

ABSTRACT

Title of Thesis: THE IMPACT OF THE COVID-19
PANDEMIC ON SOCIAL FUNCTIONING,
NEGATIVE AFFECT, AND PARANOID
IDEATION

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The COVID-19 pandemic has contributed to significant increases in mental health symptoms among the general population. Given greater levels of social isolation prior to the pandemic and an increased vulnerability to stress, those with psychosis spectrum disorders may be especially susceptible to the mental health impacts of the pandemic. Yet very few studies exploring the impact of the pandemic on social functioning and mental health have included individuals with psychosis spectrum disorders. Utilizing data gathered from a transdiagnostic sample of individuals spanning the spectrum of psychosis, the current study investigated the impact of the COVID-19 pandemic on perceptions of interpersonal relationships and symptomatology. Results indicated that perceived rejection and hostility were greater during COVID compared to pre-COVID levels and that average and high levels of negative COVID-related impacts helped to maintain levels of perceived hostility from pre-COVID levels. Analyses also found a relation

between the number of negative COVID-related impacts and lower social support, greater social distress, greater negative affect, and greater paranoid ideation during the pandemic. Contrary to expectations, symptoms during the pandemic were not predicted by social resources before the pandemic and paranoid ideation did not change compared to pre-COVID levels. However, persecutory paranoid ideation was related to more negative perceptions of the government's response to COVID. These findings demonstrate how the COVID-19 pandemic has impacted perceptions of social relationships and symptomatology among those with psychosis spectrum disorders and raise concerns that those high in paranoid ideation may be less willing to engage in government mandated protective health behaviors designed to limit the spread of COVID-19.

THE IMPACT OF THE COVID-19 PANDEMIC ON SOCIAL FUNCTIONING,
NEGATIVE AFFECT, AND PARANOID IDEATION

by

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List of Abbreviations

EMA — ecological momentary assessment

RDoC —research domain criteria

SCID-5 — Structured Clinical Interview for the Diagnostic and Statistical Manual of
Mental Disorders, 5th edition

R-GPTS — Revised Green Paranoid Thoughts Scale

BPRS — Brief Psychiatric Rating Scale

PROMIS — Patient-Reported Outcomes Measurement Information System

ASRS — Adult Social Relationships Scale

SNI — Social Network Index

SPMC — Social Psychological Measurements of COVID-19

EPII — Epidemic-Pandemic Impacts Inventory

CRISIS — Coronavirus Health and Impact Survey

Chapter 1: Introduction

The COVID-19 pandemic has contributed to significant life disruption, stress, and increased mental health concerns for people around the world. During the pandemic, there have been documented increases in psychological distress, depression, and anxiety among the general population in a variety of countries, including the United States (Daly & Robinson, 2021), India (Dubey et al., 2020) and China (Dubey et al., 2020; Rajkumar, 2020; Wang et al., 2020). In Norway, individuals who regularly engaged in social distancing reported higher levels of depression and anxiety (Ebrahimi et al., 2021). In a general population sample in the United Kingdom, when exposed to COVID-related news, fear of COVID predicted both hallucinatory experiences and paranoid ideation (Lopes et al., 2020). Even in countries such as South Korea, where the early spread of COVID was successfully managed without stay-at-home orders or social distancing for a period of time, increases in psychological symptoms, stress, and psychosis-risk increased compared to pre-COVID levels (Lee et al., 2021). Despite multiple studies that have shown the negative psychological toll of the pandemic on the general population, including increases in psychotic symptomatology, far fewer studies about the impact of the pandemic have included individuals with psychosis spectrum disorders.

Given treatment disruption, social isolation, and a greater predisposition to the effects of stress, individuals with psychosis spectrum symptoms may be especially vulnerable to stressors of the pandemic and this increased stress may contribute to subsequent increases in symptomatology and a further erosion of already impaired

social functioning. Pre-pandemic treatment for people living with psychosis often included in-person visits with psychiatrists and therapists. However, regularly scheduled in-person mental health appointments were disrupted due to COVID-19 (Dubey et al., 2020). Because of already diminished social contact, individuals along the psychosis spectrum may also be more vulnerable to the negative effects of increased social isolation occurring because of mandated stay-at-home orders and social distancing guidelines. Prior to the pandemic, those with psychosis spectrum disorders tended to spend more time alone than with others when compared to healthy controls (Mote & Fulford, 2020) and pre-pandemic research suggests that smaller social network size is related to more severe overall symptoms (Degnan et al., 2018). Additionally, in the general population fewer social contacts and greater feelings of loneliness predict increases in psychotic-like experiences (Tan et al., 2021). Consistent with the perspective that COVID-related social isolation may impact those with psychosis spectrum disorders, in an inpatient sample of individuals with psychosis spectrum disorders who were further isolated due to close contact with COVID-19, researchers found participants had greater stress, depression, and anxiety compared to inpatient participants who did not have to socially isolate and they also found that isolated participants had worse anxiety and sleep quality compared to before their isolation. (Ma et al., 2020).

In addition to the impact of the pandemic on social engagement, increased stress associated with the pandemic may also promote psychosis spectrum symptomatology. Elevated emotional reactivity to stress is present in those vulnerable to developing psychosis and increased stress or stressful events precede increases in

psychotic symptoms (Myin-Germeys & van Os, 2007). For those with psychosis spectrum disorders, heightened stress reactivity is related to and predicts increased negative affect (Horan et al., 2008; Myin-Germeys & van Os, 2007). Research done prior to the pandemic has demonstrated that those living with psychosis spectrum disorders generally experience more negative emotions and fewer positive emotions compared to healthy controls (Cho et al., 2017). Thus, individuals higher in psychosis symptomatology could be more vulnerable to pandemic-related increases in negative affect that have been observed in the general population (Daly & Robinson, 2021). Increased negative affect may be especially problematic given its impact on paranoid ideation.

Paranoid ideation is a dimensional construct characterized as unsubstantiated beliefs that intentional harm by others has or will occur and it spans a continuum, from mild mistrust and suspicion to severe paranoid delusions (Freeman, 2016; Freeman & Garety, 2000; Raihani & Bell, 2019). Consistent with this dimensional conceptualization, paranoid ideation is evident in nonclinical samples, with approximately 20% of the general population endorsing beliefs that other people are against them or that they detect hidden threats or insults in things that people say or do (Bebbington et al., 2013). A prominent model of paranoid ideation proposes that increases in negative affect contribute to the inaccurate interpretation of external events as threatening and that these misinterpretations lead to the emergence of paranoid ideation (Freeman et al., 2002). This model also proposes that negative affect predisposes people to disregard disconfirmatory evidence, thus helping to maintain paranoid ideation. Pre-pandemic research has demonstrated that increases in

negative affect can lead to greater paranoid ideation in both clinical and community samples (Freeman et al., 2014; Kramer et al., 2014; Krkovic et al., 2018; So et al., 2018). Additional work has shown that the relationship between stress and psychotic experiences is mediated by negative affect (Klippel et al., 2017). Given these findings from pre-pandemic research, increases in negative mood during the pandemic could contribute to more severe paranoid ideation.

