Resilience and adaptation in the face of the COVID-19 pandemic: Complex mixed methods research of adults in Minnesota and Hong Kong

A DISSERTATION

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Dedication

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Abstract

The COVID-19 pandemic has led to escalating family conflicts while limiting resources previously available to cope with stress. The mechanisms underlying resilience in the pandemic largely remain a black box. This dissertation aims to generate a holistic understanding of the trajectories of resilience capacity in response to complex acute-onset and chronic stress associated with the pandemic. My proposed Multisystemic Resilience Framework, a conceptual framework, illuminates resilience as a developing capacity changing over time. Informed by and empirically examining the framework, this dissertation employed complex mixed methods design targeting adults living with family members in Western cultures (i.e., Minnesota) and Eastern cultures (i.e., Hong Kong) over the first two years of the pandemic.

Study 1 used a sequential, explanatory mixed-methods design to generate a fuller understanding of resilience capacity as manifested by individual and family resources, cumulative pandemic-related stressors, and mental health of adults. Structural equation modeling was used to examine the moderating roles of coping resources in each region, while qualitative content analysis elucidated the quantitative findings. Coping resources predicted around one-third of the variance in perceive resilience capacity during the early outbreak of pandemic in each region. Different individual and family coping resources were protective of adult mental health when facing high levels of pandemic-related stressors. The qualitative findings illuminated the situation-specific and culture-specific coping strategies utilized by participants.

Study 2 used a critical realism paradigm to deepen the understanding of resilience mechanisms under specific contextual conditions throughout the pandemic. These resilience mechanisms, involving family hardiness, distress tolerance, and cognitive flexibility, offered insights into ways that individuals and families cope with complex stressors involving competing priorities. The study elucidated ways that individuals balanced family togetherness, family roles and responsibilities with their personal sense of safety from the infectious nature of COVID-19.

Overall, this complex mixed methods research provides significant theoretical, methodological, and empirical contributions to our current understanding of resilience mechanisms within sociocultural contexts. While these empirical findings align with existing psychological treatments, the findings are suggestive of the need for culturally-tailored interventions to effectively ameliorate the negative impacts of a global pandemic and future related crises.

Keywords: COVID-19 pandemic; critical realism; cross-cultural; mixed methods; resilience

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Introduction
Resilience in the COVID-19 Pandemic

The global public health crisis caused by the coronavirus disease 2019 (COVID-19) has lasted much longer than expected. The pandemic has introduced higher physical and psychological health risks to younger individuals, females, member of a minority racial group, those in the lowest income quantile, those living without a partner, and those with young children (Aknin et al., 2022; Chan & Sneed, 2023; Manchia et al., 2022). In addition, pre-existing socioeconomic inequalities and socio-political unrest exacerbated psychological distress among at-risk adult populations. Emerging evidence demonstrated that resilience capacity is the immune system to accumulative acute and chronic stressors in protecting adults' psychological well-being over the course of the pandemic (Chen & Bonanno, 2020; Manchia et al., 2022). In this dissertation, resilience is defined as the capacity of individuals and groups (e.g., family, community, society, etc.) to utilize their existing resources and navigate their way to the new psychological, social, cultural, and physical resources that sustain their well-being in the context of exposure to significant adversity (Ungar, 2021). Furthermore, resilience reflects the capacity individually and collectively to negotiate for these resources to be provided in culturally meaningful ways.

Resilience may limit psychological distress caused by the COVID-19 pandemic (Prime et al., 2020). However, our understanding of how specific individual- and family-level coping resources and perceptions contribute to resilience capacity during stressors such as a pandemic, and to what extent these factors differ by cultures, is limited (Carnahan et al., 2022; Chan et al., 2021; Wang et al., 2021). For example, high levels of cognitive flexibility, emotional regulation, and family communication buffered stressors

and psychological distress throughout the pandemic (Chan et al., 2021; Hou et al., 2021; Riehm et al., 2021). However, most findings were drawn from cross-sectional data in the early months of the pandemic. Limited studies adopted longitudinal designs to disentangle how coping resources influence the impact of stressors on mental health trajectories (Carnahan et al., 2022). In addition, few studies have compared Western and Eastern cultures in the resilience processes in the face of uncertainties and ambiguities during the global pandemic (Cheng et al., 2023). This calls for longitudinal, cross-cultural studies disentangling the interplay of individual and family processes that support or hinder adjustments and adaptations throughout the pandemic.

Theoretical Framework

Current Conceptualization and Gaps of Stress and Resilience

Stress and resilience research has been conceptualized and grounded in both Psychology and Family Science for decades. A variety of definitions of resilience are used in both fields, which overlap considerably in their methods and models. A commonly used definition from Psychology defines resilience as the capacity of a dynamic system to adapt successfully through multisystem processes to challenges that threaten the function, survival, or development of the system (Masten, 2021). Originating in Family Science, the Contextual Model of Family Stress depicts the process through which families respond to stressful events and the resulting differences in family functioning under the influence of the family and sociocultural factors (Boss, 2002; Boss et al., 2016; McCubbin & Patterson, 1983). These family processes are determined by the

interplay between the availability of existing and new resources, as well as the perceptions of the crisis, stressors, and resources.

There are three key elements common to the conceptualization of resilience across both fields: (a) a condition of risk to initiate the resilience process, (b) resources which facilitate resilience processes; and (c) adaptive outcomes despite exposure to risk (Patterson, 2002). While Psychology research tended to consider family structure and dynamics as the protective and risk factors to empower individual resilience capacity, Family Science research embedded family stress in the family's internal and external context (e.g., family values and belief systems, sociocultural context, etc.) without the explicit linkage to the resilience capacity. However, less is known about the individual differences in relevant psychosocial processes associated with resilience, i.e., how the availability of multisystemic resources, as well as the perceptions of the crisis, cumulative stressors, and resources potentially promote or hinder the trajectories of adaptation.

Overall, systematic reviews revealed that definitions and meaning of resilience are inconsistent and ambiguous across cultures. Furthermore, the existing self-reported resilience measures are unlikely to capture the complexity of resilience within and across cultures (Maurović et al., 2020; Windle et al., 2011). Instead of our current limited understanding of the elements, it is important to better understand the connections for the "how", "why", and "under what condition" of the developing resilience capacity processes in sociocultural contexts using both quantitative and qualitative methodologies

(Ungar, 2013). A better fundamental understanding of these mechanisms would move the field vertically at the basic and applied levels, by translating knowledge into practice.

Proposed Multisystemic Resilience Framework

Because the current understanding of family stress and resilience are not well-connected, I have integrated resilience with family stress into a working conceptual model called the Multisystemic Resilience Framework (**Figure 1**) building upon the Contextual Model of Family Stress and the current literature (Boss et al., 2016). The Multisystemic Resilience Framework depicts resilience as a developing capacity changing over time as a result of the intersection of multisystemic resources and perceptions embedded in the sociocultural context leading to differential trajectories of individual and family adaptations. First, when it comes to stressors, adults have a tendency to retrieve their past experiences of coping with similar adversities as a shortcut to tackle the current challenges. Past experiences may enhance the sense of threat and speed up the reaction time, while simultaneously arousing psychological distress induced by previous stressors. This framework also acknowledges that individuals and families may accumulate the experiences of pre-existing vulnerabilities as well as acute and chronic stressors over time.

Multisystemic resources and perceptions are two key interacting structures in the process of developing resilience capacity. Multisystemic resources refer to the relatively stable internal and external factors from the multisystem (e.g., individual, family system, socio-cultural context) that are appraised by individuals as available for use in facing stressors and to maximize well-being (Martin, 2002). Resources include material

resources (e.g., financial resources), social resources (e.g., social contact and support) and psychological resources (e.g., coping style, personality, feelings of control; Martin, 2002). In addition, each type of resource may come from different sources in the multisystem, such as cognitive flexibility from an individual, family strengths and shared confidence in overcoming challenges in the family, and community cohesion. It is important to note that multisystemic resources are dynamic, in which the accessibility, intention to use, and the extent of actual adoption of specific multisystemic resources may change over the course of the crisis.

Individuals, families, and community members create different meanings and values in interpretating stressful events over time. Perception consists of the cognitive triad (Beck, 1979), including affect (e.g., feelings and emotions towards the uncertainty and ambiguity), cognition (e.g., knowledge and schema regarding the stressful events, thoughts about the resources, beliefs and values in confronting challenges), and behavioral tendencies (e.g., specific responses to uncertainty or ambiguity). Each of these aspects also varies by sociocultural context (Boss, 2002; Breckler, 1984). For example, when it comes to family caregiving, a person from an individualistic culture may consider taking care of family members outside the nuclear family as a sacrifice; another person from a collectivist culture may perceive caregiving for the blood ties as a family responsibility or obligation. The way an individual or family perceives an event or situation determines the degree of stress they experience which may impact the subsequent adaptation. In addition, the perception may change over time as the stressors persist. A caregiver may perceive family caregiving as an opportunity to support and

grow in the short-term but interpret it as a stressor overwhelming one's well-being in the long-term. Above all, it is common to find disagreement or incongruences between one or more levels in (a) affect, cognition, and behavioral tendency within the same person, (b) the person's ideal self and the actual experience, and (c) attitude towards the same event between the individual, the family, and the society (Boss et al., 2016; Rogers, 1957). Thus, the perception may change over time given new circumstances and the motivation to resolve tensions and conflicts within and between the inner and outer systems.

The time required for adaptation for individuals and families depends on how one utilizes, navigates, and negotiates different resources and perceives the crisis. The adaptation consists of different domains, not limited to physical, psychological, social, and economic well-being (Hiebel et al., 2021). The understanding of adaptation varies by sociocultural contexts as different cultures have different priorities for different dimensions of well-being. An individual may have stable mental status but internalize distress into somatic symptoms. One may be functional in their work, but dysfunctional as a parent in their family context. Thus, it is important to holistically examine individual and family functioning, rather than a single dimension.

An emerging body of research has explored how social and cultural context can interact with stress and resources supporting resilience. This work provides evidence that the mechanisms of resilience and mental health outcomes may manifest differently across sociocultural contexts (Hansford & Jobson, 2021). Sociocultural contexts of individuals include, but are not limited to, culture (i.e., shared norms and values), race, ethnicity, and socioeconomic status. These contexts may differ across a number of domains. One model

of examining national cultures found six distinct dimensions, including individualism-collectivism, power distance, masculinity-femininity, uncertainty avoidance, long term – short term orientation, and indulgence-restraint (Hofstede & Minkov, 2010). Different cultural values and social contexts influence how individuals and families perceive and determine the nature of ambiguity and stress, the meaning of stressors, the ways of facing stressors, and appropriate responses.

Context in Minnesota and Hong Kong

Cultural Dimensions in the Two Regions

In order to understand the intersectional influences of family and culture in the face of the pandemic, this dissertation was conducted in Minnesota and Hong Kong, representing western and eastern cultures, respectively. While there exists heterogeneity and subcultures in each region, it is helpful to consider broader cultural differences when examining these processes in each region. Using a dimensional approach to evaluating culture, the U.S. and Hong Kong were positioned differently across six dimensions of national/regional cultures (Hofstede & Minkov, 2010). In 2017, a team rated different countries and regions using 100-score (from 1 being the lowest to 100 being the highest) in each dimension. Power distance represents the degree to which the less powerful members of a unit (e.g., family, society, etc.) accept and expect that power is distributed unequally. The U.S. was scored at 40 (low power distance), in which Americans embraced equal distribution of power and need justifications. Hong Kong was scored at 68 (high power distance), in which Hong Kong Chinese tended to accept a hierarchical order in the family and society. Individualism-collectivism represents the cultural

preference across the spectrum of loose to tight ties to interpersonal relationships. The U.S. was scored at 91 (more individualistic), in which Americans emphasized pursuing personal goals and autonomy. In the family, Americans were generally expected to take care of only themselves and their immediate family. Hong Kong was scored at 25 (more collectivistic), in which Hong Kong Chinese emphasized maintaining relationships and social harmony. In the family, Hong Kong Chinese were expected to take care of their relatives and extended family members with unquestioning loyalty. Masculinity-femininity represents the degree to which society focuses on achievement, heroism, assertiveness, and material rewards for success, in comparisons to cooperation, modesty, caring for the weak, and quality of life. The U.S. and Hong Kong both scored similarly at 62 and 57 (more masculine), respectively, in which both generally valued achievement and success, compared to valuing quality of life. Uncertainty avoidance represents the degree to which individuals feel comfortable and embrace tolerance of ambiguity, uncertainty, and expectation in society. The U.S. and Hong Kong were scored at 46 and 29, respectively, in which Hong Kong Chinese were more likely to tolerate ambiguity and uncertainty, in comparison with feeling in control of the future. The long term-short term orientation represents the extent to which individuals associate connections of the past with the current and future actions or challenges. The U.S. was scored at 26 (short-term orientation), in which Americans tended to focus on present or past, prioritizing these over the future. Hong Kong was scored at 61 (long-term orientation), in which Hong Kong Chinese were more likely to prepare for the future with persistence, perseverance, and adaptability. Indulgence-restraint represents the extent of freedom that societal norms

give to citizens in fulfilling their human desires. The U.S. was scored at 68 (indulgence), in which Americans tended to emphasize relatively free gratification of needs, such as enjoying life and having fun. Hong Kong was scored at 17 (restraint), in which Hong Kong Chinese were more likely to suppress gratification of needs regulated by strict societal norms.

COVID-19 Pandemic and Policies in the Two Regions

Apart from culture, it was important to note the differences in the course of COVID-19 development and related policies in each region. These external contextual factors impacted how individuals and families perceived what they experienced during the COVID-19 pandemic. Rather than studying the U.S. nationally, I selected a single state, Minnesota, to sample because of the wide variability in COVID cases across states as well as state-level social distancing mandates. The two regions were of approximately the same population size (5.6 to 7.5 million at the time of the study; Hong Kong Census and Statistics Department, 2020; United States Census Bureau, 2020). Each region launched their own set of social distancing policies in early 2020. Although the course of the pandemic progressed differently in the two regions, individuals and families coincidently experienced sociopolitical unrest with political polarization and mass protests, that is, the Black Lives Matter movement following the murder of Black men by police officers Minnesota in May 2020 (Dave et al., 2020), and social unrest in Hong Kong in 2019 (Ismangil & Lee, 2020).

Pandemic Course in Minnesota

In Minnesota, the first confirmed COVID-19 case was reported in early March 2020 (Department of Health in Minnesota, 2023). The first peak with over 2,000 daily COVID-19 cases was between late October 2020 and late December (*M* = 4,462; *SD* = 2,793, range = 2,017-2,050; see **Figure 2**). The second peak was in April 2021 (*M* = 2,091; *SD* = 45, range = 2,017-13,619). The third peak occurred between mid-September 2021 and mid-May 2022 (*M* = 4,540; *SD* = 3,121, range = 2,026-13,619). The daily COVID-19 cases have remained fewer than 1,000 between September 2022 and mid-March 2023.

According to the COVID-19 Stringency Index[1] (Hale et al., 2021), the US federal government response was moderately stringent between April 2020 and March 2021 (Range: 59-73). The social restrictions were relaxed following the wide implementation of COVID-19 vaccines, with differential social restrictions between the vaccinated and non-vaccinated between April and December 2021 (Range for vaccinated: 44-50; Unvaccinated: 56-59). The following describes the specific pandemic case trends and policies in Minnesota. In mid-March 2020, the Governor of Minnesota declared a state of emergency (Department of Health in Minnesota, 2023). Beginning in March 2020, the stay-at-home recommendation with remote school and working, as well as closure of indoor dining and entertainment venues was executed. In late July 2020, the Governor

[1] The COVID-19 Stringency Index is a composite measure based on nine government response indicators, including school closures; workplace closures; cancellation of public events; restrictions on public gatherings; closures of public transport; stay-at-home requirements; public information campaigns; restrictions on internal movements; and international travel controls. The Index was updated periodically between January 2020 and December 2022, ranging from 0 to 100 (100 indicates the strictest response).

enforced mask mandates in indoor public space. In November 2020, the Governor imposed restrictions of indoor and outdoor private gatherings with a limitation of people. Most of the pandemic-related policies were gradually lifted between March and May 2021. The COVID-19 vaccination was widely rolled out in March 2021. Around two-thirds of the adult population had been vaccinated by June 2021.

