Total	24.5%	36.0%
		Standardized Residual	-.7	.6
Total			Count	63
			% of Total	45.3%

Table 7.

Crosstabulation of Optimism and Xenophobia

			Xenophobia Groups	
			Low Xenophobia	High Xenophobia
Optimism Groups	Low Optimism	Count	26	27
		% of Total	19.5%	20.3%
		Standardized Residual	.8	-.7
	High Optimism	Count	30	50
		% of Total	22.6%	37.6%
		Standardized Residual	-.6	.5
Total	Count		56	77
	% of Total		42.1%	57.9%

Table 8.

Crosstabulation of Resilience and Post-behaviors

			Post-Behaviors Groups	
			Low Post- Behaviors	High Post- Behaviors
Resilience Groups	Low Resilience	Count	27	61
		% of Total	16.9%	38.1%
		Standardized Residual	.2	-.1
	High Resilience	Count	20	52
		% of Total	12.5%	32.5%
		Standardized Residual	-.3	.2
Total	Count		47	113
	% of Total		29.4%	70.6%

Table 9.

Crosstabulation of Resilience and COVID-19 Beliefs

		COVID-19 Beliefs Groups	
		Weak COVID-19 Beliefs	Strong COVID-19 Beliefs
Resilience Groups	Low Resilience	Count	38
		% of Total	23.8%
		Standardized Residual	-.6
	High Resilience	Count	34
		% of Total	21.3%
		Standardized Residual	-.6
Total	Count		76
	% of Total		47.5%

Table 10.

Crosstabulation of Resilience and Xenophobia

		Xenophobia Groups	
		Low Xenophobia	High Xenophobia
Resilience Groups	Low Resilience	Count	54
		Expected Count	36.9
		% of Total	35.3%
		Standardized Residual	2.8
	High Resilience	Count	56
		Expected Count	38.9
		% of Total	36.6%
		Standardized Residual	-3.1
Total	Count		68
	% of Total		44.4%

Table 11.

Crosstabulation of Health Anxiety and Post-behaviors

			Post-Behaviors Groups	
			Low Post-Behaviors	High Post-Behaviors
Health Anxiety Groups	Low Health Anxiety	Count	11	70
		Expected Count	23.8	57.2
		% of Total	6.9%	43.8%
		Standardized Residual	-2.6	1.7
	High Health Anxiety	Count	36	43
		Expected Count	23.2	55.8
		% of Total	22.5%	26.9%
		Standardized Residual	2.7	-1.7
Total	Count	47	113	
	% of Total	29.4%	70.6%	

Table 12.

Crosstabulation of Health Anxiety and COVID-19 Beliefs

			COVID-19 Beliefs Groups	
			Weak COVID-19 Beliefs	Strong COVID-19 Beliefs
Health	Low Health	Count	27	54
Anxiety	Anxiety	Expected Count	38.5	42.5
Groups		% of Total	16.9%	33.8%
		Standardized Residual	-1.8	1.8
	High Health	Count	49	30
	Anxiety	Expected Count	37.5	41.5
		% of Total	30.6%	18.8%
		Standardized Residual	1.9	-1.8
	Total	Count	76	84
		% of Total	47.5%	52.5%

Table 13.

Crosstabulation of Health Anxiety and Xenophobia

		Xenophobia Groups	
		Low Xenophobia	High Xenophobia
Health Anxiety Groups	Low Health Anxiety	Count	54
		Expected Count	35.1
		% of Total	35.3%
		Standardized Residual	3.2
	High Health Anxiety	Count	14
		Expected Count	32.9
		% of Total	9.2%
		Standardized Residual	-3.3
Total	Count		68
	% of Total		44.4%