The potential for the pandemic to increase paranoid ideation through both social isolation and negative affect is particularly concerning as increased paranoid ideation has been associated with greater social impairment, including behavioral avoidance and social withdrawal, decreased quality of life, and a poorer prognosis (Hajdúk et al., 2019; Pinkham et al., 2016). Paranoid ideation during the pandemic may also affect compliance with behaviors designed to limit the spread of COVID-19. In Europe, greater paranoid ideation among the general population has been found to be related to greater levels of conspiracy beliefs (Freeman et al., 2020; Kuhn et al., 2021). Greater levels of conspiracy beliefs are related to less adherence to government guidelines designed to reduce the spread of COVID-19, including in the US general population where conspiracy beliefs are related to reduced mask-wearing and a lower willingness to be vaccinated (Freeman et al., 2020; Romer & Jamieson, 2020). While conspiracy beliefs are not the same as paranoid ideation, evidence suggests that psychosis spectrum symptomatology, including delusion-proneness and paranoid ideation, contribute to the development of COVID-related conspiratorial thinking (Larsen et al., 2021). Additionally, more recent research in a multi-site international sample of the general population demonstrates that those who have both

high general paranoid ideation and high pandemic-specific paranoid thinking are less likely to engage in protective health behaviors (So et al., 2022). Taken together, these findings suggest that individuals with high levels of interpersonal mistrust, including those with psychosis spectrum disorders, may be predisposed to endorse conspiracy beliefs related to the pandemic and be less willing to engage in behaviors that protect them from COVID-19.

Although the COVID-19 pandemic has adversely impacted mental health globally, it may be especially salient for individuals with psychosis spectrum disorders or those experiencing elevated psychotic symptoms such as paranoid ideation. However, there has been very little research exploring the role of the pandemic on outcomes in samples with psychosis spectrum disorders. To our knowledge, there are only three studies that have examined the impact of the COVID-19 pandemic on symptomatology in community samples of individuals with psychosis spectrum disorders. In Veterans with psychosis, researchers found an increase in depression, anxiety, and loneliness compared to pre-COVID levels and a small, but significant, decrease in social network size (Wynn et al., 2021). However, at follow up data collection later in the pandemic, clinical participants demonstrated improvement in depression and anxiety symptoms (Wynn et al., 2021). A limitation of this study is that it relied on retrospective recall to capture pre-COVID levels of symptoms and functioning. Specifically, the study asked participants to think back and recall how they felt and what they were doing 5-8 months prior to data collection, creating concern that pre-COVID measures are subject to recall biases. Additionally, given that Veteran participants were likely engaged with VA services and the VA was

able to rapidly transition to telehealth services (Connolly et al., 2021), improvements in symptoms during the course of the pandemic may not be generalizable.

In another study Pinkham et al. (2020) compared ecological momentary assessment (EMA) data collected before the pandemic to a singular response to the same EMA questions collected during the pandemic in a mixed sample of individuals with severe mental illness, including individuals with psychosis spectrum disorders. They found that there was no change in momentary mood experiences (i.e., sad/depressed, energized/excited, happy) or psychotic symptoms, including paranoid ideation (Pinkham et al., 2020). Unexpectedly, this study also found that well-being increased during the pandemic and that this increase was related to being female and spending more time with others pre-pandemic. While this study did capture social engagement pre-COVID, it did not measure social engagement during COVID and it is unclear to what extent level of social engagement may have changed as a result of the pandemic. Also, Pinkham et al. (2020) did not assess how social relationships were perceived by participants. This is an important factor to assess as research from the general population has shown that greater perceptions of social support during the pandemic are related to lower levels of mental health symptoms and greater resiliency during the pandemic (Liu et al., 2020). Additionally, this study used a single item (i.e., “how much have you felt sad or depressed”) to assess negative affect and did not report on changes in clinical mood symptomatology. Similarly, paranoid ideation was assessed with a single item which may not adequately capture change in paranoid ideation during the pandemic as would be achieved with validated multi-item questionnaire assessing paranoid ideation (i.e., The Green Paranoid Thoughts Scale;

Green et al., 2008). Thus, this study is unable to answer to what extent clinical symptomatology may have changed over the course of the pandemic in individuals with psychosis.

Recent work by Strauss et al. (2021) demonstrated that negative symptoms (e.g., anhedonia, asociality, avolition), including those specifically related to social disengagement, worsened during the pandemic compared to pre-pandemic levels for individuals with psychosis spectrum disorders and that this worsening of symptoms was not solely due to the reduction in opportunities for social engagement. These findings further demonstrate the potential for the pandemic to contribute to increases in socially relevant symptomatology. However, this study did not collect any other data regarding social engagement or perceptions of social relationships, data which would help further inform the interpretation of the presented findings. Additionally, this study did not report on any other psychosis spectrum symptomatology, including paranoid ideation. It should also be noted that this study assessed negative symptoms during the pandemic via a semi-structured interview that was administered over Zoom. This requirement may have biased the sample by excluding individuals who are less technically literate or who are lower functioning and may be one reason why the authors note that the sample for this study was higher functioning than what would be expected for a study conducted in-person (Strauss et al., 2022).

As reviewed above, recent research exploring the impact of the COVID-19 pandemic on community-dwelling individuals with psychosis spectrum disorders provides some evidence that the pandemic is contributing to a worsening of symptoms and poorer social engagement compared to before the pandemic. However,

given the limited number of studies exploring the impact of COVID-19 which include participants with psychosis spectrum disorders and inconsistent findings in this population, more research is needed to better understand how the pandemic has impacted psychosis spectrum symptomatology. Additionally, there are several limitations that exist in the current literature including the use of retrospective recall, the failure to assess paranoid ideation using comprehensive validated measurements, not directly measuring social support and engagement during the pandemic, and using assessment methods which may limit participation for some individuals. The current study addresses these limitations by including assessments from both before and during the pandemic, by specifically measuring social support and engagement at both time points, by measuring paranoid ideation using a comprehensive measure, and by using a multimethod approach to data collection in an effort maximize participation in the study and limit potential recruitment biases.