Pandemic Course in Hong Kong

In Hong Kong, the first confirmed COVID-19 case was reported in late January 2020 (Government of the Hong Kong Special Administrative Region, 2023). During the first two years (i.e., between late January 2020 and January 2022), daily COVID-19 cases stabilized around 130 or fewer new infection (M = 19.66; SD = 27.83, range = 0-129; see **Figure 2**). The first peak with over 1,000 daily COVID-19 cases was between early February and April 2022 (M = 18,391; SD = 19,050, range = 1,082-66,194). The daily COVID-19 cases remained over 1,000 between mid-June 2022 and mid-March 2023.

According to the COVID-19 Stringency Index (Hale et al., 2021), the Hong Kong government response was moderately stringent between March 2020 and March 2021 (Range: 42-71). The social restrictions were relaxed intermittently in two months, i.e., June and October 2021 (Range: 41-52). The following describes the specific pandemic case trends and policies in Hong Kong. Beginning in early February 2020, the Hong Kong government introduced strict pandemic-related policies, including issuance of isolation orders to infected persons in the hospital and quarantine orders to close contacts of infected persons (Government of the Hong Kong Special Administrative Region, 2023). In late March 2020, the government imposed travel restrictions and social

distancing measures for indoor or outdoor premises. In July 2020, the government enforced mask mandates in all indoor and outdoor public spaces. In January 2021, the Hong Kong government implemented mandatory lockdown in the restricted areas where all residents must stay at home for mandatory COVID-19 testing. In early March 2021, the COVID-19 vaccination was rolled out. Around two-thirds of the population had been vaccinated by January 2022. In November 2021, the government mandated citizens to use a mobile application for the purpose of contact tracing whenever entering government buildings or public places, including restaurants, supermarkets, and shopping malls. All the pandemic-related policies were gradually lifted between January and March 2023.

Impact of Sociocultural Differences in the Two Regions during the Pandemic

Given different national/regional cultures and pandemic situations, it is important to take into account how sociocultural differences might influence individuals' and families' responses to the pandemic in Minnesota and Hong Kong (Velamoor & Persad, 2020). First, the Hong Kong government and citizens were prompt in reacting to the COVID-19 pandemic in early 2020 in view of the past experiences of severe acute respiratory syndrome (SARS) pandemic in 2003 (Matus et al., 2023). During the 5-month SARS pandemic, there was severe outbreak in some hospitals and one housing estate (Chan-Yeung & Xu, 2003). As Hong Kong Chinese tended to embrace long-term orientation, they were more vigilant and prepared for the early COVID-19 pandemic in view of the past pandemic experiences relative to Minnesotans. Most citizens in Hong Kong had high awareness of personal hygiene and were accustomed to wearing masks and social distancing in the early COVID-19 pandemic (Chan et al., 2021; Matus et al.,

2023). On the other hand, it was the first time for Minnesotans to experience a pandemic in 2020, and mask wearing was a novel experience to the majority (Kemmelmeier & Jami, 2021). Second, Minnesota and Hong Kong had different levels of power distance (Hofstede & Minkov, 2010), which might be associated with the degree of compliance and resistance to the restrictions resulting from pandemic-related policy. As the government was the central authority, Hong Kong Chinese were viewed as more likely to embrace harmony with the natural order, and tolerate and accept restrictions imposed by the government during the pandemic relative to Minnesotans (Lee, 2020). On the other hand, when compared to Hong Kong Chinese, Americans were more inclined to challenge norms as they believed that government decisions were less participative with stakeholders (Lee, 2020). Accordingly, Minnesotans were viewed as more likely to show resistance to social distancing recommendations in the pandemic relative to Hong Kong Chinese (Lee, 2020). Third, in addition to cultural differences, it was important to take into account how race, ethnicity, and socioeconomic status may associate with a disparity in psychological well-being within each culture. In the U.S., racial and ethnic minorities had been disproportionally affected by COVID-19 because they were disproportionately represented among essential workers who were at higher risk of being exposed to COVID-19. These groups also tend to have barriers in access to multisystem resources (e.g., living in spacious housing; Tai et al., 2020). In view of the above, it was essential to examine how the mechanisms of resilience (i.e., how the intersection of perceptions and resources empower successful adaptation in response to the pandemic-related stressors) might be universal as well as culturally specific to each sociocultural context.

Self as Researcher

Born and educated in Hong Kong, I had the privilege to pursue a doctoral degree in Family Social Science, at the University of Minnesota beginning in the Summer of 2019. Hong Kong is a largely homogenous society, with over 90% people being ethnically Chinese, embracing patriarchal family values (Hong Kong Census and Statistics Department, 2020). As an international Asian graduate student, I personally experienced the diverse sociocultural values in Minnesota and the United States. I could identify some personally shared and distinct family values with different ethnic/racial groups from both theories in class and personal experiences in day-to-day life over the past four years.

Because I experienced the outbreak of SARS in Hong Kong in 2003, it was quickly evident to me that in the early months in the 2020 that the COVID-19 pandemic presented a global challenge to both individuals' and families' coping. I also recognized that coping strategies would vary with respect to significant regional and cultural differences. Recognizing the unique opportunity to study cross-cultural resilience, I initiated a longitudinal study to systematically examine and explore how resilience capacity influenced the trajectories of individual and family adaptations in Minnesota and Hong Kong.

In the past four years, I lived in the Twin Cities, Minnesota most of the time. While I maintained regular virtual contact with my immediate and extended family in Hong Kong, I travelled to Hong Kong three times during the winter breaks of 2019 (before the global pandemic emerged), 2021 and 2022 (in the midst of the pandemic). As

an emerging researcher who was sensitive to cultural nuances, I considered myself to be an insider physically living in Minnesota but an outsider to the American cultures, while an outsider physically living outside Hong Kong, but an insider to the Chinese cultures. In addition, I was aware of how the social unrest in Hong Kong in 2019 and the George Floyd incident in the Twin Cities, Minnesota in 2020 impacted my lived experiences of COVID-19 pandemic.

As a post-positivist researcher, I follow the approach of critical realism (Maxwell, 2012). First, I believe that the reality is stratified into three levels, including the 'empirical', consisting of experienced reality (e.g., checking in and sending masks to family members); the 'actual', consisting of actual or possible events if activated (e.g., social structure such as geographical proximity with family members; individual agency such as fear of family members infecting COVID-19); and the 'real', consisting of mechanisms and structures that trigger events (e.g., showing love and care toward family members; Maxwell, 2012). Second, I believe that reality may exist independently of our awareness of the mechanisms. That is, human knowledge captures only a small part of reality (i.e., empirical and some actual level). Thus, I uncover the underlying unobservable mechanisms under specific contexts and structures (Maxwell, 2012). Third, I believe that the world is theory-laden, but not theory-determined. Although the proposed Multisystemic Resilience Framework, a conceptual framework, helps me get closer to the reality (i.e., identifying the mechanisms and structures), I believe that existing knowledge is fallible and is always partial and subject to revision (Fletcher, 2017). That is, I can potentially support, elaborate, or deny the existing theory and

concepts by building a new and more accurate explanation of reality (Fletcher, 2017). Fourth, I believe that mixed methods were an important methodology to identify the mechanisms. The quantitative data helps identify observable patterns of events, while the qualitative data helps understand for whom, in what circumstances, and how these regularities have a tendency to occur (Brown et al., 2020).

The Present Study

Given the differences in cultural dimensions, the course of the COVID-19 pandemic, and relevant policies, this dissertation aimed better understand the mechanisms of resilience contributing to adaptation of adults in the Western cultures (i.e., Americans in Minnesota, U.S.) and Eastern cultures (i.e., Chinese in Hong Kong, China) throughout the COVID-19 pandemic. The dissertation was informed by my proposed Multisystemic Resilience Framework. This framework depicts resilience as a developing capacity changing over time. The trajectories of individual and family adaptations are determined by the intersection of multisystemic resources and perceptions embedded in the sociocultural context (**Figure 1**). I used complex mixed methods design with three waves of data collection (Creswell & Clark, 2017; Tashakkori et al., 2020). Specifically, I used longitudinal quantitative data to examine part of the framework first (Waves 1: May 20 – June 30, 2020; Wave 2: July 13 - August 5, 2021) and then elucidated the quantitative results and the full framework with in-depth follow-up qualitative data (Wave 3, see **Figure 3**).

Study 1 (Chapter 2) used a sequential explanatory mixed-methods design to generate a partial understanding of resilience capacity as manifested by individual and

family resources, accumulated pandemic-related stressors, and the mental health of adults in Minnesota and Hong Kong over the course of the first two years of the pandemic. Longitudinal online surveys were administered to the same groups of adults who lived with at least one family member and experienced social distancing in the early outbreak of the COVID-19 pandemic. Structural equation modeling was used to examine the moderating roles of individual and family resources in each region as depicted in the proposed framework. Individual interviews were conducted with a subsample of sample who experienced high pandemic-related stressors at Wave 2 and reported varied levels of resilience capacity at Wave 1.

Aim 1 examined the proportion of variance in perceived resilience capacity that could be explained by individual and family resources in each region during the early months of the pandemic.

> I hypothesized that perceived resilience capacity would be predicted by individual and coping resources in the early months of the pandemic (H1)

Aim 2 examined individual and family resources measured early in the pandemic as moderators of the relationship between pandemic-related stressors and the psychological distress of adults approximately one year later in both regions taking into account demographic differences,

> I hypothesized that higher adaptive individual and family coping resources in the early pandemic would be associated with less psychological distress after one year (H2), and that higher adaptive coping resources would buffer psychological distress in times of high levels of pandemic-related stressors (H3).

Aim 3 explored situation-specific and culture-specific coping strategies to further illuminate the identified significant moderators in each region.

Study 2 (Chapter 3) used a critical realism paradigm to generate a fuller understanding of resilience mechanisms under specific contextual conditions over the course of the first two years of the pandemic. The qualitative phase sought to deepen the understanding of how the intersection of multisystemic resources and perceptions as a process contributed to the successful adaptation facing high pandemic-related stressors over time within and across the two regions. Moreover, I identified the conditions that triggered the resilience mechanisms during the pandemic (e.g., cultural factors). Specifically, semi-structured interviews were conducted with an interview protocol to explore each element of the proposed framework, i.e., stressors, multisystemic resources, perceptions, adaptation, and social cultural context throughout the pandemic.

Aim 4 explored the resilience mechanisms contributing to the adaptation of American adults in Minnesota and Chinese adults in Hong Kong over the course of the COVID-19 pandemic.

Research questions:

Among adults who lived with family members and experienced high levels of pandemic-related stressors, what did resilience capacity look like in Minnesota and Hong Kong throughout the first two years of the pandemic?

How did individuals and families navigate and negotiate their resources to sustain their well-being and functioning in the face of the COVID-19 pandemic?

Collectively, Chapter 4 discussed the theoretical, methodological, and empirical contributions of this complex mixed methods research. Specifically, I discussed the insights about resilience mechanisms generated from Study 1 and 2, as well as the future directions.

Complex Mixed Methods

This study adopts complex mixed methods research design because mixed methods research is rooted in the assumptions of complexity and complex systems (Poth, 2018). Specifically, Kallemeyn et al. (2020) described complex mixed methods research drives by complexity theory as seeking to unpack the complexity of phenomenon through (a) perceiving the worldview as essentially interconnected, (b) disentangling the study of complex systems, and (c) the ensuring congruence of methods. In my complex mixed methods research, I was interested in unpacking the complex human psychosocial reactions in response to the uncertainties and ambiguities arising from the rapidly changing COVID-19 pandemic over time. The complex systems included individuals interacting with family members living in the same or different households, the community, social policies, and cultures as a whole.

The adaptation of complex mixed methods research design goes beyond the traditional sequential, explanatory mixed methods design in one single study. First, the longitudinal data collection considers the temporality of findings. While Study 1 examines how coping resources at the early outbreak of the pandemic are associated with the change of psychological distress spaced appropriately one year apart, Study 2 illuminates resilience as a process with consideration of changes over time (i.e., prior to

and during the first two years of the pandemic). Second, the Wave 1 and 2 quantitative design empirically examines part of the resilience mechanisms, that is, the moderating roles of individual and family coping resources between stressors and psychological distress. The subsequent Wave 3 qualitative design of Study 1 further illuminates the situation-specific and culture-specific coping strategies under the pandemic in Minnesota and Hong Kong. Study 2 is a standalone qualitative study using the Wave 3 data to uncover the unknown resilience mechanisms marked with chaos and complexity, nonlinear relationships, multiple causality, interactions of individual, family systems and culture, as well as the interplay of individual agency and social structure (Kallemeyn et al., 2020).

To do so, I consistently deployed a postpositivist paradigm in both studies. Study 1 adopted a conventional postpositivist paradigm using a sequential, explanatory mixed methods design, in which I understood the whole (i.e., resilience mechanisms) through careful study of the parts (i.e., individual and family resources, mental health). I acknowledged that individual and family resources could only explain some of the known sources of explained variations in psychological distress. To take into account of the unexplained variations, I controlled for individual differences such as demographic variables by including these as covariates. The subsequent qualitative content analysis further explained the situational and cultural factors in which specific coping strategies promoted or hindered mental health (Creswell & Clark, 2017). Study 2 adopted a postpositivist critical realism paradigm and qualitative content analysis, in which I acknowledged the complexity of reality through social interactions of different layers in

the ecological system (Maxwell, 2012). The adoption of critical realism removed the assumptions from Study 1 and explored the unknown unknowns underlying the resilience mechanisms over the course of pandemic.

Study 1 – Resilience and mental health during the COVID-19 pandemic: A longitudinal mixed methods study from Minnesota and Hong Kong

Introduction

The uncertainties and distress brought by the global COVID-19 pandemic has produced a persistent and substantial impact on public mental health. However, we know little about the resilience processes that may relevant during the pandemic, i.e., the specific individual and family resources or processes that buffer the negative impact of the pandemic on mental health, and how those processes may vary by sociocultural context. The present longitudinal, mixed methods study aimed to generate a better understanding of resilience capacity (manifested by individual and family resources), cumulative pandemic-related stressors, and mental health of adults living with family members in Minnesota and Hong Kong over the course of the first two years of the pandemic.

The COVID-19 pandemic has contributed to an unprecedented mental health crisis with worsening psychological distress, such as heightened depression, anxiety, and stress symptoms, in adult populations (Aknin et al., 2022). Recent systematic reviews of longitudinal studies demonstrated that adult mental health problems peaked in the early months of the pandemic in 2020, while the prevalence of depression and anxiety symptoms decreased over the course of the first year of the pandemic (Bourmistrova et al., 2022; Cénat et al., 2022; Manchia et al., 2022). Notably, there were regional variations in mental health symptoms, with a higher prevalence of anxiety, depression, and loneliness in North America compared to Europe, Asia, and Latin America (Cénat et

al., 2022). However, there was a lack of longitudinal studies conducted outside of Western, educated, industrialized, rich, and democratic regions (e.g., Asia; Cénat et al., 2022). Longitudinal, cross-cultural research may help uncover the trajectories of individual pandemic-related adaptations in physical and psychosocial wellbeing across the Eastern and Western regions.

While adaptive individual coping generally alleviates psychological distress, global studies have demonstrated variability in these processes across cultures and gender during the pandemic (Prime et al., 2020). A meta-analysis of studies conducted in 44 nations demonstrated that culture moderated the association between individual coping style and levels of psychological distress during the early outbreak of the pandemic from January to July 2020 (Cheng et al., 2023). Overall, across nations, higher problem-focused coping (i.e., exerting direct effort to confront problems) was associated with lower anxiety and depressive symptoms, while higher avoidance coping (i.e., escaping from problems and resorting to passive strategies) was associated with higher psychological distress. Interestingly, under cultures with high masculinity (i.e., achievement-oriented cultural norms), higher emotion-focused coping (i.e., regulating unpleasant emotions and making oneself feel better) was associated with higher psychological distress. The use of emotion-focused coping without proactively tackling problems might not fit well with the achievement-oriented cultural norms. Moreover, in cultures with high uncertainty avoidance (i.e., less tolerant of the ambiguity in unpredictable situations), higher support seeking (i.e., reaching out for material/behavioral assistance and emotional support) was associated with higher anxiety.