The current study seeks to investigate the impact of the COVID-19 pandemic on social engagement, negative affect, and paranoid ideation. To study the impact of the COVID-19 pandemic on psychosis-spectrum symptomatology, the current study adopts a dimensional approach to psychopathology as laid out in the National Institute of Mental Health's Research Domain Criteria (RDoC; Cuthbert, 2022; Kozak & Cuthbert, 2016) initiative. Specifically, we examined the impact of the COVID-19 pandemic within a transdiagnostic sample including individuals with psychotic disorders as well as healthy individuals to ensure that the full range of symptomatology and social functioning was represented. This strategy aligns with findings that psychosis spectrum symptomatology, including paranoid ideation, is

evident in non-clinical samples (e.g., Bebbington et al., 2013) and with findings that such symptoms can be associated with COVID-related beliefs and behaviors in the general population (Freeman et al., 2020; Kuhn et al., 2021; Larsen et al., 2021; Romer & Jamieson, 2020; So et al., 2022).

Taking advantage of data gathered pre-COVID from a transdiagnostic sample of individuals spanning the spectrum of psychosis, and in conjunction with data collected during the pandemic from a subset of this sample, the current longitudinal study seeks to determine the impact of the COVID-19 pandemic on relationships and symptomatology. Based on prior research, we sought to determine if pandemic-related experiences would erode social relationships and lead to increases in negative affect and paranoid ideation. Further, we investigated whether stronger social engagement and social relationships prior to the pandemic would protect against increases in symptomatology during the pandemic. Specifically, we explored the following hypotheses:

1. Compared to the baseline assessment, participants will report lower levels of social support and higher levels of social distress during the COVID pandemic
2. Compared to the baseline assessment, participants will report increased paranoid ideation during the COVID pandemic
3. The number of adverse COVID-related events experienced by an individual will moderate the relation between social support and paranoid ideation at baseline and at the COVID assessment such that those with more adverse events will experience greater decreases in social support and greater

increases in social distress and paranoid ideation compared to those with fewer adverse events.

4. Greater social resources at the baseline assessment will predict lower symptomatology during the pandemic. Specifically, greater social support, lower social distress, and a larger social network pre-COVID will predict lower depression, anxiety, and paranoid ideation during the pandemic.

In addition to the above hypotheses, exploratory analyses were conducted to determine if greater paranoid ideation during the COVID assessment would be related to more negative appraisals of the governments' response to the pandemic (e.g., anger and distrust about government rules relating to COVID).

Chapter 2: Method

Participants

Participants (N = 55) were recruited from a transdiagnostic sample which included individuals with psychosis who previously participated in a larger NIH-funded project (N = 120) prior to the COVID-19 pandemic. Utilizing a dimensional approach to psychopathology, the final sample for the current study includes 39 participants (71%) with a diagnosis of a psychotic disorder and 16 healthy controls (29%) without any history of psychosis. For the parent study, clinical participants were recruited from outpatient mental health clinics in the Washington D.C. and Baltimore metropolitan area while healthy controls were recruited from the same geographic area using online advertisements. All previous participants in the larger NIH study were eligible for the current study and provided consent to be contacted about future study opportunities during their initial participation. Participants were contacted via mail and phone and all respondents who expressed interest in the current study were enrolled. To increase participation in the current study, a \$40 electronic gift-card was offered as compensation for the time spent completing the survey.

Pre-pandemic baseline data were drawn from the parent study and participants provided information about their experiences during COVID by completing online surveys between October 2020 and February 2021. In Maryland, the period of data collection coincided with a second surge in cases and hospitalizations along with state-mandated social distancing and mask requirements. Additionally, vaccines were only available to healthcare workers and individuals 65+ years old during data

collection, and thus were not available to any participants (Maryland COVID-19 Data Dashboard, n.d.).

For the parent study, inclusion criteria for clinical participants included (1) aged 18-60, (2) lifetime history of a psychotic disorder, (3) clinical stability (i.e., no inpatient hospitalizations for 3 months before enrollment, no changes in psychoactive medication four weeks before enrollment) as indicated by approval of clinician and medical record review, and (4) fluent in English. Inclusion criteria for non-clinical participants included (1) aged 18-60, (2) no current clinical disorder or psychiatric medications, (3) no lifetime history of a psychotic or mood disorder, (4) no avoidant, paranoid, schizotypal or schizoid personality disorder, and (5) fluent in English. Exclusion criteria for all participants included (1) current substance use disorder, (2) neurological conditions (e.g., epilepsy, multiple sclerosis), (3) evidence of intellectual disability as determined by medical evaluation or prior cognitive testing, (4) any history of serious head injury, (5) any MRI contraindications (e.g., MRI unsafe metal in body, weight that exceeds the limitations of MRI machine), and (6) unwillingness to have assessments videotaped during study participation. For the present study, exclusion criteria also included (7) no access to a valid email address. This final exclusion criterion was necessary as remote payment could only be provided via email.

Procedures

Pre-COVID measures were collected during an in-person baseline assessment for the parent NIMH study. For data collected in the second assessment during the COVID-19 pandemic, participants completed self-report surveys via phone or internet

to maintain social distancing requirements. Participants were encouraged to select the method that was most accessible and convenient for them. Participants who completed surveys via the internet ($N = 24$) were emailed a personalized Qualtrics survey link to complete on their own time. Participants who completed the survey via phone ($N = 29$) were asked each item by trained research staff who entered responses into the Qualtrics survey in real time. One participant began the survey via phone and completed the remaining portion via the internet. The average time between the two assessments was 769.78 days, $SD = 302.21$. This length of time is similar to what has been reported in other studies exploring the effects of the pandemic on psychosis spectrum symptomatology (e.g., Strauss et al., 2021).

Measures

Diagnostic and Clinical Assessment

To confirm psychiatric diagnoses, the mood and psychotic disorder modules of the Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (SCID-5; First et al., 2015) were administered to all clinical participants. Participants completed the SCID-5 modules as a part of the parent study prior to participating in this study. Healthy control participants completed a SCID-5 screener form and relevant SCID-5 modules to confirm eligibility in the parent study.

The Revised Green Paranoid Thoughts Scales (R-GPTS; Freeman et al., 2021) was used to assess paranoid ideation. The R-GPTS is an 18-item self-report measure of paranoid thinking over the past month and consists of two subscales: social

reference and persecution. The original GPTS is considered the most valid and psychometrically sound self-report measure for paranoia (Statham et al., 2019), but was recently revised to improve the measure's precision. The revised measure includes a subset of items from the original GPTS (Green et al., 2008).

The Brief Psychiatric Rating Scale (BPRS; Ventura et al., 1993) is a 24-item clinical interview designed to assess clinical symptomatology over the previous week. Using previously established factors (Kopelowicz et al., 2008), the symptom score for Depression-Anxiety was used to assess for pre-COVID levels of negative affect. The BPRS could not be administered during the pandemic due to concerns about its validity in a remote context and the additional burden (i.e., need for computer with webcam) that it would place on participants.

To assess for negative affect during the pandemic using the least burdensome, but valid method, the National Institutes of Health Patient-Reported Outcomes Measurement Information System (PROMIS) Depression and Anxiety short form scales (Pilkonis et al., 2011) were used to assess depression and anxiety. The Depression scale is an 8-item questionnaire that inquires about symptoms of depression experienced over the past week, such as feeling depressed or down and feeling worthless. The Anxiety scale is a 7-item questionnaire that inquires about common symptoms of anxiety experienced over the past week, including feeling worried and feeling tense. Both scales were developed using rigorous item-response theory methods and were developed to capture the full range of negative affect for participants from both the general population and clinical samples (Pilkonis et al., 2011). Both scales have demonstrated excellent internal consistency, convergent

validity with similar self-report measures, and were reviewed by a panel of experts to confirm context validity (Pilkonis et al., 2011). The short forms for both depression and anxiety perform as well as legacy measures for depression and anxiety with fewer items and, therefore, place less burden for participants (Clover et al., 2018; Pilkonis et al., 2011, 2014). The PROMIS Depression short form has also been shown to differentiate clinical (i.e., diagnosis of clinical depression using the SCID) from non-clinical participants (Clover et al., 2018).

Social Support and Engagement

The Adult Social Relationships Scale (ASRS; Cyranowski et al., 2013) consists of six self-report scales assessing participant perception of social support and social distress. Specifically, perceived social support is assessed with subscales for Instrumental Support (“*There is someone around to help me if I need it*”), Emotional Support (“*I have someone who will listen to me when I need to talk*”), and Friendship (“*I feel like I have lots of friends*”), while perceived social distress is assessed with subscales for Loneliness (“*I feel alone and apart from others*”), Perceived Rejection (“*People in my life act like my problems aren’t that important*”), and Perceived Hostility (“*People in my life blame me when things go wrong*”). The ASRS was developed as part of the NIH Toolbox for the Assessment of Neurological and Behavioral Function and each subscale has demonstrated good internal reliability and concurrent validity with other self-report scales (Cyranowski et al., 2013). The ASRS has previously been used in samples with psychosis (Blanchard et al., 2020) as well as other severe mental illnesses (Andrea et al., 2016; Klim et al., 2020).

The Social Network Index (SNI; Cohen et al., 1997) is a 13 item self-report measure assessing for the total number of individuals a person has interacted with in their social network at least once in the past two weeks. The SNI is one measurement recommended to assess how social integration influences health and well-being (Brissette et al., 2000). The SNI has previously been used to study the relation between social contact and psychosis symptomatology in both samples with psychosis (Blanchard et al., 2020) and samples at ultra-high risk for psychosis (Robustelli et al., 2017).

COVID Impact

The Social Psychological Measurements of COVID-19: Coronavirus Perceived Threat, Government Response, Impacts, and Experiences Questionnaire Short Form (SPMC; Conway et al., 2020) measures perceptions of government response to the pandemic, personal impact from COVID, and personal experiences with COVID. Items from the Government Restriction and Government Punishment subscales were used to create a Positive Perceptions of Government scale which included items such as: “*I support Federal government measures to restrict the movement of American citizens to curb the spread of COVID-19*” and “*I want my Federal government to severely punish those who violate orders to stay home.*” The Government Reactance and Government Information Contamination subscales were used to create a Negative Perceptions of Government scale which included items such as: “*It makes me angry that the Federal government would tell me where I can go and what I can do, even when there is a crisis such as COVID-19*” and “*I distrust the*

information I receive about COVID-19 from my Federal government.” Both the Positive Perceptions of Government and Negative Perceptions of Government scales demonstrated acceptable internal reliability in the current study ($\alpha = .78$ and $\alpha = .71$ respectively). In addition to these scales, two items from this measure were included in the current study to descriptively assess diagnosis of COVID-19 and close contact with COVID-19.

To capture the number of adverse events experienced as a result of the COVID-19 pandemic, the Epidemic-Pandemic Impacts Inventory (EPII; Grasso et al., 2020) was used. The EPII asks participants to indicate whether they or someone in their household experienced various life changes over the entire course of the COVID-19 pandemic. Participants respond to statements about potential impacts of the pandemic such as *“Unable to pay important bills like rent or utilities”* and *“Less physical activity or exercise”* with *Yes (Me)*, *Yes (Person in Home)*, *No*, or *N/A*. The EPII was specifically developed to examine the impact of the COVID-19 pandemic on personal and family life. As such, there are no psychometric properties available for this scale and no optimal scoring procedures have yet been created. In the current study, the number of items with a *Yes (Me)* response were totaled to create a count score. This approach is consistent other studies exploring the mental health impacts of the COVID-19 pandemic (Carroll et al., 2021; Harriger et al., 2021; Haydon & Salvatore, 2022). In the current study, specific items were selected from the Economic, Emotional Health and Wellbeing, and Physical Health Problem subscales.

To provide additional descriptive data on the impact of the COVID-19 pandemic, the Coronavirus Health and Impact Survey (CRISIS; Nikolaidis et al.,

2021) was also administered. The CRISIS has been found to be a valid and reliable measure of the impacts of COVID and has been recommended for population-based mental health research during the COVID-19 pandemic (Nikolaidis et al., 2021). To reduce participant burden, and because of content overlap with the EPII and other assessment of mental health symptoms, only a subset of CRISIS questions was administered in the current study. Specifically, the CRISIS was used to assess for changes in the quality of relationships caused by the pandemic and stress related to these changes over the past two weeks, rated on a 5-point Likert scale. Items include *“During the past two weeks, how has the quality of the relationships between you and members of your family changed?”* and *“How stressful have these changes in family contacts been for you?”*

Data Analytic Plan

All data analyses were completed using R statistical software version 4.0.2 (R Core Team, 2020). Prior to data analyses, descriptive statistics pertaining to demographic information and the impact of COVID-19 were calculated. Also, a series of Chi-Squared tests and t tests was conducted to examine potential demographic or symptom differences between the current sample and those not participating from the parent study to determine to what degree recruitment bias may have impacted the final sample. Next, paired-sample t-tests were conducted to examine changes in social support, social distress, and paranoid ideation from pre-COVID levels to levels during COVID. Multiple regression analyses were conducted on significant findings to determine whether COVID-related impacts moderated the relation between variables of interest before and during COVID. Then, a series of

multiple regression analyses were conducted to explore whether social support, social distress, and social network size pre-COVID predicted paranoid ideation and negative affect during COVID. Finally, exploratory zero-order correlations were conducted to explore the relation between paranoid ideation during COVID and perceptions of the government response to COVID.

Chapter 3: Results

Demographic characteristics of the current sample are provided in Table 1.