Facing the largely unknown virus and uncertainties early in the pandemic, people from cultures that avoid uncertainty tended to rely on others for support and assurance. However, the heightened needs were not met when accessing social support or tangible services was limited under social restrictions in the early pandemic. Moreover, emerging studies showed that gender played a role in coping strategies and psychological adaptation during the pandemic (Kolakowsky-Hayner et al., 2021; Krase et al., 2022; Rana et al., 2021). Specifically, women were more likely than men to develop mental health symptoms but also more likely to seek emotional support. It is unclear whether gender would moderate the association between coping strategies and psychological distress, particularly in cultures which embrace self-reliance and restricted emotionality (Cheng et al., 2010). Altogether, these findings encourage additional studies examining how individual coping resources contribute to the mental health of adults facing pandemic-related stressors across gender and diverse cultures over the course of the pandemic.

While emerging studies illuminated that individual coping strategies impacted mental health, few empirical studies have examined how family coping resources played a role during the pandemic (Gayatri & Irawaty, 2022). Existing empirical studies primarily explored how the emergence of the pandemic disrupted family routines and changed family dynamics (Bates et al., 2021; Eales et al., 2021; Wong et al., 2022). Thus, Walsh (2020) called for the exploration of how family-level meaning-making and a positive, hopeful outlook in the family promoted individuals and family members to withstand and rebound from disruption and multiple losses during the pandemic. To

address these empirical gaps, my previous cross-sectional findings demonstrated that different elements of family resources were protective against the adverse psychological effects of pandemic-related stressors in the Eastern and Western regions during the early months of the pandemic outbreak (Chan et al., 2021). Specifically, high levels of open family communication and collaborative problem solving were protective of family members' stress levels in Minnesota, while high levels of family-based positive outlook exacerbated the relationship between pandemic-related stressors and anxiety symptoms in Hong Kong. Because these were cross-sectional findings from early in the pandemic, it was not clear how individual and family resources at the start of the pandemic might moderate the association between pandemic-related stressors and trajectories of psychological distress over the full course of the pandemic.

The Present Study

Informed by the proposed Multisystemic Resilience Framework (see **Chapter 1**), this longitudinal study sought to generate a fuller understanding of resilience capacity as manifested by individual and family resources, cumulated pandemic-related stressors, and the mental health of adults in Minnesota and Hong Kong over the course of the first two years of the pandemic. Specifically, this study used a sequential explanatory mixed-methods design to (a) examine the proportion of variance in perceived resilience capacity that could be explained by individual and family resources in each region during the early months of the pandemic, (b) examine individual and family resources measured early in the pandemic as moderators of the relationship between pandemic-related stressors and the psychological distress of adults approximately one year later in both regions (see

Figure 4), and (c) explore the situation-specific and culture-specific coping strategies to further illuminate the identified significant moderators in each region. For the quantitative phase, I hypothesized that perceived resilience capacity would be predicted by individual and coping resources in the early months of the pandemic (H1), higher adaptive individual and family coping resources in the early pandemic would be associated with less psychological distress after one year (H2), and that higher adaptive coping resources would buffer psychological distress in times of high levels of pandemic-related stressors (H3).

Methods

This longitudinal study employed a sequential explanatory mixed methods approach to examine the relationships of the main study variables using quantitative data and to further explain the statistical findings of situation-specific and culture-specific coping strategies using qualitative results (See **Figure 3**; Creswell & Clark, 2017). The study began with two waves of online quantitative surveys spaced approximately one year apart targeting the same groups of American adults in Minnesota and Chinese adults in Hong Kong. To deepen the understanding of resilience processes, a subsequent wave of qualitative individual interviews was conducted virtually with a purposive sample who reported high exposure to pandemic-related stressors and varied perceived resilience capacity in the survey. This study was approved by the author's university ethics review boards in Minnesota and Hong Kong.

Wave 1 and 2: Quantitative Survey

The Wave 1 online survey was administered during the early outbreak of the pandemic (May 20–June 30, 2020), with 1,039 adult responses (442 from Minnesota; 597 from Hong Kong; Chan et al., 2021). The Wave 2 survey was administered after the availability of vaccines (July 13 - August 5, 2021), with 424 responses (209 from Minnesota; 215 from Hong Kong). The dropout rate was 64.0% and 52.7% in Minnesota and Hong Kong, respectively.

Procedures

Survey respondents were adults over aged 18, living with at least one family member in Minnesota or Hong Kong, and practicing social distancing at recruitment. Participants were excluded if they were living on their own or living with non-family members only. Social distancing referred to the mandatory or voluntary practice of reducing physical contact with people outside of the home (e.g., in social, work, or school settings) to reduce the risk of transmission of COVID-19. Only one member from each household was encouraged to participate.

Convenience and snowball sampling was used to recruit participants from both regions in the Wave 1 (Chan et al., 2021). Study information was advertised on local Facebook groups and via university networks in Minnesota and Hong Kong, respectively. Participants were directed to a link for the Qualtrics survey. IP addresses were checked to confirm the unique identity and location of participants. Participants could opt in for a follow-up study and/or a random drawing of a gift card upon completion of the survey.

After approximately one year, participants who agreed to be contacted again were invited to complete the Wave 2 survey.

Participants

Table 1 shows the demographics of the samples from each region. For the Minnesota sample in Wave 1 (N = 442), respondents had an average age of 41 (SD = 12.86) and were predominately females (86%) and White non-Hispanic (80%). A majority of respondents (77%) had completed bachelor's degrees or above. Respondents were predominately middle class, married or cohabitating (79%) and living with children (61%). More than half (53%) of respondents were caregivers for children or grandchildren. Of note, the sample in Minnesota was slightly different from overall state demographics (United States Census Bureau, 2020), with a similar proportion of White non-Hispanic and age group distribution, but was slightly more educated than the state average for the adult population and had greater representation of females. Those missing responses in the Wave 2 survey were less educated (i.e., without a bachelor's degree; $p < .001$), reported fewer pandemic-related stressor ($p = .002$), and scored lower in support seeking ($p = .014$) relative to those who completed the Wave 2 survey.

For the Hong Kong sample in Wave 1 (N = 597), 72% of respondents were females with an average age of 32 (SD = 12.51). Nearly half of respondents (43%) had bachelor's degrees and above. Respondents were predominately unmarried (67%) and living with parents (69%) and siblings (42%). Around 20% of respondents reported being caregivers for children or grandchildren. Of note, the Hong Kong sample demonstrated some differences from the overall region demographics (Hong Kong Census and

Statistics Department, 2020), with a higher proportion of younger adults than the regional distribution, greater education than the regional average, and greater representation of females. For those missing responses in the Wave 2 survey, they were significantly more likely to be male ($p = .047$), less educated (i.e., without a bachelor's degree; $p < .001$), report fewer depressive ($p = .006$), and stress symptoms ($p = 0.039$) than those who completed the Wave 2 survey.

Study Measures

English and Chinese survey batteries were provided to participants in Minnesota and Hong Kong respectively. Demographics and validated scales were used to measure resilience capacity, pandemic-related stressors, psychological distress, individual and family resources.

Demographics. At Wave 1, participants provided demographics, including age, gender, ethnicity (for the Minnesota sample), marital status, annual household income, information about family members living in the same household, and caregiving responsibilities for children, grandchildren, older parents, grandparents, or adults with disabilities.

Perceived resilience capacity. At Wave 1, perceived resilience capacity was measured using the 10-item Connor-Davidson Resilience Scale (CD-RISC10; Connor & Davidson, 2003). Each item was rated on a five-point Likert scale ranging from 0 'never' to 4 'almost always', with higher scores indicating greater perceived resilience capacity over the past month. The Chinese version of CD-RISC10 had been validated in a Hong

Kong sample (Chow et al., 2018). Scale reliability for the current sample was satisfactory (α = .87 for Minnesota and α = .92 for Hong Kong).

Individual resources. At Wave 1, participants reported individual coping strategies dealing with problems in the pandemic using the 28-item Coping Orientation to Problems Experienced Inventory (Brief COPE; Carver, 1997). The Chinese version of BCOPE had been previously translated and utilized in a Hong Kong sample (Yeung & Fung, 2007). Each item was rated on a four-point Likert scale to indicate the frequency of engaging in a specific coping strategy during the pandemic, from "I haven't been doing this at all" to "I've been doing this a lot".

While a variety of factor structures have been employed previously with the scale, one established structure is a three-factor model grouping fourteen strategies into with three overarching coping styles, including approach coping, avoidance coping, and support seeking (Solberg et al., 2022). Eisenberg et al. (2012) further suggested excluding items related to humor and religion as these strategies did not fit into approach or avoidance coping. A confirmatory factor analysis with the current sample revealed that a three-factor model (excluding humor from the approach coping factor and religion items from the avoidant coping factor) fit the data well in both regions. Fit indices were acceptable in Minnesota ($\chi^2(226) = 444.06$, $p < .001$, SRMR = .08, RMSEA = 0.05, and CFI = 0.95) and in Hong Kong ($\chi^2(230) = 445.27$, $p < .001$, SRMR = .08, RMSEA = 0.05, and CFI = 0.95).

Approach coping consisted of eight items (e.g., I've been thinking hard about what steps to take), which was characterized by active coping, planning, positive

reframing, and acceptance (α = .82 for Minnesota and α = .88 for Hong Kong). A high score indicated frequent adoption of coping strategies that aimed at changing the stressful situation. Avoidance coping consisted of 10 items (e.g., I've been giving up trying to deal with it), which was characterized by denial, substance use, self-blame, venting, behavioral disengagement, and self-distraction (α = .75 for Minnesota and α = .82 for Hong Kong). A high score indicated frequent adoption of coping strategies that aim at physical or cognitive efforts to disengage from the stressors. Support-seeking consisted of four items (e.g., I've been getting help and advice from other people), which was characterized by instrumental support and emotional support (α = .86 for Minnesota and α = .87 for Hong Kong). A high score indicated frequent adoption of coping strategies that aimed at soliciting social support.

Family resources. At Wave 1, participants reported their current family coping strategies using the 32-item Family Resilience Assessment Scale (FRAS 32; Sixbey, 2005). The Chinese version of FRAS 32 had been translated into traditional Chinese by researchers from Taiwan (Li et al., 2016). When utilized in a Hong Kong sample, the subscale of utilizing social resources was excluded due to the questionable reliability (Chan et al., 2021). Two subscales were utilized in the current study, namely, family communication and collaborative problem solving (e.g., We feel free to express our opinions), and maintaining a positive family outlook (e.g., We feel we are strong in facing big problems). Each item was rated on a four-point Likert scale ranging from 1 'strongly disagree' to 4 'strongly agree', with higher scores indicating greater adoption of the specific family coping strategy. Subscale reliability for the current sample was

excellent for family communication and collaborative problem solving (α = .96 for both regions) and satisfactory for maintaining a positive family outlook (α = .87 for Minnesota and α = .86 for Hong Kong).

Pandemic-related stressors. At Wave 2, pandemic-related stressors were measured using seven items: (a) personally experienced or suspected of having symptoms of COVID-19, (b) family members inside/outside the home experienced or suspected of having symptoms of COVID-19, (c) family members inside/outside the home died from COVID-19 or its related complications, (d) family members inside the home experienced reduced employment (e.g., job loss, limited working hours, or not working due to safety concern) as a result of COVID-19, (e) family members inside the home *currently* working in healthcare or other high risk jobs for contracting COVID-19, (f) family members *currently* working from home in response to COVID-19, and (g) personally *currently* practicing social distancing or quarantining. These items were selected based on the existing literature identifying common pandemic-related stressors (Connor et al., 2020; Prime et al., 2020). An overall pandemic-related stressors score was created by summing the number of pandemic-related stressors experienced (range: 0-7).

Psychological distress. At Waves 1 and 2, participants reported their psychological distress over the past week using the 21-item Depression Anxiety Stress Scale (DASS; Lovibond & Lovibond, 1995). The DASS-21 consisted of three subscales, namely, depression, anxiety, and stress symptoms. The Chinese version of DASS 21 had been validated previously and has an established corresponding 3-factor structure in a Hong Kong sample (Moussa et al., 2001). The reliability of three subscales were α

= .84-.90 for Minnesota and α = .88-.90 for Hong Kong. Each item was rated on a four-point Likert scale to indicate the severity or frequency of experiencing each symptom over the past week. A latent variable of psychological distress consisting of depression, anxiety, and stress symptoms was created for each region. A higher latent score indicated more intense psychological distress. To assist with interpretation of scores, I categorized participants into conventional severity labels (i.e., normal, mild, moderate, severe, and extremely severe) based on normed cut-off scales when describing the sample (Lovibond & Lovibond, 1996).

Data Analysis

Participant demographic characteristics and their pandemic-related stressors were summarized within each region. All standardized instruments were scored per instrument guidelines and summarized using descriptive statistics in *SPSS* 28.0 and Mplus 8.8. Bivariate correlations were examined between study variables for each region. Datasets from Minnesota and Hong Kong were analyzed separately using structural equation modeling. To reach the decision, I had investigated the possibility of conducting a multi-group analysis (i.e., combining MN and HK samples into a single model) following standard measurement invariance testing procedures. However, the measurement invariance testing revealed a lack of configural equivalence, violating an assumption of a multi-group model (Putnick & Bornstein, 2016). Therefore, I was not able to proceed with a multi-group model. In addition, I conducted a missing data analysis to compare the demographics and key measures in Wave 1 between those who responded and those who did not respond in the Wave 2 survey using two-sample t-tests and chi-square tests.

Then, I adopted full information maximum likelihood estimation to manage the missing data due to the high dropout rate in both regions in Wave 2 surveys (Minnesota: 64.0%, Hong Kong: 52.7%; Enders & Bandalos, 2001).

For *Aim a*, I conducted regression analyses in each region to examine the proportion of variance in perceived resilience capacity at Wave 1 that could be explained by individual resources (i.e., approach coping, avoidance coping, and support seeking) and family resources (i.e., positive family outlook, and family communication and collaborative problem solving) at Wave 1.

For *Aim b*, I ran multiple structural equation models in each region (Kline, 2015). In *step 1*, main effects models were estimated with coping resources (Wave 1) and pandemic-related stressors (Wave 2) predicting a latent variable of psychological distress indicated by depressive, anxiety, and stress symptoms as measured by the DASS-21 (Wave 2), while controlling for demographics (i.e., age, gender, race/ethnicity, marital status, below poverty level status, and number of family members living in the same household) and a corresponding Wave 1 latent variable of psychological distress. In *step 2*, five separate moderation models were run by mean-centering and adding the interaction effects of pandemic-related stressors and each coping resource. The Johnson-Neyman Technique was used to identify the region of significance for significant moderators (Lin, 2020). In *step 3*, the significant moderators were put under the same model if two or more moderators were identified in each region. In *step 4*, an additional multigroup analysis by gender was run in Hong Kong to compare the coefficients of the path analysis. Multigroup analysis was run to explore gender differences in each

individual and family resources, regardless of the results in *step 3*. A multigroup analysis was not run by gender in Minnesota because the sample size of males (n = 55) was not large enough to reliably estimate a multi-group model by gender (Matthews, 2017).

I evaluated the goodness of fit using four different model fit indices (Hu & Bentler, 1999). Chi-square values determine how well the observed data fits the proposed structure model. Specifically, Chi-square compares the observed covariance matrix of the variables to the predicted covariance matrix based on the model. A non-significant chi-square test result indicated the data fit the model well. However, the chi-square test is sensitive to sample size. When the sample size is large, it does not necessarily mean that the model was a poor fit for the data even when the chi-square test is significant. Other model fit information needed to be considered. The standardized root mean square residual (SRMR) is an absolute model fit index and compares the observed and the model implied covariance matrices. SRMR index is improved with more parameters added to the model, with values smaller than .08 indicate a good fit. The root mean square error of approximation (RMSEA) is a parsimonious model fit index, which compares the observed and model-implied covariance matrices while adjusting for model complexity. RMSEA index is improved as more parameters with useful contributions are added, with values between .06 and .08 indicating acceptable fit and values smaller than .06 indicating good fit. Comparative fit index (CFI) is an incremental model fit index, which compares a model's absolute or parsimonious fit relative to a baseline model. CFI index greater than .95 indicates a good fit.