Prior to hypothesis testing, we conducted a series of Chi-Squared tests and t-tests to examine potential demographic and symptom differences between the current sample and the participants from the parent study who did not participate in the current study. Chi-squared tests revealed a significantly greater proportion of non-clinical participants in the current study compared to those not participating from the parent study ($\chi^2 = 6.58, p = .01$). Non-clinical participants comprise 29% of the current sample compared to 18% of those from the parent study who did not participate in the current study. Additionally, Welch two sample t-tests revealed significant differences in income ($t = 3.17, p = .002$) and education ($t = 3.10, p = .002$) between those who participated in the current study and those who did not. Specifically, those who participated in the current study had a larger average income ($M = 19116.62$) and more years of education ($M = 13.69$) compared to those who did not participate in the study (income: $M = 8686.72$; education: $M = 12.35$). There were no other demographic or symptom-level differences between those who participated in the current study and those who did not (p 's > .05).

Table 1.
Sample Characteristics

	Mean (<i>SD</i>) or <i>n</i> (%)
Age (years)	46.78 (12.16)
Sex	
Male	32 (58.2%)
Female	23 (41.8%)

Race	
Black/African American	32 (58.2%)
White	16 (29.1%)
Asian	3 (5.5%)
More than one race	3 (5.5%)
Not Reported	1 (1.8%)
Ethnicity	
Non-Hispanic or Latino	49 (89.1%)
Hispanic or Latino	5 (9.1%)
Not Reported	1 (1.8%)
Education (years)	13.44 (2.31)
Clinical Status	
Clinical	39 (70.9%)
Healthy Control	16 (29.1%)

Also prior to hypothesis testing, descriptive statistics were calculated for all measures. Descriptive statistics for all baseline assessments are summarized in Table 2 and descriptive statistics for all COVID time point assessments are summarized in Table 3. Frequencies for adverse COVID-related events, as measured by the EPII, were also calculated to better understand the range of COVID impacts on the current sample and are summarized in Table 4. These data indicate significant impacts of the pandemic on health-related behaviors, with about half the sample indicating getting less physical activity during the pandemic and nearly two thirds indicating spending more time being sedentary compared to before the pandemic. Between a fifth and a quarter of the sample also indicated difficulties obtaining enough food or being able to fulfill their transportation needs because of COVID. In addition to these impacts, a smaller proportion of participants indicated more serious COVID-related experiences, such as not being able to pay important bills or obtain needed medications. Despite these impacts, however, no participants had been diagnosed with COVID-19 by the

time of data collection and only 8 (14.5%) reported having been in close contact with someone who tested positive for COVID-19.

Table 2.

Descriptive Statistics for Baseline Assessments

	<i>N</i>	Mean (<i>SD</i>)	Range
ASRS Emotional Support	55	32.38 (7.26)	14 - 40
ASRS Instrumental Support	55	26.06 (8.62)	8 - 40
ASRS Friendship	54	25.61 (7.93)	8 - 40
ASRS Loneliness	54	11.00 (5.27)	5 - 25
ASRS Perceived Rejection	55	14.36 (7.09)	8 - 40
ASRS Perceived Hostility	55	13.65 (6.07)	8 - 40
R-GPTS Social Reference	55	5.17 (6.63)	0 - 30
R-GPTS Persecution	55	5.76 (8.78)	0 - 36
BPRS Depression-Anxiety	55	8.27 (4.12)	4 - 18
SNI Social Network Total	55	11.8 (8.41)	0 - 36

ASRS= Adult Social Relationships Scale; R-GPTS = Revised Green Paranoid Thoughts Scale; BPRS = Brief Psychiatric Rating Scale; SNI = Social Network Index

Finally, prior to hypothesis testing, descriptive statistics for changes in social relationships and stress related to those changes, as measured by the CRISIS, were calculated. Descriptive statistics for the CRISIS are summarized in Table 5.

Responses indicate that participants had a little less contact with people outside of their home due to COVID. Participants also reported that the quality of their relationships with their family were slightly better than before COVID and that the quality of their relationships with their friends was about the same compared to before COVID. However, these responses also indicate increases in stress due to changes in relationships with both family and friends.

Table 3.
Descriptive Statistics for COVID Assessments

	<i>N</i>	Mean (<i>SD</i>)	Range
ASRS Emotional Support	54	30.80 (7.70)	12 - 40
ASRS Instrumental Support	55	26.09 (9.72)	8 - 40
ASRS Friendship	55	24.35 (8.37)	8 - 40
ASRS Loneliness	54	13.17 (5.89)	5 - 25
ASRS Perceived Rejection	54	17.87 (7.45)	8 - 35
ASRS Perceived Hostility	53	16.45 (5.77)	8 - 29
R-GPTS Social Reference	52	6.42 (7.31)	0 - 32
R-GPTS Persecution	53	6.31 (8.98)	0 - 40
PROMIS Depression	55	16.45 (7.81)	8 - 40
PROMIS Anxiety	55	16.83 (7.99)	7 - 35
SPMC Positive Perceptions of Government	55	9.86 (3.14)	2 - 14
SPMC Negative Perceptions of Government	54	7.33 (3.17)	2 - 14
EPII Count Score	55	2.31 (1.85)	0 - 9

ASRS= Adult Social Relationships Scale; R-GPTS = Revised Green Paranoid Thoughts Scale; PROMIS = Patient-Reported Outcomes Measurement Information System; SPMC = Social Psychological Measurements of COVID-19; EPII = Epidemic-Pandemic Impacts Inventory

Regarding our first hypothesis, pertaining to changes in social support and distress, results indicated greater levels of Perceived Rejection ($t = 2.56, p = .01$) and Perceived Hostility ($t = 2.46, p = .02$) during COVID compared to baseline levels. There were no significant differences in scores for emotional support ($t = -1.13, p = .27$), instrumental support ($t = .02, p = .99$), friendship ($t = -1.20, p = 0.24$), or loneliness ($t = 1.95, p = .06$). After controlling for the duration of time between the two visits, change in perceived rejection scores ($t = 2.50, p = .01$) and perceived hostility scores ($t = 2.44, p = .02$) remained significantly different. These findings indicate that self-reports of social distress, specifically perceptions of being rejected and of others being hostile, increased during the pandemic.