Wave 3: Qualitative Interviews

The qualitative design employed a critical realism paradigm with the overarching research questions as follows: “Among adults who lived with family members and experienced high levels of pandemic-related stressors, what did resilience capacity look like in Minnesota and Hong Kong throughout the first two years of the pandemic? How did individuals and families navigate and negotiate their resources to sustain their well-being and functioning in the face of the COVID-19 pandemic?” (See **Chapter 3**). In order to further elucidate the quantitative findings of this paper, this article only presents findings about the resilience processes associated with specific individual and family coping resources that were found to be statistically significant in Minnesota and Hong Kong, respectively. Interview questions were not specifically tailored to elaborate upon these specific significant moderators of quantitative findings but illuminated the broader coping experiences.

Participants

Interview participants were selected based on a purposive sampling and maximum variation of key participant characteristics. Specifically, the participant pool in the qualitative phase included Wave 2 respondents who reported at least one pandemic-related stressor and agreed to be contacted. I selected a subset of participants by descending number of cumulative pandemic-related stressors reported in the Wave 2 survey and varied resilience capacity (high / medium / low) reported in the Wave 1 survey. High levels of perceived resilience capacity referred to 0.5 standard deviation (SD) above the mean or higher within the corresponding region; moderate levels referred

to within 0.5 SD of the mean; low levels referred to 0.5 SD below the mean or lower. Those having experienced higher cumulative pandemic-related stressors were approached first as their resilience processes were more likely to be triggered during the pandemic. High levels of stressors referred to 1.5 standard deviation (SD) above the mean or higher within the corresponding region; moderate levels referred to within 0.5 SD below the man and 1.5 SD above the mean; low levels referred to 0.5 SD below the mean or lower. To ensure diversity in the sample, I selected respondents with respect to key individual differences, including gender, race/ ethnicity, age, and marital status. Recruitment of samples continued until theoretical saturation was reached, i.e., no new information related to resilience mechanisms was elicited (Saunders et al., 2018).

A total of 29 participants who lived with family members (15 from Minnesota, 14 from Hong Kong) were interviewed. In Minnesota (n = 15), participants ranged in age between 25 and 74 (see **Table 2**). Two-thirds were females (n = 10); most were married (n =14) and lived with a spouse and children. Participants identified as non-Hispanic White (n = 10), Hispanic (n = 1), native American (n = 1), Asian (n = 2), and multiracial (n = 1). Participants reported experiencing moderate level (n = 10) and high level (n = 5) of pandemic-related stressors. While six participants reported high perceived resilience, others reported moderate (n = 8) and low (n = 1) perceived resilience. In addition, their report of coping strategies in Wave 1[2] (i.e., avoidance coping, family communication and

[2] High levels of coping resources referred to 0.5 standard deviation (SD) above the mean or higher within the corresponding region; moderate levels referred to within 0.5 SD of the mean; low levels referred to 0.5 SD below the mean or lower.

collaborative problem solving), as well as psychological distress in Waves 1 and 2 are listed in **Table 2**.

In Hong Kong (n = 14), participants ranged in age from 19 to 62 (see **Table 3**). Around two-thirds were females (n = 10). Half were married (n = 7) living with children, one was cohabited, and six were single living with parents and adult siblings. Participants reported experiencing low level (n = 1), moderate level (n = 11), and high level (n = 2) of pandemic-related stressors. While six participants reported high perceived resilience, others reported moderate (n = 4) and low (n = 4) perceived resilience. In addition, their report of coping strategies in Wave 1[2] (i.e., support seeking, family-level positive outlook), as well as psychological distress in Waves 1 and 2 are listed in **Table 3**.

Data Collection and Management

Individual, semi-structured interviews were conducted virtually viz Zoom between November and December 2021. Informed by the Multisystemic Resilience Framework (see **Figure 1**), interview questions focused on pre-existing and pandemic-related stressors, coping resources, perceptions of the pandemic, as well as individual and family adaptation over the course of the pandemic. Specifically, the current analysis focused on mental health outcomes with relevance to how respondents navigated with individual and family coping resources. The specific interview questions related to coping experiences included: (a) How did you cope with the challenges you described? (b) How did you maintain your well-being facing all these stressors? (c) Did your coping strategies change over the course of the pandemic, compared to the pre-pandemic? How?

(d) Were there any cultural, religious, or spiritual resources that help you cope with? (e) What was your family supportive of you over the course of the pandemic?

I conducted interviews in Minnesota in English and interviews in Hong Kong in Cantonese Chinese. All interviewed were transcribed verbatim into the corresponding language of the interview. Any identifiable information was removed from the transcripts. All electronic files were password protected and only accessible to qualitative team members. When required for analysis and dissemination, translation into English was verified by another member who was a bilingual English and native Cantonese Chinese speaker.

Qualitative Data Analysis

I conducted a qualitative content analysis (Elo & Kyngas, 2007; Forman & Damschoroder, 2008) to understand the situation-specific individual and family coping processes and associated psychological distress within individuals' sociocultural contexts. The focus was the manifest content of individual and family coping resources that contributed to mental health when facing pandemic-related stressors. I paid close attention to how situation-specific and culture-specific coping strategies, i.e., (a) avoidance coping and family communication and collaborative problem solving among interview participants in Minnesota, and (b) support seeking and family-level positive outlook among male interview participants in Hong Kong, empowered the process of resilience among adults in their specific sociocultural context. I used both inductive and deductive content analysis with a research team of five members (two females from the United States who self-identified as non-Hispanic Black and Asian, and three females

from Hong Kong who self-identified as Chinese). The research team started with inductive content analysis by identifying any observable individual and family coping resources, as well as the cultural nuances in all interview transcripts. Then, the team used deductive content analysis to reorganize the identified universal and culturally-specific coping behavior into existing domains of resources measured by the quantitative measures of individual and family coping resources. Data were managed using NVivo version 1.7.1.

The research team conducted content analysis following a three-level abstraction process: Immersion: Engagement with the data, Reduction: Reorganizing data and mapping with existing quantitative domains, and Interpretation with reference to situation and culture (Elo & Kyngas, 2007; Forman & Damschoroder, 2008). For *step 1*, the team started with immersing in the data by comprehension, open coding, and memoing. When reading the data several times, the questions were "who was telling?", "where was this happening?", "when did it happen?", "what was happening?", and "why?". For open coding, the team chunked data regarding observable behavior and processes that illustrated all individual- and family-level coping resources, and labeled the data with codes that were reflective of participants' experiences using participants' language. Specifically, two independent coders conducted open coding for the first 10 transcripts (5 from Minnesota, 5 from Hong Kong). After open coding of each interview, independent coders discussed differences in the semantic meaning of the coding to reach consensus. This process built the initial coding structure. I then used the coding structure to finish coding the remaining transcripts; any new identified codes were discussed with at least

one team member. Throughout the coding process, each team member recorded their early ideas and thoughts by identifying subcategories and themes that began to emerge. The memos described themes and the connections among them throughout the iterative process that also served as an audit trail of the researchers' analytic processes.

For *step 2*, I led the research team to reduce the data (both codes and memos) into more manageable themes and thematic segments. Specifically, we reorganized the data into inductive subcategories that manifested cultural nuances and mapped the subcategories into deductive categories (i.e., existing domains of quantitative measures) to address the research questions. Throughout the reduction process, the team wrote memos of how codes were grouped into subcategories informed by participants, as well as whether and to what extent the subcategories fit into the quantitative domains of coping resources.

For *step 3*, I interpreted the qualitative categories, subcategories, and codes with reference to situation and context in each region based on the quantitative data using a matrix table (see **Table 2**). The matrix table facilitated the process of recognizing patterns across cases and drawing conclusions from the integrated quantitative and qualitative data in each region.

I used different techniques to establish rigor in the qualitative analysis (Elo et al., 2014). Triangulation of quantitative and qualitative data from the same participant established credibility, dependability, and confirmability. In addition, I established dependability by maintaining an audit trail to systematically record the detailed analytical process and stages of theme development. I established confirmability by having the

interpretations and findings validated by a third person outside the qualitative team. I established transferability by thick, rich descriptions of data.

Results

Wave 1 and 2: Quantitative Findings

Table 1 shows individual and family characteristics, pandemic-related stressors, perceived resilience capacity, individual and family resources, as well as psychological distress of the Minnesota and Hong Kong samples. Although household size was similar across the Minnesota and Hong Kong samples, more married or cohabitated respondents from Minnesota lived with their spouses and children, while more unmarried respondents from Hong Kong lived with their parents and siblings. In Wave 2, the Minnesota sample (M = 2.64, SD = 1.43) reported more pandemic-related stressors than Hong Kong sample (M = 1.57, SD = 1.10), with similar proportion of respondents currently practicing social distancing in both regions (Minnesota: 39.3%; Hong Kong: 29.6%). **Table 4** shows bivariate correlations of each region. The results for the Minnesota sample are shown above the diagonal, while those for the Hong Kong sample are shown below the diagonal.

Perceived Resilience Capacity Findings

Table 5 presents the results of regression analyses for perceived resilience as predicted by both individual and family resources in Wave 1 from both regions. In Minnesota, the five resources accounted for 32% of the variance of perceived resilience capacity in Wave 1, F (5, 415) = 41.15, p <0.001. Approach coping (B = .45, SE = .06, β = .35, p < .001) and family-level positive outlook (B = .65, SE = .15, β = .30, p < .001) were positively associated with perceived resilience capacity. In contrast, avoidant coping

(B = -.21, *SE* = .05, β = -.19, $p < .001$) and support seeking (B = -.21, *SE* = .09, β = -.11, $p = .025$) were negatively associated with perceived resilience capacity.

In Hong Kong, the five resources similarly accounted for 33% of the variance of perceived resilience capacity in Wave 1, F (5, 581) = 58.85, p <0.001. Approach coping (B = .58, *SE* = .05, β = .46, $p < .001$) and family-level positive outlook (B = .38, *SE* = .09, β = .19, $p < .001$) were positively associated with perceived resilience capacity. In contrast, avoidant coping (B = -.33, *SE* = .05, β = -.29, $p < .001$) and family communication and collaborative problem solving (B = .06, *SE* = .03, β = .11, $p = .015$) were negatively associated with perceived resilience capacity.

Minnesota Moderation Findings

In Minnesota, the main effects model demonstrated acceptable model fit: $\chi^2(53) = 131.88$, $p < .001$, SRMR = 0.03, RMSEA = .06, and CFI = .95. There were four significant main effects predicting psychological distress at Wave 2 (*H1,* see **Table 6**). A high number of pandemic-related stressors were associated with more psychological distress (B = .39, *SE* = .16, β = 2.47, $p = .013$). Furthermore, high avoidance coping (B = .16, *SE* = 0.08, β = 2.00, $p = .046$), high positive family outlook (B = .33, *SE* = .13, β = 2.57, $p = .010$), and low family communication and collaborative problem solving (B = -.09, *SE* = .04, β = -2.58, $p = .010$) were associated with more psychological distress at Wave 2. Moreover, the covariates of age (B = -.05, *SE* = .02, β = -2.30, $p = .022$) and psychological distress at Wave 1 (B = .54, *SE* = .11, β = 5.16, $p < .001$) were positively associated with psychological distress at Wave 2.

In addition, there were two significant interaction effects (*H2*; see **Table 6**). Lower levels of avoidance coping buffered the relationship between pandemic-related stressors and psychological distress (**Figure 5**). The avoiding coping interaction model demonstrated acceptable fit: $\chi^2(57) = 139.08$, $p < .001$, SRMR = .03, RMSEA = 0.06, and CFI = 0.95. Among respondents in Minnesota with moderate to high endorsement of avoidance coping strategies at Wave 1, high pandemic-related stressors exacerbated psychological distress at Wave 2. The interaction region of significance occurred where avoidance coping scores were negative 0.2 standard deviations or higher. In addition, higher levels of family communication and collaborative problem solving buffered the relationship between pandemic-related stressors and psychological distress (**Figure 6**). This interaction model demonstrated acceptable fit: $\chi^2(57) = 136.76$, $p < .001$, SRMR = .03, RMSEA = 0.06, and CFI = 0.95. Among respondents in Minnesota with low to moderate family communication and collaborative problem solving at Wave 1, high pandemic-related stressors exacerbated psychological distress at Wave 2. The interaction region of significance occurred where family communication and collaborative problem-solving scores were 0.1 standard deviations below the mean or lower. Notably, the avoidance coping, and family communication and collaborative problem-solving interaction effects were no longer significant when the two moderators were put in the same model.

Hong Kong Moderation Findings

In Hong Kong, the main effects model demonstrated acceptable model fit: $\chi^2(49) = 83.48$, $p = .002$, SRMR= .02, RMSEA = .03, and CFI = .99. There were no significant

main effects predicting psychological distress at Wave 2 (*H1*; see **Table 7**). However, the covariates of below poverty level status (B = .13, *SE* = .06, β = 2.24, p = .025) and psychological distress at Wave 1 (B = .58, *SE* = .07, β = 8.15, $p < .001$) were positively associated with psychological distress at Wave 2.

There was one significant interaction effect involving support seeking (*H2*; see **Table 7**). This interaction model demonstrated acceptable model fit: $\chi^2(53) = 88.51$, p = .002, SRMR= .02, RMSEA = .03, and CFI = .99. Support-seeking buffered the relationship between pandemic-related stressors and psychological distress (**Figure 7**). Among respondents in Hong Kong with low support seeking at Wave 1, high pandemic-related stressors exacerbated psychological distress at Wave 2. The region of significance occurred where support seeking scores were one standard deviation below the mean or lower. Notably, positive family-level outlook at Wave 1 did not buffer the relationship between pandemic-related stressors and psychological distress at Wave 2.

Split by gender in Hong Kong, support-seeking (**Figures 8-9**) and family-level positive outlook (**Figures 10-11**) buffered the relationship between pandemic-related stressors and psychological distress for males, but not for females. Notably, other coping resources did not differ by gender. The support-seeking and family-level positive outlook multi-group models demonstrated acceptable model fit, respectively: $\chi^2(116) = 176.36$, $p < .001$, SRMR= .05, RMSEA = .04, and CFI = .98; $\chi^2(115) = 180.06$, $p < .001$, SRMR= .03, RMSEA = .04, and CFI = .98. Among male respondents with low support seeking at Wave 1, high pandemic-related stressors exacerbated psychological distress at Wave 2 (**Figure 8**). In contrast, among male respondents with high support seeking at

Wave 1, low pandemic-related stressors exacerbated psychological distress at Wave 2. The interaction regions of significance for males occurred where support seeking scores were negative one standard deviation or lower and 1.3 standard deviation or higher. In addition, among male respondents with low positive family outlook at Wave 1, high pandemic-related stressors exacerbated psychological distress at Wave 2 (**Figure 10**). The interaction region of significance for males occurred where family-level positive outlook scores were 0.5 standard deviations below the mean or lower.

Wave 3: Qualitative Findings

The qualitative findings further illuminated situation-specific and culture-specific significant moderators of coping in each region. That is, avoidance coping, family communication and collaborative problem solving in Minnesota, and support seeking and family-level positive outlook in Hong Kong.

Avoidance Coping in Minnesota

While the use of avoidance coping was often described as maladaptive under high stress, it depended on the threshold, duration, purpose of engaging in the activities, as well as the impact on individual and family functioning. A number of participants in Minnesota described engaging in activities to distract themselves from psychological distress temporarily under high stress. One non-Hispanic White woman was aware of how she spent a reasonable amount of daily time on leisure activities to take her mind off of challenging circumstances, “TV is not a very adaptive coping strategy, but it was a way for me to not to work, intentionally not be checking the news and having enough

milk, just be present with my husband." (Participant ID 331, low avoidance coping, moderate pandemic-related stressors, normal psychological distress in Wave 2)

However, behavioral disengagement and excessive involvement in other activities for distraction was maladaptive to individual and family functioning. Some participants were able to recognize the harms of behavioral disengagement on themselves and their families. Specifically, one non-Hispanic White mother who experienced high stress vividly recalled how she redirected herself from the virtual reality to the present:

> I was scrolling social media, and my daughter was coming up to me and holding a book and wanted me to read to her. And, in my brain I was like "Oh my gosh, she's so annoying" … And I caught myself thinking that. I do not care about this stuff nearly as much as I care about my daughter and being present in her life. So, at that exact moment, I deleted all my social media, and I read to my daughter… It does feel some guilt around it, taking that moment for me to recognize it, but I'm also grateful that it happened, because I have been a lot more present in my own body, and also present with my family ever since making that decision. (Participant ID 180, high avoidance coping in Wave 1, moderate pandemic-related stressors, mild psychological distress in Wave 2)

Notably, I observed that a vast majority of participants acknowledged using some level of self-distraction coping strategies under high stress, particularly in the early outbreak of the pandemic. Whether avoidance coping was adaptative or maladaptive depended on how frequently the participants endorsed the avoidance coping strategies and whether such disengagement disrupted their adaptations in social roles and daily

functioning. Those who persisted in disengaging were more likely to experience psychological distress. On the other hand, those who had higher self-awareness tended to readjust their maladaptive coping and have better mental health in the face of the prolonged pandemic.

Family Communication and Collaborative Problem-solving in Minnesota

Facing escalating family tensions, the majority of participants in Minnesota had open, intentional discussions and shared decision making to balance the needs and concerns of family members. When facing high stress, those who used open communication processes and collaborative problem solving with family members might have triggered more conflicts in the early outbreak. However, these individuals seemed to have better adjustment after establishing routines and structures in response to the changing demands. For example, one non-Hispanic White female participant who experienced high stress described "We (My husband and I) are intentionally bringing up concerns during therapy, rather than letting them build and then exploding all at once. We like to talk about it right away, and figure it out, and then move on." (Participant ID 180, high family communication and collaborative problem solving in Wave 1, moderate pandemic-related stressors, mild psychological distress in Wave 2)

However, a few participants were less open to honest communication and sharing painful feelings (e.g., sadness, anger). As family members spent more time in the same household, they were more irritated by one another and had more fights. One Asian-American father of three preadolescent children who experienced high stress remarked their negative family dynamics:

> It's probably more yelling and screaming to tell people (children) to be quiet or go away, that you're on my nerves, coz we're spending too much time together. So now we're just stuck at home. There're more potential interactions for conflicts, versus before COVID… you know, husband, wife, have an uncomfortable conversation, and then someone gets mad at the other person, and walks away, but eventually we get over it. (Participant ID 543, low family communication and collaborative problem solving in Wave 1, moderate pandemic-related stressors, moderate to severe psychological distress in Wave 2)

Moreover, the same Asian-American father appeared less open to non-positive feelings and considered his family members to be dramatizing their negative emotional expressions:

> But my family is pretty dramatic, especially my girls. So just that the slightest threat of taking away their iPhone, they will sit there and start to produce tears and cry, "Dad, you hate me", "Why are you taking away my phone". So, I don't know if my kids are gonna have a career in drama because they are very good at expressing [themselves], even my son. They all do a good job of crying [laughing], saying how bad things are (Participant ID 543)

Another non-Hispanic White young adult who lived with her parents and adult siblings shared the process of problem solving in her family. Under high stress, her family had a limited amount of open conversation in tackling problems, but instead tended to inform family members only after making independent decisions. She shared how her family handled the decision of family togetherness using group chat in the

pandemic:

> We (My family)'ve all made our individual decisions without much family input [laughing]… Over the summer [2021], my cousin had a wedding, and we decided as a family, if we were going or not, [laughing] We all texted in the group chat about it a bunch, and there was a lot of like mixed feelings about whether we should go or not, and then we all got together for dinner, I said "Well, I'm not going", and then one by one for the rest of them [family members] just followed. That was how the decision was made. (Participant ID 285, low family communication and collaborative problem solving in Wave 1, high pandemic-related stressors, severe psychological distress in Wave 2)

Notably, I observed that those few participants who had high stress and reported minimum levels of open family communication, emotion expression, and decision making tended to have moderate to severe psychological distress in the face of the changing demands in the pandemic.

Support Seeking in Hong Kong

Support seeking appeared to be a gendered notion among participants in Hong Kong. Male participants showed more resistance to seeking emotional or instrumental support from family members or professionals even when facing pre-existing vulnerabilities and high levels of pandemic-related stressors.

Almost all male participants had a tendency to rely on themselves rather than seeking any support from family members despite under low to moderate stress. One male participant who cohabitated with his partner said, "I don't need family members

[not living with me] to care about me emotionally at all. It's good enough when they bother me" (Participant ID 1445, moderate support seeking in Wave 1, moderate pandemic-related stressors, mild to moderate psychological distress in Wave 2) Similarly, another male participant forced himself to "stay strong" for their families, "First priority is all about yourself. You don't want to be a pessimistic person. I personally think that family ranked second, because you will become a burden of your family if you can't sort out your own issues." (Participant ID 1237, low family positive outlook in Wave 1, moderate pandemic-related stressors, extremely severe psychological distress in Wave 2).

Another male participant who was under low pandemic-related stressor, but intense pre-existing vulnerability strongly believed that seeking help for his own negative emotions was futile despite facing intense family stressors. He noticed his manifestation of psychological distress as physical symptoms, such as difficulties in sleeping and hair loss. He insisted on keeping negative emotions to himself. He vividly described how he coped with grief of his parents and terminal illness of his adolescent son:

> My parents passed away, the bandage was cut off, so this is a kind of feeling, sorrow, this was something inside, and I wouldn't want to share with a lot of people. Why should I? Because this is my family business, and I tried to calm myself, I even went to see a shrink offering psychological support, but it didn't help much, so I usually try to kill my time by learning. I believe that I have to stand on my own and be strong. (Participant ID 1264, low support seeking in Wave 1, low pandemic-related stressor, extremely severe psychological distress in Wave 2)

> I have been very unhappy for many years, especially when I got to know that my son suffered from leukemia. So we went through leukemia, so we're not so afraid of this pandemic. I think, in this sense, a serious blow, challenge, or disease, a pandemic, hardship, can really make someone stronger than before, more resilient. But you must have positive energy, you cannot always expect somebody else to help you, even a shrink wouldn't give you much help. It's up to you. It's your fate, it's in your hand. (Participant ID 1264)

A vast majority of male participants relied on themselves. They perceived themselves as needing to stay strong and take care of their own problems so that they can be there to support their families. They rejected seeking emotional support despite facing intense family stressors and suffering from psychological distress.

Family Positive Outlook in Hong Kong

For most of the male participants in Hong Kong, the notion of luck played a central role in their interpretation of the possibilities to overcome stressors as a family unit, which was culturally distinct from the quantitative measure in family positive outlook. Good luck referred to the family strengths to conquer the challenges, while bad luck referred to the failure to overcome the adversities. For example, a male participant with high stress interpreted the minimum disruption of his family's job as "good luck". He remarked, "I [My family] was very lucky. Both my parents and I worked. Fortunately, our industries were not negatively impacted by the pandemic, apart from a minimum on my job, working on the cruise." (Participant ID 1108, moderate family positive outlook in Wave 1, low pandemic-related stressor, extremely severe psychological distress in Wave

2) Another participant, a father with son having leukemia, perceived surviving COVID19 as a matter of luck for his family. He said:

> The boy [my son] is recovering at the moment. But this pandemic is deadly. If we [my family] are lucky enough to survive from the pandemic, if he's not hit by the pandemic, he should be alright. I put all my hope upon my son that he can survive the two years in the final stage of treatment. (Participant ID 1264, moderate family positive outlook in Wave 1, low pandemic-related stressor, extremely severe psychological distress in Wave 2)

However, the same participant also complained about the family's bad luck and complained about "why us". He complained, "In a population of 100,000 persons, only three cases [of leukemia]. Who can be more unfortunate than we are?" (Participant ID 1264)

Moreover, some male participants could identify family hope and optimism in child development. They perceived that the children in the family bring hope and purpose, which empowered other adult family members to move forward. One male participant shared how his young niece brought hope to the coresident family members during the pandemic. He said, "I feel more relaxed whenever I hug the boy [my nephew]. Everyone [every family member] loved him. We want to try our best to protect him and make him happy in a safe home environment." (Participant ID 1543, moderate family positive outlook in Wave 1, moderate pandemic-related stressors, mild psychological distress in Wave 2) Similarly, the father with son have leukemia found hope as his son grow up:

> He's [my son's] outstanding. I'm confident he will go to a good university, to do whatever he wants in the future, so that I will be very happy. Personally, I don't have any regrets for my life, it is already good enough, better than I expected it. I put all my hope upon my son that he can survive the two years in the final stage of treatment. (Participant ID 1264)

In general, positive family outlook was demonstrated in the notion of luck and hope in child development among male participants in Hong Kong. Under high cumulative stress, the interaction of good luck and identification of hope in children may buffer psychological distress during the pandemic.

Discussion

This longitudinal, mixed-methods study was one of the first to generate a fuller understanding of resilience capacity, manifested by individual and family coping resources, pandemic-related stressors, and psychological distress, in two culturally distinct regions. First, my findings empirically examined the *Multisystemic Resilience Framework* by examining to what extent resources represent perceived resilience capacity and evaluating to what extent resources buffer the impact of stressors on psychological distress in the pandemic context. Individual and family coping resources predicted around one-third of variance in perceive resilience capacity during the early outbreak of pandemic in each region. Second, my study identified modifiable individual and family coping resources that were protective of adult mental health when facing pandemic-related stressors in the first year of the pandemic. In Minnesota, lower levels of avoidance coping and higher levels of family communication and collaborative problem

solving buffered the adverse relationship between pandemic-related stressors and psychological distress. In Hong Kong, higher levels of support-seeking and higher family-level positive outlook buffered the relationship between pandemic-related stressors and psychological distress for males, but not for females. Third, the qualitative findings illuminated the situation-specific and culture-specific coping strategies in the face of pandemic-related stressors. Broadly, my findings highlighted the role of cultural context in coping with a global pandemic. Last, the unique sources of resilience in each region were suggestive of the value of culturally-specific interventions. Through supporting processes most likely to support coping within each culture, interventions might be more effective to ameliorate the negative impacts of a global pandemic and promote mental health.

Mental Health and Resilience Manifested as Coping Strategies

Informed by the Multisystemic Resilience Framework, the current study first examined the association between perceived resilience capacity and individual and family coping resources during the early outbreak of the pandemic. In both Minnesota and Hong Kong, approach coping, and family-level positive outlook were positively associated with perceived resilience capacity, whereas avoidant coping was negatively associated with resilience capacity. While my findings were consistent with the existing literature about the relationship of resilience and individual coping (Campbell-Sills et al., 2006), the current study extended our understanding of family-level coping and perceived resilience capacity.

Moreover, unique predictors of perceived resilience capacity were identified in each region. Specifically, support seeking was negatively associated with perceived resilience capacity in Minnesota, while family communication and collaborative problem solving was positively associated with perceived resilience capacity in Hong Kong. While counterintuitive in Minnesota, it may be that perceived resilience capacity as measured in the current study best captures perceptions of individual resilience (i.e., the ability to personally cope with challenges without support from others). In Minnesota, those who perceive themselves as lacking individual resilience may be more likely to seek emotional and instrumental support from others rather than relying on individually-oriented coping skills.

Additionally, some individual and family coping strategies predicted psychological distress in Minnesota, but not Hong Kong, after one year of the pandemic. I speculate that this may be due to the overall higher average number of pandemic-related stressors experienced by adults in Minnesota than Hong Kong. Thus, adaptive coping strategies would be more likely to alleviate psychological distress in Minnesota. Specifically, avoidance coping and positive family outlook exacerbated psychological distress, whereas family communication and collaborative problem solving alleviated distress in Minnesota. Consistent with findings in the U.S., avoidance coping was associated with higher levels of distress during the early outbreak of the pandemic (Wootton et al., 2022). While it was unexpected that family-level positive outlook in the early pandemic triggered more psychological distress, I hypothesize that there was a mismatch between the positive “can-do” attitude as a family and the unexpectedly

prolonged disruption of family stability. Additional research will be important to further elucidate the counterintuitive findings.

Situation-specific and Culture-specific Coping Strategies

The quantitative and qualitative findings elucidate the adaptation associated with different coping strategies into the context of the rapidly changing COVID-19 pandemic. These findings empirically illuminate resilience as the capacity to respond to the changing demands with situationally- and culturally-based coping strategies (Bonanno, 2021; Cheng, 2001). There are no universally adaptive coping strategies in the face of changing demands, but adaptive strategies seem to be a product of where (i.e., fit of the strategy with cultural or social norms), when / how long (i.e., the temporality of adopting the strategy), and to what extent (i.e., the balance of adopting the strategy without disrupting daily functioning).

American cultural norms tend to embrace direct, open communication and shared decision making (Hofstede & Minkov, 2010; Kohls, 1984). For participants from Minnesota, well-intentional communication and open discussion with family members was not surprisingly adaptive and helped to mitigate individual psychological distress. Furthermore, consistent with values surrounding personal control over the environment and actively addressing problems (Kohls, 1984), the use of avoidance coping was maladaptive when facing high levels of stress in the Minnesota sample. However, the qualitative findings clarified that avoidance may not always be a problem, depending on the situational demands and the level of avoidance of stressors (Veilleux, 2022). When distress is particularly intense under high pandemic-related stressors, temporary self-

distraction to a small extent might help create space to decrease emotions to a more tolerable level. It is evident that avoidant strategies were adaptative in reducing intense emotion in the moment but not when used habitually (Veilleux, 2022). A more prolonged escape from the sources of stress or problems may disrupt social roles and family functioning. In the face of uncertainties and ambiguities over the prolonged pandemic, one might feel heightened lost sense of control.

Chinese culture tends to embrace self-reliance and restricted emotionality (Cheng et al., 2010). Traditional Chinese families in Hong Kong are patriarchal, in which men face the stereotype of staying strong and tough to protect their families. Upholding these beliefs while also keeping family matters private, male participants in Hong Kong were more reluctant to bring up personal problems to others. In fact, the current findings were consistent with a study comparing the reasons of seeking support between European Americans and Asian Americans (Taylor et al., 2004). The study found that relative to European Americans, Asian American participants showed greater concerns that voicing their problems would make things worse. They were more concerned about receiving negative evaluations after making their problems known to others and prioritized face saving and avoiding embarrassment consistent with a value of self-reliance rather than placing burdens on others. These concerns are consistent with those raised by men from Hong Kong in this study. Men from Hong Kong similarly shared concerns about preserving face and maintaining harmonious social relations. They generally rejected seeking support with a focus on handling their own problems and supporting their families. In addition, I identified the cultural perceptions of luck in the family. Hong

Kong Chinese perceived good luck when they could identify family strengths to conquer the challenges. In contrast, Hong Kong Chinese perceived bad luck when the family failed to overcome the adversities. Similar to the qualitative findings from a study of young adults with childhood adversities in Hong Kong (Ho et al., 2021), my study demonstrated that those perceived their family as having "good luck" appeared to have less psychological distress. Those who focused on the family's "bad luck" and questioned "why us" tended to have more psychological distress.

Implications

There are clear research implications arising from my longitudinal, mixed methods study. The qualitative findings explored the situation-specific and culture-specific coping strategies identified in the quantitative findings over the course of the pandemic. As it was difficult to capture situation-specific coping strategies during the rapidly changing situations using a conventional quantitative design over one year time span, future researchers are encouraged to employ sequential, explanatory mixed methods to further illuminate the statistical findings identified from quantitative designs (Creswell & Clark, 2017). Specifically, a qualitative design will provide more insights exploring cultural differences in coping strategies within and across regions. In addition, future researchers may consider adopting intensive longitudinal methods to capture the situational specificity in coping strategies in the face of changing demands (Bolger & Laurenceau, 2013). As flexibility in coping is complex, future researchers are encouraged to disentangle the simultaneous employment of different individual and family coping

strategies over time. This approach can shed light into how to better support individuals and family facing acute and chronic stressors in diverse sociocultural contexts.

Limitations

Several study limitations are important to note when interpreting my results. First, convenience sampling and bias toward female participants limited the generalizability of my findings. The relatively small sample size of male participants in Minnesota did not allow running a multigroup analysis by gender. Second, my data was collected via an online survey and relied exclusively on self-report. This might increase the chance of common method variance among constructs as well as biases in responding. Future studies could consider using naturalistic observations and examining the effect of family resilience by recruiting multiple family members from a single family system. Regardless, my results were strengthened by the administration of widely used and validated measures of psychological distress, individual and family resources. Third, attrition was fairly high in both regions (i.e., > 50%), especially among those less educated and males, which might create biases. Nevertheless, the longitudinal design helps elucidate the adjustment and adaptation processes of individuals and families over time. Fourth, I acknowledged the use of individual and family resources were not measured at Wave 2. While the focus of this study was on understanding how resources at the onset of the pandemic may relate to subsequent coping with stressors, future studies may examine how coping resources may evolve over the course of chronic stressors. However, my subsequent qualitative study (Chapter 3) may provide insight into evolution of resilience capacity over the two years of the pandemic.