Table 4.
EPII COVID-19 Impacts

	Yes- Me (%)	Yes-Person in Home (%)
Unable to get enough or healthy food	12 (21.8%)	3 (5.5%)
Unable to access clean water	1 (1.8%)	0 (0%)
Unable to pay important bills	8 (14.5%)	2 (3.6%)
Difficulty getting places due to less access to public transportation or safety concerns	13 (23.6%)	3 (5.5%)
Unable to get needed medications	6 (10.9%)	3 (5.5%)
Unable to access mental health treatment	8 (14.5%)	2 (3.6%)
Increase in health problems not related to COVID-19	10 (18.2%)	3 (5.5%)
Less physical activity or exercise	27 (49.1%)	13 (23.6%)
Overeating or eating more unhealthy foods	21 (38.2%)	8 (14.5%)
More time sitting down or being sedentary	36 (65.5%)	12 (21.8%)

Regarding our second hypothesis, assumptions for normality for paranoid ideation were not met as both baseline and COVID scores were positively skewed for both subscales. To correct for skewness, bootstrapping analyses were conducted with 10,000 samples. Analyses revealed no difference between R-GPTS scores for Social Reference 95% CI [-1.50, 3.06] or for Persecution 95% CI [-2.43, 3.21] between the two timepoints. Thus, paranoid ideation did not increase during the pandemic assessment. As both Perceived Rejection and Perceived Hostility increased compared to baseline levels, this null finding regarding paranoid ideation is surprising given the relation between social distress and paranoid ideation (Januška et al., 2021). To better understand the relation between social distress and paranoid ideation in the current study, post-hoc Spearman's correlations were conducted. Results from these correlations indicate moderate to strong relations between multiple components of social distress and both subscales on the R-GPTS at the baseline assessment ($\rho = .33-.50$) and at the COVID assessment ($\rho = .41-.58$). However, there was no relation

between ASRS scores and R-GPTS scores across the two timepoints. The results of these post-hoc analyses are presented in Table 6.

Table 5.
Descriptive Statistics for the CRISIS

	<i>N</i>	Mean (<i>SD</i>)	Interpretation of Mean
Changes in contact with people outside of the home due to COVID	51	2.53 (1.46)	Slightly less
Changes in quality of relationships with family due to COVID	50	3.30 (1.02)	About the same to slightly better
Stress due to changes in family relationships	52	2.27 (1.30)	Increased
Changes in quality of friendships due to COVID	51	2.90 (0.81)	About the same
Stress due to changes in social contact with friends	52	2.13 (1.14)	Increased

Before exploring the moderating role of the number of negative COVID impacts (EPII count score) using a time-dependent analysis, cross-sectional correlational analyses were conducted to better understand how variability in the number of COVID impacts are related to perceptions of social relationships and symptoms during the pandemic. Regarding perceptions of social relationships, nonparametric correlational analyses indicated that greater EPII count scores were related to less emotional support ($r = -.36, p = .007$), less instrumental support ($r = -.35, p = .008$), greater loneliness ($r = .27, p = .045$), greater perceived rejection ($r = .32, p = .017$), and greater perceived hostility ($r = .38, p = .005$). EPII count scores were not significantly related to perceptions of friendship during COVID ($r = -.26, p = .058$). Regarding mental health symptoms during COVID, analyses indicated that greater EPII count scores were related to greater paranoid ideation (Persecution: $r = .34, p = .012$; Social Reference: $r = .44, p < .001$), greater depression ($r = .38, p = .004$), and

greater anxiety ($r = .49, p < .001$). Thus, a greater number of negative COVID impacts was related to less social support, more social distress, and worse symptoms during COVID.

Table 6.
Correlations Between Social Support, Social Distress, and Paranoid Ideation

	Baseline R-GPTS Soc. Ref	Baseline R-GPTS Per.	COVID R-GPTS Soc. Ref	COVID R-GPTS Per.
Baseline ASRS Emotional Support	-.38**	-.43**	-.17	-.05
Baseline ASRS Instrumental Support	-.30*	-.35**	-.27	-.07
Baseline ASRS Friendship	-.27	-.23	-.19	-.24
Baseline ASRS Loneliness	.22	.17	.08	.16
Baseline ASRS Perceived Rejection	.50**	.48**	.15	.11
Baseline ASRS Perceived Hostility	.33*	.34*	.23	.23
COVID ASRS Emotional Support	.03	-.15	-.50**	-.59**
COVID ASRS Instrumental Support	.22	.08	-.25	-.38**
COVID ASRS Friendship	.25	.09	-.30*	-.36**
COVID ASRS Loneliness	-.04	.11	.44**	.41**
COVID ASRS Perceived Rejection	-.02	.16	.55**	.58**
COVID ASRS Perceived Hostility	-.05	.24	.47**	.52**

ASRS= Adult Social Relationships Scale; R-GPTS = Revised Green Paranoid Thoughts Scale; Soc. Ref = Social Reference; Per. = Persecution

* $p < .05$, ** $p < .01$

Regarding our third hypothesis, moderation analyses found that the number of negative COVID impacts did not moderate the change in Perceived Rejection scores between the two time points ($t = 0.69, p = 0.49$). However, moderation analyses found that the number of negative COVID impacts did moderate the change in Perceived Hostility scores between the two time points ($t = 2.28, p = 0.03$). When

exploring the conditional effects of EPII scores at low ($-1 SD$), average, and high ($+1 SD$) levels of negative COVID-related impacts, analyses revealed that there was no significant difference in Perceived Hostility based on COVID-related impact when COVID impact was average ($t = 0.47, p = 0.64$) or high ($t = 1.82, p = 0.07$). However, those with low levels of COVID-related impact had lower levels of Perceived Hostility during COVID compared to pre-pandemic levels ($b = -0.36, t = -2.03, p = 0.05$). Thus, it appears that average and high levels of adverse COVID impacts maintain levels of Perceived Hostility from baseline into the pandemic while low levels of negative COVID impacts are associated with decreases in Perceived Hostility across the two assessments.

Regarding our fourth hypothesis, two multiple linear regressions were conducted to test whether baseline social support, social distress, and social network size entered as a single block predict both depression and anxiety during COVID. Results revealed that baseline levels of social support, distress, and social network did not predict depression ($F(7,46) = 0.42, p = 0.88$) or anxiety ($F(7, 46) = 0.73, p = 0.65$) during COVID. Due to the positive skewness of R-GPTS scores, log transformations were used to correct for skewness of both R-GPTS subscale scores and to meet assumptions. Multiple regression analyses were then conducted to predict the log of Social Reference and Persecution based on pre-COVID levels of social support, distress, and social network size. Results revealed that neither the log of Social Reference ($F(7,44) = 0.92, p = 0.50$) nor the log of Persecution ($F(7,44) = 0.80, p = 0.59$) were predicted by pre-COVID levels of social support, distress, and social network size.

Regarding our exploratory goals, assumptions for normality were violated due to the skewness of R-GPTS data. Due to this assumption violation, bootstrapping analyses with 10,000 samples were conducted to correct for skewness in the data. No relation between R-GPTS Social Reference and either Positive Perceptions of Government, 95% CI [-0.24, 0.25] or Negative Perceptions of Government, 95% CI [-0.11, 0.36] was found. Additionally, there was no relation between R-GPTS Persecution and Positive Perceptions of Government, 95% CI [-0.31, 0.14]. However, there was a significant positive relation between R-GPTS Persecution and Negative Perceptions of Government, 95% CI [0.04, 0.50]. This indicates that more severe persecutory beliefs during the pandemic were associated with more negative perceptions of the government's response to COVID-19.