Conclusion

In the face of changing demands, my study did not reveal universally adaptive individual- and family-level coping strategies. This longitudinal, mixed methods elucidated resilience as the capacity to respond to the changing demands with situationally- and culturally-based coping strategies. My findings highlighted the role of cultural context in coping with a global pandemic and suggested the value of culturally-specific interventions. Through supporting both individual and family processes most likely to support coping within each culture, interventions may be more effective to ameliorate the negative impacts of a global pandemic and promote mental health. Future research may further refine these findings by examining resilience as manifested in individual and family coping for more diverse samples, such as across gender, ethnic/racial groups, educational status, and socioeconomic backgrounds within American and Chinese societies.

Study 2 – Resilience mechanisms in the face of the COVID-19 pandemic: A critical realist study in Minnesota and Hong Kong

Introduction

The global outbreak of the novel coronavirus disease 2019 (COVID-19) was an unprecedented crisis necessitating individual and family physical, psychological, and social adjustments and adaptations. The declaration of a pandemic from the World Health Organization (2020) triggered uncertainties. The resulting acute-onset stress in the early stages of the outbreak was due to anxiety and fear of contracting COVID-19, caused by a lack of knowledge and remedies about the novel disease. Moreover, emergency orders with government-imposed social restrictions disrupted daily routines (e.g., struggles between work and childcare; Prime et al., 2020). As the pandemic continued, chronic stress from its duration of over three years caused family relationship challenges, mental fatigue, or even burnout due to ambiguities surrounding when society would return to pre-pandemic life.

In the face of acute-onset and chronic stressors, building resilience capacity is one key to keep distress at a minimum while tolerating uncertainties and ambiguities simultaneously (Leyro et al., 2010). Although previous research on disease outbreaks and natural disasters provided insights on the protective and risk factors related to individual differences and family contexts of psychological adjustment and adaptation, the unfolding COVID-19 pandemic was a unique opportunity to explore trajectories of short-term and long-term coping processes (Bonanno et al., 2010; Bonanno et al., 2008; Chen & Bonanno, 2020). Importantly, this qualitative study dove deeply into resilience

mechanisms, that is, individuals' and families' flexibilities when adopting, reevaluating, and modifying coping strategies as disease demands, government procedures, and prevention approaches changed (Bonanno, 2021; Cheng et al., 2014). Critical realism, the paradigm and method employed in this study, does not control for sociocultural and contextual factors, but rather illuminates the conditions that evoke enactment of human resilience capacity in response to changing situational demands as the pandemic unfolded.

Uncertainty and Ambiguities in the Pandemic

Presented as a novel airborne transmission disease, the COVID-19 pandemic forced individuals to evaluate their risk tolerance to contagion and social needs as it unfolded (Fried, 2021; Morawska & Cao, 2020). As an acute-onset stress, the COVID-19 pandemic was somewhat similar but distinct from the temporal emergency of natural disasters (Shing et al., 2016). Compared to natural disasters, the pandemic was widespread globally and imposed higher uncertainties with known and unknown risks from the contagion with rapid changes of infection. In the early outbreak, the simultaneous imperfect (i.e., missing, changing, conflicting, or imprecise) knowledge and information overload of the COVID-19 created tremendous fear and anxiety to individuals and families (Cipolletta et al., 2022; Williams et al., 2022). Moreover, individuals and families had various levels of risk tolerance to assimilate physical threats through engaging with others, from very strict (i.e., staying in their personal "bubble" with no outside household contact) to very open (i.e., socializing without social

distancing, marks, or extra precautions to protect oneself from infection; Association of Premier Nanny Agencies, 2020).

Despite facing a global pandemic, the risk perceptions towards the COVID-19 varied across individual, family, and cultural factors (e.g., past experiences, pre-existing vulnerabilities, government recommendations in preventive behaviors, etc.; Cipolletta et al., 2022; Gillman et al., 2023). As time passed, the unfolding COVID-19 pandemic made determining how safe it would be for individuals and families to reengage people, places, and activities increasingly ambiguous (Fried, 2021). For many, COVID-19 pandemic, the complex acute-onset and chronic stress, triggered nonlinear emotional distress experiences of denial, anger, bargaining, depression, and acceptance, which was somewhat similar to the human losses and grieving process in the face of terminal illness (Kübler-Ross et al., 1972). Given the complex nature of stress from the COVID-19 pandemic, this qualitative study addressed the gaps by disentangling the dynamics of how individuals and families navigated and negotiated through uncertainties and ambiguities as the pandemic unfolded over time.

Gaps in Understanding Resilience as a Dynamic Process

Resilience is a dynamic process in which individuals and families navigate and negotiate resources in culturally meaningful ways in order to recover from challenges, sustain in moving forward, and growth in function (Reich et al., 2010; Ungar, 2021). Emerging empirical research has explored and examined the mechanisms that underlie the resilience process in the face of adversities within individuals across time and circumstances (Hiebel et al., 2021; Ijntema et al., 2023; Stainton et al., 2019). For

example, cognitive flexibility enables individuals to modify cognitive behavioral strategies to respond accurately to changing environment, i.e., assess situations, reappraise when necessary, and avoid interference by negative stimuli (Bonanno, 2021; Dajani & Uddin, 2015; Kalisch et al., 2015).

Ijntema et al. (2023) explained two distinct processes in the face of stressors that have different disruptive effects on individuals' core values. When the stressors are not in contradiction to their own core values, individuals only change their interpretation of the meaning of the stressors. In contrast, when stressors disrupt individuals' core values, individuals need to change their existing meaning and construct a new meaning about themselves and/or the world. Tolerance to stressors is another critical mechanism through which individuals refrain from responding defensively to specific stressors and maintain functioning (Ijntema et al., 2023). Tolerance is an actual behavior, not merely the attitude or behavioral tendency of accepting something individuals do not like.

Despite preliminary examination of cognitive flexibility and tolerance to stressors as resilience mechanisms, research has called for uncovering the complex temporal and situational dynamics of resilience mechanisms beyond the traditional quantitative methodology and experimental set-up (Bonanno, 2021). Qualitative methodology using a critical realism paradigm allows for an illumination of the interplay of known and unknown factors and processes that foster resilience capacity under changing circumstances.

Resilience in the American and Chinese Culture

Little research has adopted qualitative strategies to explore how endorsement of different cultural values influences the resilience mechanisms (i.e., unobservable processes of personal ideology, value commitments, and ways individuals situated with others) in the face of adversities, especially outside of a Western context (Ungar & Liebenberg, 2011). To my knowledge, no qualitative studies have attempted to compare and disentangle how American and Chinese adults navigated and negotiated their resources during the pandemic in a culturally meaningful way. Further, our current understanding of differences was limited to observable coping behavior and facets of cultural values primarily based on systematic reviews and measures developed in a Western context.

A meta-analysis of locus of control across 18 regions identified cultural differences in coping with stressful events (Cheng et al., 2013). Americans were more likely to use active confrontation strategies to mitigate fears and uncertainties to stressors. In contrast, Chinese were more likely to use acceptance strategies to follow the ebb and flow of nature and act only when the situation was appropriate. As advocated by Confucian doctrine, both acceptance and endurance of suffering are deemed appropriate responses for Chinese to preserve social harmony and group cohesion (Cheng et al., 2010). Similar to the findings in the meta-analysis, the comparison of national/regional cultures by Hofstede and Minkov (2010) demonstrated that people from Hong Kong were more likely than American to tolerate ambiguity and uncertainty, compared to feeling in control of the future.

Resilience in the COVID-19 Pandemic

While the mechanisms underlying resilience remain a black box, a majority of empirical research has explored and examined individual traits and coping behaviors that facilitate successful adaptations in the face of the COVID-19 pandemic. For example, qualitative studies conducted with older adults in the United States and Hong Kong consistently identified that positive coping attitudes and behavior in the first year of the pandemic, such as staying busy with activities, seeking social support, and having a positive mindset promoted resilience (Chan et al., 2022; Fuller & Huseth-Zosel, 2020). Quantitative studies found that psychological flexibility mitigated the detrimental impacts of COVID-19 risk factors on adults' mental health and family cohesion during the early months of COVID-19 pandemic (Daks et al., 2020; Pakenham et al., 2020). While the above empirical studies explored and examined facets of resilience in a snapshot of the COVID-19 pandemic, scholars continued to call for a holistic understanding of the trajectories of resilience capacity in response to the situational demands of the complex acute-onset and chronic stress over the course of the pandemic.

Theoretical Framework

To connect the conceptualization of family stress and resilience, I have proposed a conceptual framework – Multisystemic Resilience Framework (see **Chapter 1**). The Multisystemic Resilience Framework depicts resilience as a developing capacity that changes over time as a result of the intersection of multisystemic resources and perceptions embedded in the sociocultural context. In turn, this leads to different trajectories of individual and family adaptations. The framework informed the semi-

structured interview protocol of the current study that aimed to explore each element, i.e., stressors, resources, perceptions, and adaptation throughout the pandemic. I intentionally explored trajectories or changes of each element from pre-pandemic through the first two years of the pandemic.

Additionally, this qualitative study explored a deeper understanding of the interplay of resources and perceptions from the intersection of individual and family levels. Notably, while the conceptual framework informed the process of collecting data to uncover the reality of resilience mechanisms during the pandemic, the critical realism paradigm enabled me to build a new and more accurate theoretical framework to explain the stratified reality.

The Present Study

This qualitative study aimed to explore the resilience mechanisms contributing to individual and family adaptation in the specific sociocultural contexts in Minnesota and Hong Kong over the course of the pandemic. The research questions were as follows: Among adults who lived with family and experienced high levels of pandemic-related stressors, what did resilience capacity look like in Minnesota and Hong Kong throughout the first two years of the pandemic? How did individuals and families navigate and negotiate their resources to sustain their well-being and functioning in the face of the COVID-19 pandemic?

Methods

Research Paradigm

As a post-positivist researcher, I followed the paradigm of critical realism (Maxwell, 2012). Critical realism looks for demi-regularities (i.e., partial patterns or broken trends in data) that point towards the underlying causal mechanisms (i.e., processes) that explain the empirically observed phenomenon (Bhaskar, 2009). Mechanisms are causal entities that generate or trigger observable human actions and ideas depending on situational conditions (Elder-Vass, 2010). Critical realists acknowledge that reality is complex; the phenomenon of interest is likely to work differently in different contexts with different individuals (i.e., what works, for whom, in what context). The interplay of social structure (i.e., organized sets and relationships of social institutions such as family) and individual agency (i.e., human thoughts and actions) possess causal powers to trigger causal mechanisms.

Ontologically, I believe that there are three stratified levels of reality: the real, the actual, and the empirical (see **Figure 12**; Maxwell, 2012). The 'real' consists of mechanisms and structures that have the causal power to explain the phenomenon of interest, but cannot be directly seen or experienced (e.g., showing love and care toward family members). The 'actual' consists of individual agency and social structure that activate and procedure the changes (e.g., geographical proximity with family members, fear of family members contracting COVID-19). The 'empirical' are observable events that people experience or perceive (e.g., checking in and sending masks to family members during the outbreak of the pandemic). The primary goal of critical realism is to

explain observable events (i.e., the empirical) through the causal mechanisms (i.e., the real) activated by the social structure and individual agency (i.e., the actual).

Additionally, I believe that reality exists independently of our awareness of these mechanisms. Causal explanations are not solely based on empirical regularities from the five human senses, but also the unobservable structures and mechanisms. Human knowledge that is collected from interviews with participants only captured a small part of reality (i.e., the empirical and some of the actual). In summary, critical realist researchers uncover underlying unobservable mechanisms under specific contexts and structures (Maxwell, 2012).

Epistemologically, I believe that the world is theory-laden, but not theory-determined. While existing theory (i.e., Multisystemic Resilience Framework, see **Chapter 1**) and concepts (i.e., resilience) helped me get closer to the reality (i.e., identifying the mechanisms and structures), I believe that existing knowledge is fallible and is always partial and subject to revision (Bhaskar, 1975). That is, I believed that I could build a new and more accurate explanation of reality to potentially support, elaborate, or deny existing theory and concepts (Fletcher, 2017).

Participants

Participants were 29 adults who lived with their families, experienced high pandemic-related stress at Wave 2, and reported varied levels of resilience capacity at Wave 1. In Minnesota (n = 15), participants' ages ranged from 25-74 (M = 41.6, SD = 12.6; see **Table 8**). Two-thirds were females (n = 10). Participants identified as non-

Hispanic White (*n* = 10), Hispanic (*n* = 1), Native American (*n* = 1), Asian (*n* = 2), and multiracial (*n* = 1). Most were married (*n* =14) and one was single.

Participants were highly educated, with either a bachelor's degree (*n* =3) or a graduate degree (*n* =12). Most participants worked part-time (*n* =4) or full-time (*n* =8); the remaining three participants were homemaker (*n* =1) or student (*n* =2). Socioeconomically, one participant's income was below the poverty line; seven participants were middle-income household; seven participants were upper-income households. Household size ranged from 2-6 (*M* = 4.1, *SD* = 1.0). Participants lived with spouse only (*n* = 1), spouse and (adult) children (*n* = 13), and parents and adult siblings (*n* = 1). Participants experienced between three and seven pandemic-related stressors[3] (*M* = 4.6, *SD* = 1.1). While six participants reported high perceived resilience using a validated 10-item Connor-Davidson Resilience Scale (CD-RISC), others reported moderate (*n* = 8) and low (*n* = 1) perceived resilience.

In Hong Kong (*n* = 14), participants' ages range from 19-62 (*M* = 41.6, *SD* = 12.6; see **Table 9**). Around two-thirds were females (*n* = 10). Half were married (*n* = 7), one was cohabitating, and six were single. The majority of participants had either a bachelor's

[3]Pandemic-related stressors were measured using seven items: (a) personally experienced or suspected of having symptoms of COVID-19, (b) family members inside/outside the home experienced or suspected of having symptoms of COVID-19, (c) family members inside/outside the home died from COVID-19 or its related complications, (d) family members inside the home experienced reduced employment (e.g., job loss, limited working hours, or not working due to safety concern) as a result of COVID-19, (e) family members inside the home currently working in healthcare or other high risk jobs for contracting COVID-19, (f) family members currently working from home in response to COVID-19, and (g) personally currently practicing social distancing or quarantining. An overall pandemic-related stressors score was created by summing the number of pandemic-related stressors experienced (range: 0-7).

degree (n = 4) or a graduate degree (n = 4). The remaining participants had an associate degree (n = 3) or some college (n = 3).

Most participants worked part-time (n = 1) or full-time (n = 10); the remaining three participants were homemaker (n = 1) or student (n = 2). Socioeconomically, three participants' income was below the poverty line, five participants were middle-income household, and six participants were upper-income households. Household size ranged from 2-6 (M = 3.7, SD = 1.1). Participants lived with spouse only (n = 1), spouse and (adult) children (n = 5), parents only (n = 1), spouse, parents and adult siblings (n = 5), and grandparent, parents, and adult cousin (n = 2). Participants experienced between three and seven pandemic-related stressors[3] (M = 3.0, SD = 1.1). While six participants reported high perceived resilience using a validated CD-RISC measure, others reported moderate (n = 4) and low (n = 4) perceived resilience.

Procedures

The Institutional Review Board at the author's doctoral institution approved the study. Interview participants gave informed consent electronically prior to their interviews. Between November and December 2021, I conducted virtual interviews online via the Zoom platform to conform to COVID-19 public health guidelines. Each interview lasted 61-158 minutes (M = 79.2, SD = 17.8). I conducted the interviews in English for the sample in Minnesota, and in Cantonese Chinese for the sample in Hong Kong. Notably, I conducted most interviews for the sample in Hong Kong while I was quarantining in the hotel in Hong Kong. Each participant received a $20 USD or $150 HKD gift card for reimbursement at the end of the interview.

All interviews were audio-recorded and transcribed verbatim. All electronic files were password-protected and only accessible to team members. I assigned numbers to participants at the time of recruitment to avoid potential identification. I also removed any identification information from the transcripts before data analysis began.

Recruitment

The participant pool for this study was those who had completed the Wave 2 online surveys and had (a) agreed to a follow-up interview at the end of the Wave 2 survey, and (b) reported in the Wave 2 survey that they had experienced higher than mean cumulative pandemic-related stress compared to others in their respective region.

I conducted purposive sampling based on the quantitative analysis of Wave 2 survey responses. I selected a subset of participants by the descending number of reported cumulative pandemic-related stressors and varied resilience capacity (high / medium / low) reported in the Wave 1 survey. I approached those reporting higher cumulative pandemic-related stress first as their resilience mechanisms were more likely triggered during the pandemic. To ensure diversity in the sample, I used maximum variation sampling to select a wide range of cases with respect to key individual differences, including gender, race/ ethnicity, age, and marital status. Recruitment of those identified through purposive sampling continued until theoretical saturation was reached, i.e., no new information related to resilience mechanisms was elicited (Saunders et al., 2018).

Interview

I conducted intensive, semi-structured interviews using an established interview protocol (see **Table 10**). Questions dived into the stratified realities informed by the

Multisystemic Resilience Framework; the aim was to enrich understanding of resilience mechanisms contributing to adults' adaptation when faced with high pandemic-related stressors during the first two years of the COVID-19 pandemic with respect to their specific sociocultural contexts. There were five sections of interview questions. First, I started with trying to understand participants' pre-pandemic and current family context (i.e., coresident family members, outside family members with contact, family roles, etc.), and pandemic-driven family transitions. Second, I asked questions to identify stressors existing prior to the pandemic and new stressors triggered by the pandemic. Interview questions also explored the subjective appraisal of pandemic-related stressors. These interview questions attempted to capture the condition/context of pandemic-related stressors (i.e., triggers of the resilience mechanism) and perceptions of their experiences.

Third, I explored participants' individual, family, and community resources and how the intersections of different properties of multisystem resources may have affected their adaptive process over the course of the pandemic. These questions captured the intersections of multisystem resources/characteristics (e.g., high individual support but low family support) and resilience mechanisms (i.e., how the multisystem resources/characteristics promoted or hindered adaptive outcomes in the specific sociocultural context).

Fourth, I explored trajectories of individual adaptation or maladaptation over the pandemic in participants' specific sociocultural context. Last, I asked participants to describe their perceptions of a resilient individual and family. Based on description, I asked them to evaluate their overall perceived resilience throughout the pandemic.

Analytic Strategy

The qualitative interviews were transcribed verbatim to the corresponding language of the interview. When required for analysis and dissemination, interviews were translated into English and verified by a colleague who was a bilingual English and native Cantonese Chinese speaker. Data were managed using NVivo version 1.7.1. I analyzed the data using content analysis with both manifest and latent inferences to understand causal explanations (Leung & Chung, 2019). I employed constant comparison across the Minnesota and Hong Kong groups to explore how sociocultural contexts and conditions influenced the occurrence of resilience mechanisms. The focus was on the causal explanations of resilience mechanisms that contributed to individual and family adaptation in the face of cumulative pandemic-related stressors. I paid attention to how the intersection of individual and family resources empowered the process of resilience among adults in the specific sociocultural context.

I primarily conducted inductive analysis following a four-level abstraction process: comprehension, synthesis, theorizing, and reconceptualization (Bygstad & Munkvold, 2011). For *step 1*, I started with comprehension of the data through open coding (i.e., chunking data and labeling the data with codes that were reflective of participants' experiences using participants' language). Specifically, I searched for the following: (a) How was the effect being caused? (e.g., resilience mechanisms manifested in observable resources and perceptions, etc.) (b) Why did resilience happen? (e.g., social structure and individual agency that triggered the resilience mechanisms) (c) Under what circumstances triggered or inhibited resilience to occur? (e.g., condition and context that

trigger resilience mechanisms) (d) When did resilience happen? (e.g., turning points that triggered the changes in observable resources and perceptions, etc.)

I led a research team of five members (two females from the United States who self-identified as non-Hispanic Black and Asian, and three females from Hong Kong who self-identified as Chinese). Two independent coders conducted open coding for the first 10 transcripts (5 from Minnesota, 5 from Hong Kong). In the open coding process, team members wrote theoretical memos about three issues: (a) contradictory patterns (e.g., outdoor family gatherings at the driveway in the first Thanksgiving despite low risk tolerance to social interaction); (b) unexpected patterns (e.g., no fear of contracting COVID-19 and insisted on maintaining family routine prior to the pandemic); and (c) emerging explanations related to resilience inferred from the observable behavior and thoughts (e.g., being a cancer survivor increased the tolerance of ambiguities in the pandemic). After open coding of each interview, independent coders discussed differences in the semantic meaning of the coding to research consensus. This process built the initial coding structure. I then used the coding structure to finish coding the remaining transcripts and discussed any new identified codes with at least one team member.

For *step 2*, I synthesized the codes through an iterative process to build, refine, and confirm the accuracy of codes with team members. Specifically, I organized the codes into the conceptual framework by interview transcript. I paid close attention to how participants changed the threshold, valence and nature of their perceptions and resources over the course of the pandemic. See **Figure 13** for an example. Additionally, I used

theoretical memos to stratify by transcript the synthesized codes into empirical, actual, and real realities. This iterative process enabled me to identify possible causal explanations of resilience mechanisms triggered by certain social structures and individual agency under specific sociocultural contexts and conditions. See **Figure 14** for an example.

For *step 3*, I theorized causal explanations through an inferential process using analytical devices of critical realism, including abduction, retroduction, and retrodiction (Elder-Vass, 2010). Abduction is an early inferential process to formulate how existing knowledge outside of the initial conceptual framework may explain the empirical data. For example, I used the concept of "cognitive dissonance" to describe the contradictory thoughts and actions related to the pandemic. Retroduction is the explanation of why the phenomenon occurs as it does, and the identification of what conditions are necessary for the phenomenon of interest to occur. For example, I identified that being a cancer survivor enabled oneself to be less fearful of contracting COVID-19 even during the outbreak. Retrodiction is the identification of how the interplay of events and experiences (i.e., social structure and individual agency) produces certain events. For example, being a cancer survivor and having religious faith together made individuals less fear of contracting COVID-19. I continued these analytical processes with all interview transcripts.

For *step 4*, I reconceptualized through peer briefing with all members of the research team. Specifically, I re-described the causal explanations of evolving resilience

mechanisms and the necessary conditions. I also identified negative cases, which did not fit with the generated themes or subthemes.

Qualitative Rigor

I used different techniques to establish rigor in my qualitative analysis: credibility, dependability, confirmability, and transferability (Elo et al., 2014). Triangulation of coders (independent and consensus code) established credibility, dependability, and confirmability. I conducted analysis for all interviews, while five other research team members supported independent initial coding and subsequent confirmation of all new codes. I practiced peer debriefing and reflexivity with the research team throughout the coding and theorization process. Specifically, the research team discussed the 'empirical', 'actual', and the plausible 'real' after coding each interview. Additionally, the research team examined the entire analytic process and the plausibility of all identified patterns. In this process, all divergent opinions were resolved thought active discussion with the research team. At the same time, the research team and I reflected on our own personal pandemic-related perceptions and biases that might have affected the coding and theorization process.

I also established credibility by actively seeking out and disclosing negative cases that did not fit into some of the themes of the resilience mechanisms. I established dependability by keeping an audit trail of individual coding and theoretical analytical memos during multiple stages of theme development. I established confirmability by having an independent third-party researcher analyze the audit trail, i.e., the systematic processes and decision making from coding to theorization. I established transferability

through purposive sampling to capture resilience mechanisms and thick, rich descriptions of the data.

I acknowledge that critical realism explores the causal mechanisms in a specific condition under a specific sociocultural context, which might limit the full applicability to other contexts and situations. However, I believe that the essence of pandemic-related resilience mechanisms will be transferrable to other chronic stressors that are characterized by uncertainty and ambiguity.

Positionality

I identify as an international Asian female graduate student from Hong Kong, trained in Family Social Science in the United States, with previous degrees in Business Administration and Psychology in Hong Kong. I conduct research in the area of family stress and resilience. Interdisciplinary training and cross-cultural lived experiences inform my worldviews about the interplay of individual- and family-level adaptation. Having lived in both Minnesota and Hong Kong, I was sensitive in asking interview participants directly about the intersection of family and cultural nuances affecting adaptation over the pandemic in both regions.

Over the three-year pandemic, I lived in the Twin Cities, Minnesota, and experienced the George Floyd incident in 2020. During the data collection for Hong Kong sample, I spent time quarantined in a hotel due to travelling from the U.S. I disclosed to participants during the interviews my cultural and social identities, as well as my country of origin. This built rapport with participants, who were more open to share about their own local and foreign experiences or knowledge about the pandemic.

Personally, throughout the pandemic, I considered myself physically distanced from family in Hong Kong, but emotionally close to my immediate and extended family members such as grandparents. Prior to the COVID-19 pandemic, I personally experienced the SARS pandemic in Hong Kong when I was in elementary school. This enabled me in 2020, early in the outbreak, to recognize the COVID-19 pandemic as an opportunity to explore resilience mechanisms across distinct cultures. Additionally, I contracted COVID-19 in late May 2022 and experienced long-COVID-19 symptoms over the following summer. These personal experiences have influenced my perception of risk to contagion and distress tolerance to social interactions. I waited to conduct the qualitative analysis in spring 2023 when I felt more physically and emotionally distanced from COVID-19.

Results

The outcome of this qualitative study is a theoretical framework of adults living with family members' resilience mechanisms of in response to changes over two years of the pandemic (illustrated in **Figure 15**). Resilience mechanisms occurred in a nonlinear fashion under four conditions: (a) cultural and relational identities, (b) course of pandemic development, (c) physical and emotional proximity to family members, and (d) personal space. The uncertainties and ambiguities created by the emergence and persistence of the COVID-19 pandemic disrupted family stability and aroused cognitive dissonance (i.e., conflicting attitudes, beliefs, and/or values between oneself and the social norms in the family, workplace, community, and society). Participants experienced multiple conflicts with different institutional systems simultaneously. The cumulative

stress from pre-existing vulnerabilities and pandemic-related stressors triggered psychological distress, which in turn activated resilience mechanisms. These resilience mechanisms operated on individual and family levels. The individual-level mechanism was the on-going conscious or subconscious cognitive processes that required distress tolerance and cognitive flexibility to resolve competing life priorities in response to changing demands. The family-level mechanism was the on-going processes that family members working cohesively to combat stressors and actively find solutions to the changing demands. Individuals might repeat the above process in varied duration, which would thus lead to different individual and family adaptations. The aforementioned resilience mechanisms were dynamic processes interconnected with the changing perceived risk of contagion and risk tolerance to social interaction throughout the first two years of the pandemic.

The next section explains the four conditions in more detail (cultural and relational identities, course of pandemic development, physical and emotional proximity to family members, and personal space). The section also explicates the four themes and corresponding subthemes: (a) disruption in family stability, (b) cognitive dissonance: conflicting attitudes, beliefs, and/or values between oneself and the social norms, (c) cognitive flexibility and distress tolerance in resolving competing life priorities, and (d) family hardiness.

Conditions of Resilience Mechanisms

The occurrence of resilience mechanisms was contingent on four conditions: cultural and relational identities, course of the pandemic development, physical and

emotional proximity to family members, and personal space. These four conditions reflected antecedents to participants' worldviews that helped them navigate during the first two years of the pandemic.

Cultural and Relational Identities

Cultural and relational identities based on worldviews influenced how individuals interpreted, adopted, or rejected the beliefs, values, behaviors, and norms of daily life throughout the pandemic. Compared to pre-pandemic times, participants who held social identities of mother or family caregiver experienced more challenges balancing care of family members and self-care. Despite living with parents, the ways American and Chinese young adults navigated the pandemic differed due to their different cultural heritages and upbringing.

In Hong Kong, participants generally embraced practices of avoiding family conflicts and suppressing intense negative emotions (i.e., avoidance of crying) in public spaces to safeguard family harmony. A number of participants described the family norm of "sharing pleasant news but withholding unpleasant news". One Hong Kong Chinese participant explained how suppressed negative emotions burst into volatile emotions when triggered during the pandemic:

> Our family seldom expressed emotions, even before the pandemic, maybe related to the traditional Chinese culture. This triggered a sense of mistrust. As part of the family, it was difficult to change the family dynamics. I had been worried that my expression of negative emotion would lead to more intensive negative responses

> or blaming from family members. When it came to family conflicts during the pandemic, the emotions became more volatile. (Participant 1184, Hong Kong)

A vast majority of participants described the hierarchical structure in Hong Kong; individuals of lower power or younger generations are expected to respect and comply to authority or the older generation. On a societal level, one Hong Kong Chinese woman described this as "I think most people in Hong Kong are generally more obedient. When policies were executed by the government, people would generally comply, unlike the resistance observed in foreign countries" (Participant 1233, Hong Kong). Another Hong Kong Chinese man described his ambivalence toward public health policies as "Annoyed [with the policies] but have to accept it. I need to live with it. There is nothing else I can do…" (Participant 1543, Hong Kong). On the family level, one young Hong Kong Chinese adult eloquently described vicious family dynamics and that she had to compromise to "save face" for older generation family members:

> When I burst into argument with mum, it made two of us irritated… People in the entire household were affected and upset. When I felt unhappy, I would cry privately. However, it turned out, it's me to compromise and admit wrongdoing. (Participant 1423, Hong Kong)

In Minnesota, participants were more ethnically and racially heterogeneous so therefore presented more variations in terms of their upbringing. However, a vast majority of participants openly expressed their thoughts, ideas, and feelings to their family members despite holding different points of views. One non-Hispanic White American woman described how she interacted with her husband: "Sometimes we hang

on to our stuff, and then it explodes sometimes [laughing]. But sometimes we'll get frustrated or grumpy or short-tempered, and then it's time to check ourselves and reset. And then we have a conversation about what's going on." (Participant 554, Minnesota). Another non-Hispanic White American young adult eloquently described how she showed love and care to significant others who were not living with her through daily check-ins:

> I'd love to be able to balance being a, like a human, and friend, daughter, sibling, with like being a student better… Just feel like maybe everyone's stretched a little bit further, emotionally, and so I have felt more of a need to check in and make sure that everyone's doing okay since the pandemic. I'd like to be able to be more present when I am talking with them, and not have so many different things going on in the back of my head. I wish I was more organized; just like with all of the things that I want to be putting time. (Participant 285, Minnesota)

Course of the Pandemic Development

Over the course of the pandemic in both regions, the level of contagion of COVID-19 varied, and thus influenced participants' perceived risk of tolerance related to social interactions. When the pandemic emerged, a vast majority of participants experienced intense fear and anxiety due to ambiguities that surrounded the disease and uncertainties imposed by public health policies. Many participants, particularly the more vulnerable groups (e.g., young children, older adults, those with chronic conditions or immunocompromised, etc.) had very low risk tolerance for social interaction with people beyond those with whom they lived. A retired non-Hispanic White American man shared:

> Previously when we [my wife and I] were unvaccinated, we lived in this little bubble. The changes in COVID didn't have much impact, cuz we were careful all the time. We're over 65 and the risk level was unacceptably high. (Participant 325, Minnesota)

The availability of vaccine in 2021 was a critical milestone in navigating the pandemic. However, polarization of attitudes towards vaccinations was apparent in both regions – vaccines offered some degree of relief, “peace of mind”, for some participants. Those vaccinated in Minnesota became somewhat more open to leave home for work, exercise, and essential social interaction with caution, but also triggered more hesitancy among those doubtful about vaccine necessity and efficacy. An Asian American homemaker with two young children, remarked:

> I think when we all got vaccine, that helps, because we were able to see some family, and have some childcare relief, for me, like, you know, just to be able to like have grandparents entertained my kids while I got housework… After the vaccination, I think that, like when everybody's fully vaccinated, it was a big turning point for us. (Participant 164, Minnesota)

Physical and Emotional Proximity to Significant Others

Throughout the pandemic, individuals in both regions varied in physical proximity (i.e., physical contact and geographical proximity) and emotional proximity (i.e., emotional closeness) with significant others. Due to travel restrictions, physical proximity was related to whether the family members lived in the same or different households, or whether different households lived in the same county/district,

state/region, or country. Emotional proximity was related to the extent of emotional closeness and support among family members. In the analysis, it was possible to identify intersections of physical and emotional proximity from different participants.