Chapter 4: Discussion

The COVID-19 pandemic has contributed to significant increases in mental health symptoms, including psychotic symptoms, among the general population. Given that those with psychosis spectrum disorders already experience greater social isolation and are more vulnerable to the effects of stress, the pandemic may be especially deleterious to those with psychosis spectrum disorders, contributing to increases in psychotic symptoms such as paranoid ideation. Unfortunately, there has been very little research exploring the impact of the COVID-19 pandemic on interpersonal functioning and psychotic symptoms in community-dwelling samples with psychosis spectrum disorders. Given limited research with somewhat contradictory findings, the present study sought to provide additional insight into how the COVID-19 pandemic has impacted interpersonal relationships and symptoms in psychosis spectrum disorders and how paranoid ideation relates to perceptions of the government response to COVID in this population.

Results from the current study show that within a transdiagnostic sample of individuals with psychosis, perceived social distress increased during the pandemic. Specifically, perceived rejection and perceived hostility during the pandemic were both greater compared to baseline levels. Thus, participants perceived that people in their life were more neglectful of them and their problems and that people in their life were more critical or openly hostile compared to before the pandemic. However, there were no changes in loneliness compared to pre-pandemic levels. With the implementation of stay-at-home orders and social distancing guidelines, participants may have been forced to spend more time at home and in close proximity with family

and friends compared to before the pandemic. While there are benefits that could be conferred with this social contact, including, as reported in the current study, the maintenance of the quality of relationships with family and friends, it also could have increased opportunities for actual interpersonal conflict. This interpretation is reflected in increases in stress due to changes in social contact with family and friends reported in the current sample and is also consistent with research in romantic relationships which demonstrates the occurrence of interpersonal conflict due to COVID and COVID-related restrictions (Luetke et al., 2020). Thus, COVID-related restrictions may have contributed to increases in interpersonal conflict and stress which were accurately perceived by participants. However, it is important to note that this interpretation is somewhat speculative as the current study did not directly assess who participants were interacting with during COVID and changes in perceived rejection and perceived hostility may have also been driven by relationships with people outside of their social circle.

Contrary to our hypothesis, there was no significant change in social support during the pandemic compared to baseline levels. This finding contradicts evidence from previous research in psychosis spectrum disorders which suggests that the pandemic contributed to small decreases in social network size (Wynn et al., 2021). However, evidence from a sample with clinical depression and anxiety suggests that clinical participants spent more time engaged in face-to-face interactions compared to controls and that levels of symptoms predicted greater social engagement during the pandemic (McGuire et al., 2020). Additional evidence from the general population also suggests that social relationships were maintained during periods of social

distancing (Bond, 2021; Fried et al., 2022). Even in the current sample, participants report that the quality of their relationships with their family and friends was about the same as before COVID. Thus, while the current findings regarding social support and distress might initially appear to contradict one another, taken together they suggest that levels and quality of social engagement with close friends and family were maintained, and potentially increased slightly, compared to pre-pandemic levels, thus helping to maintain levels of perceived social support while also providing more opportunities for interpersonal conflict, simultaneously increasing levels of social distress.

Contrary to our predictions, there was no change in paranoid ideation from baseline to the COVID assessment. This result is consistent with findings from Pinkham et al. (2020) which also demonstrated no change in paranoid ideation from baseline to COVID. It is important to note that data for the current study was collected during the second half of the first full year of the pandemic (October 2020 to February 2021). Thus, while symptoms may have increased at the beginning of the pandemic, they may have returned to pre-pandemic levels as the initial disruption lessened and participants adjusted to their new routines. Similar patterns have been observed in regards to depression and anxiety among individuals with psychosis spectrum disorders (Wynn et al., 2021) and the general population (Daly & Robinson, 2021). Despite this, however, the current findings are somewhat surprising given the connection between paranoid ideation and social distress in both the current study and previous research (Januška et al., 2021). However, the ASRS is designed to measure social relationship quality (Cyranowski et al., 2013) while the GPTS is designed to

measure excessive levels of mistrust and perceptions of threat (Freeman et al., 2021; Green et al., 2008). Thus, the ASRS may be more sensitive to subtle changes in perceived rejection and hostility.

When exploring the moderating role of specific COVID impacts on changes in social distress, results demonstrated that the number of negative COVID-related impacts moderated the change in perceived hostility. Specifically, those with low levels of COVID-related impacts had lower levels of perceived hostility compared to baseline levels while those with average and high levels of COVID-related impacts had no change in perceived hostility. Due to their ability to meet their basic needs, those with low levels of COVID-related impacts may have experienced less stress compared to those with average and high COVID-impacts. This relatively low stress may have contributed to lower negative affect, thus improving the ability for participants to accurately interpret social interactions, and potentially contributing to a reduced likelihood of interpersonal conflict which was accurately interpreted by participants. It is important to note that while non-significant, for participants with high levels of COVID-related impacts, there was a trend toward increased perceived hostility ($p = .07$). Thus, while these findings cannot be interpreted, they may help to explain why perceived hostility increased overall compared to pre-pandemic levels, despite the reduction observed in those with low levels of COVID-related impacts.

Additionally, post-hoc analyses exploring the cross-sectional relation between the number of COVID-related impacts and both perceptions of social relationships and mental health symptoms indicated that a greater number of negative COVID-related impacts was related to lower levels of social support, greater social distress,

greater negative affect, and greater paranoid ideation. Although not part of a priori hypotheses, these findings indicate that COVID impacts are cross-sectionally related to an array of symptomatology as well as perceptions of social relationships during the pandemic. This finding partially replicates research from the general population which finds a relation between negative COVID-related events and both depression and anxiety symptoms (Haydon & Salvatore, 2022). These findings also add to the current understanding of how the pandemic has affected those with psychosis spectrum disorders as none of the current research exploring the impact of the pandemic in this population directly assesses for specific COVID impacts or reports on the relation between such impacts and social perceptions or symptoms. While informative, it is important to note that these findings are cross-sectional and it is possible that rather than negative COVID-related impacts contributing to poorer social relationships and worse symptoms, the direction may be reversed, with those with poorer social relationships and worse symptoms experiencing more negative COVID-related impacts because of their symptoms and poorer social relationships.

Contrary to hypotheses, greater social resources at baseline did not predict lower depression, anxiety, or paranoid ideation during the pandemic. This finding contradicts previous research which suggests that social resources before the pandemic related to increases in well-being during the pandemic (Pinkham et al., 2020). These null findings may reflect a return of symptoms to pre-COVID levels as the pandemic continued (Daly & Robinson, 2021; Wynn et al., 2021) thus making it difficult for the current study to accurately assess how social resources may have been a protective factor against worsening mental health symptoms early in the

pandemic. Alternatively, mental health symptoms may have remained relatively stable in the current sample because those in the current sample avoided the most extreme and stressful impacts of the pandemic. This is reflected in the fact that no participants contracted COVID and under 15% of participants reported more stressful impacts such as being exposed to COVID, having difficulty paying bills because of COVID, or having difficulty accessing medications or mental healthcare because of the pandemic. This null finding may also reflect the fact that the models used to assess this hypothesis included many aspects of social resources while not accounting for the potential role of negative COVID-related impacts, thus making it more difficult to detect any meaningful predictors.

Findings from our exploratory analyses demonstrate a positive relation between more severe persecutory beliefs during the pandemic and more negative perceptions of the government's response to COVID-19. Taken together with previous research which finds a relation between paranoid ideation and COVID-specific paranoid ideation (Larsen et al., 2021; So et al., 2022) and research that shows that greater conspiracy beliefs relate to less adherence to health promoting behaviors related to COVID (Freeman et al., 2020; Romer & Jamieson, 2020), this finding raises concerns that those high in paranoid ideation may be less willing to engage in behaviors that protect them against COVID-19, such as wearing masks, social distancing, testing, and vaccination, especially if these behaviors are recommended or mandated by the government. Given that higher rates of premature mortality among those with psychosis spectrum disorders are driven largely by chronic medical diseases such as cardiovascular disease and COPD (Olfson et al.,

2015), diseases which also increase the risk of severe illness or death from COVID-19 (Du et al., 2021), it may be especially important for healthcare providers to devise unique methods to encourage adherence to protective health behaviors among those with psychosis spectrum disorders.

While the findings of the current study are highly informative, it is also important to note several limitations. First, analyses demonstrated that the current sample had more healthy controls and fewer clinical participants compared to those not participating from parent study, likely also explaining the differences in education and income as well. This recruitment bias suggests that the current sample may have been more high functioning than expected, similar to other work in psychosis conducted during the pandemic (Strauss et al., 2022). Despite these differences, however, participants in the current sample averaged only slightly more than a high school education ($M = 13.44$ years) and had relatively low-income levels ($M = \$19,116.62/\text{year}$), indicating relatively low levels of functioning. It is also important to note that despite these demographic differences, there were no differences in symptoms and no other demographic differences. While the current study explored questions about social support and engagement, other clinical factors which may influence social behavior and functioning, including negative symptoms (Blanchard et al., 2017), were not directly measured in the current study. Additionally, although the current sample consisted of stable outpatients, data on psychiatric medications were not collected and we are unable to determine which participants were taking psychiatric medications during the pandemic, how many were compliant with medications, and whether reported disruptions to medication access reported in the

current sample reflect an inability to access psychiatric medications as opposed to somatic medications. The current study also did not assess for the potential impact of other societal factors in the United States which occurred during the first year of the COVID pandemic, including widespread Black Lives Matter protests in response to the killings of George Floyd, Breonna Taylor, and other Black people by police and the 2020 US presidential election, which may have acted as additional stressors during this period. Additionally, the sample size of the current study may have limited our ability to detect meaningful differences between variables of interest both cross-sectionally and across time points and prevented us from exploring changes based on diagnostic category, as has done in other research during the pandemic (Pinkham et al., 2020). Finally, while our finding regarding the relation between paranoid ideation and negative perceptions of the government's response to COVID is informative, it should be noted that the current study did not measure compliance with protective health behaviors and, therefore, we are unable to directly assess the role that paranoid ideation may play in compliance with these behaviors.

The present findings highlight several areas for addition research. First, while our approach using data from a single time point during the pandemic has provided some useful insight, the COVID pandemic is now chronic, with rates of infection and hospitalization varying widely depending on the time and geographical location (*COVID Data Tracker*, n.d.; *World Health Organization Coronavirus (COVID-19) Dashboard*, n.d.; Mancini & Prati, 2022). Even areas with similar prevalence rates can have different mental health outcomes based on country-level and localized conditions, with research suggesting that COVID-related media exposure is one

factor which contributes to differential mental health outcomes between American and Italian cities with similar prevalence rates (Mancini & Prati, 2022). Given the dynamic situation and the variable impact of local conditions on both mental health outcomes and disruptions to daily life, future studies exploring the impact of the pandemic on mental health should consider more nuanced and longitudinal assessments, including specifically assessing for media consumption and negative COVID-related impacts, to better understand the effects of rapidly changing local circumstances on mental health. Future studies should also explore the social impact of COVID on individuals with psychosis spectrum disorders by assessing for both socially relevant symptoms (i.e., negative symptoms) and obtaining more comprehensive reports of social engagement, including information on who participants are spending time with during the pandemic and the quality of that social contact.

Additionally, given that the most common adverse COVID-related impacts in the current study were changes in health behaviors (e.g., poorer diet, more sedentary), it will be important for future research to further examine how the pandemic has impacted health-related behaviors among those with psychosis spectrum disorders. Specifically, future studies should seek to determine whether changes in health-related behaviors persist over time and assess how these changes impact long-term health outcomes for individuals with psychosis spectrum disorders. This is particularly important given that before the pandemic, individuals with psychosis spectrum disorders were already less physically active compared to controls and had increased rates of chronic health problems, including higher rates of both diabetes and

obesity (Annamalai et al., 2017; Stubbs et al., 2016). Additionally, it will be important for future research to directly measure the relation between paranoid ideation in samples with psychosis spectrum disorders and compliance with health behaviors that prevent the spread of COVID. Understanding the relation between symptoms and protective COVID-related health behaviors is crucial as those with psychosis spectrum disorders are at increased risk for serious illness and death from COVID due to higher rates of chronic medical conditions (Annamalai et al., 2017; Du et al., 2021; Olfson et al., 2015) and unique interventions may be required to educate and engage individuals high in paranoid ideation on the importance of protective health behaviors.

In summary, current findings demonstrate that COVID-19 has important implications for individuals with psychosis spectrum disorders. Our findings show that levels of social distress have increased during the pandemic and that more negative experiences during the pandemic have helped to maintain levels of social distress from pre-pandemic levels. Also, more negative experiences during the pandemic are related to poorer social support, greater social distress, and worse symptoms during the pandemic. Current findings also highlight the relation between paranoid ideation and negative perceptions of the government's response to COVID. These findings have implications for our understanding of how the COVID pandemic can impact social perceptions and symptoms for individuals with psychosis spectrum disorders. Additionally, the current findings raise concerns about how paranoid ideation may create barriers to engaging in COVID-related protective health

behaviors, especially if these behaviors are recommended or mandated by the government.

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