It was quite common over the course of the pandemic to find participants living physically distant from family members (i.e., lived in different counties or states), but maintaining close emotional connections. One non-Hispanic White American woman remarked:

> I don't have a lot of family really nearby me physically. [For] emotional support, yes. I feel like I'm closer to my parents now, and I think we talk more, like in a deeper way. My younger brother is good at disarming situations. So, if I called him and I was like super anxious, he'd be like "Hey, hey, calm down" and he would say something, and it would help. So, he's very emotionally supportive too. (Participant 554, Minnesota)

On the other hand, living in the same household (close physical proximity) was not necessarily associated with emotional closeness. One Hong Kong Chinese woman who lived with her older parents reported that she purchased protective gear for her parents out of fear, not care:

> Because they [my parents] sometimes went in and out of hospital. We [my sister and I] were so scared, so I bought full protective gear for them [parents] and helped them sanitize stuff after returning home. I believe it was more out of fear of them contracting COVID, rather than showing care to them [emotionally] (Participant 1233, Hong Kong)

Personal Space

Personal space was highly relevant to the adjustment and adaptation in the pandemic because coresident family members spent more time in the same household. Particularly, frontline workers were at higher risk of exposure to COVID-19 contagion and spreading it to their coresident family members. Thus, living in a confined apartment might exacerbate the vulnerability to physical health (if one family member contracted COVID-19) or mental health problems (challenges of shared space). A Hispanic American father of four children with a household income below the federal poverty line was "feeling trapped living in a small apartment" (Participant 293, Minnesota).

A vast majority of Hong Kong Chinese participants lived in confined apartments, which became a trigger for family conflicts. One woman grumbled:

> Working in an office was more relaxing than working from home. The house in Hong Kong is so small. Five of us live in a public housing apartment, with not so well soundproof. There are lots of disturbances at home with my young niece and mum chatting or arguing, very noisy. It is difficult to have a quiet space. (HK 1466, Hong Kong)

In contrast, most participants in Minnesota lived in houses, with extra quiet rooms or space to accommodate remote working at home. A non-Hispanic White American man from an upper-income household said:

> Our home's not a big house but it's big enough. It's got a lot of different rooms and areas. So, I was able to set up down in the base, this is a guest bedroom, but

we mostly use it for storage, and it became my home office about May or June of 2020. (Participant 002, Minnesota)

Disruption in Family Stability

Most participants shared that the acute-onset and chronic nature of the pandemic disrupted their daily routine and thus the family stability. Specifically, the outbreak of the pandemic in early 2020 brought uncertainties to day-to-day life. Heightened by the ambiguities about the novel virus, participants in both regions felt various levels of threat based on their perception of contagion and their risk tolerance for social interaction. The pandemic-driven public health policies (e.g., closure of non-essential business, remote working, distance learning, etc.) resulted in temporary and prolonged disruption to individual adaptation in work, education, and daily living. Ripple effects spread from individual family members to entire family systems if members were living together or having regular interaction.

Forgoing non-essential, in-person engagement

To conform to public health guidelines and mitigate the threat of COVID-19, many participants reported forgoing non-essential, in-person engagement and shifting focus from external activities (e.g., work, study, etc.) to activities inside the family household. As a result, essential workers voluntarily or involuntarily stopped working, particularly in the first year of the pandemic. A Native American mother of two young children, described her caution due to uncertainty and ambiguity that influenced her to quit her frontline job voluntarily:

> My job was in the public. My husband and I talked about it, and for our family that was the safest option to keep us all home during that time. We didn't know what it [COVID-19] was about in March and April [in 2020], it's brand new, and people [who infected with COVID-19] were really sick… And my role, still a mom but I had to become a teacher, I don't know, do a little bit more on the house, serve lunch for everyone (Participant 123, Minnesota).

Additionally, the closure of indoor and outdoor public spaces led to the unemployment of breadwinners, which had ripple effects on their families. Given the uncertainty of dialing back in the public health policies, a non-Hispanic White American mother of three young children, vividly described their financial constraint and hardship:

> It started to get rough for us in September [2020]. Because I coached swimming, and when they [the Government] shut down everything, health clubs and pools, and there wasn't any clear indication of when any of that would start up. So, I was unsure if I would have a job. So, I pulled my children out of school…And it started to being home all day, every day, with all of us, was starting to get challenging. The kids would fight a lot more, there were a lot more tantrums, a lot more explosive, yelling. It seemed like everybody was a bit on edge at that time, so I reached out to a therapist that I had seen previously (Participant 455, Minnesota).

Escalating Family Conflicts

Almost all the participants reported escalating family tensions or conflicts, no matter what walks of life they occupied; it was not limited to students, frontline workers,

non-essential workers, or retired persons. Family members spent more time at home, such that the heightened physical proximity became the sources of stress and distress. A Hispanic American father of four children recollected, “Our patience and tolerance with each other was low when we constrained in the apartment” (Participant 293, Minnesota).

Another Hong Kong Chinese young woman described her family dynamics, “It is undeniable that the pandemic draws family physically closer under the same shelter. However, arguments and fights proportionally escalated as well”. (Participant 1423, Hong Kong) She continued to describe how her tolerance with her family tapered off as the pandemic persisted, “Acknowledged that mum was upset, I would avoid conflicts (with her), hide (myself) in my room. However, when she criticized me upfront, I would confront her head-on. When she yelled at me, I would shout even more loudly.”

Even worse, participants would feel anxious and scared when learning the people they interacted with confirmed with COVID-19. They passed their heightened anxiety on to household members, particularly those living in apartment buildings with limited space. One Hong Kong Chinese woman vividly recalled the big family conflict in the household when her sister’s colleague contracted COVID-19:

> My sister didn’t dare to return home because she was afraid of infecting dad in case of contracting it [COVID-19]. It took a long while for us [mum and I] to persuade her to go back home and isolate herself in the bedroom… At that time, dad was panicking, because he had chronic conditions. He blamed my sister, “Why did you have close contact with those contracted? Do you want me to die? I will die once you pass it on to me. (Participant 1233, Hong Kong)

The escalating family conflicts went beyond living in the same household. When it came to family togetherness across different households, participants in both regions escalated family conflicts due to different comfort levels and risk tolerance for social interaction. A non-Hispanic White American mother with two young children added:

> We all really didn't feel that way until March of 2021, after we [my husband and I] got vaccinated. So, we ended up holding them [father- and mother-in-law] at arm's length until that time, and that was hard. I think everybody had to do their best to calculate and tabulate their own risks and safety and comfort, and his parents put a different calculation than we did, and really wanted to visit [their grandson]. And we had many conversations with them where just felt like it was hard to find common ground. We love you, we would love for you to visit, and we don't feel safe yet for you to come on a plane and visit us. (Participant 331, Minnesota)

Cognitive Dissonance: Conflicting Attitudes, Beliefs, and/or Values between Oneself and the Social Norms

Resilience was evident in participants developing capacity over time to resolve conflicting attitudes, beliefs, and/or values between oneself and the social norms in the family, workplace, community, and society. The conflicts covered three main areas, including a sense of safety from the contagion, family togetherness, and enacting family roles and responsibilities.

Sense of Safety from the Contagion

A large number of participants were concerned about their own and families' health and safety due to the fear of contracting the disease, particularly during the early outbreak of the pandemic. Many participants shared conflicting attitudes, beliefs and values between senses of safety from getting COVID-19 versus socializing with people outside of their home. One non-Hispanic White American mental health professional was anxious about meeting her clients in person for fear that she might bring the virus home to her newborn daughter:

> So that was definitely a HUGE challenge, and lot of sleepless nights, around like, should I straight up quit my job so that I don't have to be worried about my family and my daughter safety, but then my husband will be like "Well, I still have to go to work" so like really, even if one of us left our job, or went on a temporary leave or something like that, the other person would still be going it. (Participant 180, Minnesota)

Similarly, a large number of participants in Hong Kong expressed greater concerns about their own and their families' health and safety, than their psychosocial well-being (i.e., sense of loneliness and isolation) at home. One Hong Kong Chinese woman eloquently described her perceived sense of threat:

> At that time, I felt outside home was really dangerous, that is one would contract [COVID-19] when going out. Maybe, because a resident living in my apartment building got a diagnosis of COVID, I was really worried of contracting the virus even riding in an elevator. These fear and anxiety outweighed the burdens

> [distress from noisy environment] at home. Safety should come first, those burdens at home are nothing relatively. (Participant 1466, Hong Kong)

However, a contrast case was identified in Hong Kong. With a social identity of being a cancer survivor, one woman (a mother, a grandmother) in her sixties prioritized her life purpose over a sense of safety against contracting the disease. Specifically, she vividly described how her terminal illness had changed her worldview regarding life priorities:

> I have already faced some difficulties or terminal illness. The worst thing that would happen is taking away my life [laughing]. The pandemic may last a long time, but it cannot take away all my things. I can take control and lead my life in the constrained environment… Some people tried hard to disinfect and prevent from contracting COVID, but I don't want to be like that. My focus is to live to the fullest. I would spend more time with my family – being their companion. (Participant 1074, Hong Kong)

Family Togetherness

Family togetherness with family members outside of the household conflicted with the sense of safety against contagion and public health policies. Moreover, family members living in the same or different household with different comfort levels of socializing, experienced escalated tensions or conflicts. Although family togetherness during festivals and significant life events was crucial, people in both regions struggled to balance their sense of safety against the risk of contagion. A retired non-Hispanic White

American man in his seventies remained firm in his precaution to protect himself despite his desperation to stay with his family:

> Well, we're [my wife and I] less willing to see people [family members] who weren't vaccinated. So, that's difficult, we don't fight about it. We sort of decided not to, it wouldn't be a source of anger between us, coz it's more important to keep my connection with my family, than it is to get them to do what I want, but I have to take precautions to protect myself. And, hopefully, they understand that. (Participant 325, Minnesota)

Due to public health policy restrictions, it was difficult to attend significant life events of extended family members during the pandemic. For example, one Hong Kong Chinese woman recollected:

> I couldn't see my extended family in all festivals [laughing]. My cousin, with pretty close relationships, got married in December last year [2020]. Because of the restrictions of indoor social gatherings, only family members from the oldest generation could attend his wedding. For the remaining family, we could just watch the live broadcast [laughing], a little regret missing these significant life events. It seems like losing close relationships. (Participant 1117, Hong Kong)

Enacting Family Roles and Responsibilities

When the pandemic emerged, almost all family caregivers reported struggling with allocating time and balancing family roles and responsibilities versus work. A number of homemakers sacrificed their own mental health to support their families, such as focusing on distance learning of young children, which added a new role of being a

teacher at home. An Asian American father of three preadolescent children, reported his additional childcare responsibilities working from home:

> So, it is a little challenging to balance their [my children's] schoolwork, my home life, and my work. There are times when I just block off my calendar at work, say, from 12 to 1, you know, just tell my boss that it's lunchtime, I have to cook lunch, and I have to help them with homework coz sometimes the teacher, just not being there helping them out. I guess I have to be that teacher to help fill in those gaps. So, the consequence of that is sometimes my workday gets extended a little later in the day, where I have to catch up from the stuff that had put aside to help with the family stuff. (Participant 543, Minnesota)

Two other American homemakers eloquently shared how they devoted time and energy to support the day-to-day living of their families despite having contracted COVID-19 or experiencing psychological burnout:

> My husband and my kids both had a really bad cold and I caught it last. And for some reason mine tested positive for COVID and theirs didn't… The day I went to go get tested, I actually like mow my lawn first. Yeah. So, like I didn't have all the COVID symptoms. I didn't feel super super sick. And I power through most things, I'm still gonna make dinner [laughing]. (Participant 554, Minnesota)
>
> I was not taking care of myself. I was just waking up with the boys [two young sons], getting them through the day, and then going to bed, because I had no energy, and I cooked dinner, I had to clean the kitchen, do certain housework, because the house needed to stay afloat… And so, I would say my mental health,

> those three months [between April and June 2020], it was very, very hard to do it. The focus was on them and getting them through those last month of school. But I was suffering. (Participant 123, Minnesota)

Cognitive Flexibility and Distress Tolerance in Resolving Competing Life Priorities

The conscious or subconscious cognitive processes required flexibility in resolving competing life priorities and tolerance to setbacks, in response to changes in the environment. Priorities changed over the course of the pandemic as individuals' perceived threat of contagion and risk tolerance for socializing. Individuals adopted different strategies to resolve competing lifestyle priorities. These included assessment of one's own and/or significant others' COVID-19 infection risk due to socialization, setting clear physical and emotional boundaries on what one believed, drawing a line between what one can and cannot control, acting and respecting differences in core values, and setting realistic expectations and letting go of previous ones.

Assessing and Adjusting Threshold of COVID-19 Risk Tolerance

Many participants consciously or subconsciously assessed their own and coresident family members' COVID-19 risk tolerance against in-person engagement. One non-Hispanic White American mother of three children eloquently described how she struggled between the competing priorities between socialization and physical health of her young children. She actively sought pediatricians' advice, while assessing the costs and benefits of different options for her young children:

> It's been a constant assessment of my risk tolerance, because my oldest was in kindergarten. His doctor said that COVID in children under six is not as

> concerning as an older person. Yes, there is that inflammatory disease that could happen, but not being in school is a greater problem at their age, so we decided to have our children in school this year [in 2021]. But any other extracurricular activity is on hold until we can get all our kids vaccinated, because we already have the risk of school happening. (Participant 455, Minnesota)

Similarly, another non-Hispanic White American man in his seventies articulated his heightened concern for personal safety within social interactions, “There's a certain amount of anxiety that goes along with that, and it's not clear to me that the anxiety has gone down as fast as the risk has gone down.” (Participant 325, Minnesota) Thus, he intentionally trained himself to increase his COVID-19 risk tolerance in light of the availability of medical remedies. He recalled having a very strict intolerance for socializing during the first year of the pandemic. Due to his older age, he limited himself to staying in his own personal “bubble”, his home, with no outside contact. He explained how he readjusted himself to social interaction as his perceived risk changed:

> [For] this kind of abnormal, there's nothing I can do about it, but like, the one thing that I struggle with trying to understand is, so I’ve had the two [COVID-19] shots plus booster, and there's all new medications coming online all the time in case I actually got sick, so my risk level is nowhere, nearly as severe as it was a year ago, but I, I have a hard time, you know, I sort of trained myself to, to be risk aversive, and I have a hard time being freer. (Participant 325, Minnesota)

When family members had different comfort levels of social interaction, participants negotiated and navigated to strike a balance between their social needs and

the risk of COVID-19 infection. A mother in Hong Kong wanted to take her child for outdoor activities when COVID-19 cases were low, but the father was more cautious due to his perception of potential harm to their child. She said:

> I really wanted to get a balance [between socialization needs and physical health], particularly when the pandemic cases were low. We [My husband and I] needed to negotiate and make compromises to some extent. So, I needed to tell him what extra precautions I would take to bring our son to the park. (Participant 1117, Hong Kong)

Establishing Healthy Interpersonal Boundaries

Individuals intentionally established healthy interpersonal boundaries to confront conflicting attitudes, beliefs, and/or values between oneself and the social norms. Through physical limits and structure, participants working from home negotiated and assigned specific time and space for their work and family responsibilities. A number of participants working from home informed their young children not to interrupt them when work was in process. One Hong Kong Chinese mother said, “I am working from 9-12, but we can talk at 12 noon during lunch hour” (Participant 1535, Hong Kong). Some remote working participants locked themselves in their home-office or basement if they had extra space in the house.

For emotional boundaries, participants would stop arguing with significant others in the family or affiliated others in social media holding different worldviews in the pandemic in order to alleviate intense stress and psychological distress.

Different family members had different risk tolerance of COVID-19 infection in the pandemic. Acknowledged conflicting values between sense of safety from the contagion and family togetherness, individuals set physical limits to protect self and coresident family members. One non-Hispanic White American woman mentioned how she clearly communicated with her non-coresident family members about her comfort level of family togetherness during the pandemic:

> My mom and her husband were kind of like, “Nah, COVID is barely a thing”, and I was like, I'm gonna set this boundary with them, because I am in charge of my daughter’s safety, her health and well-being, and I need to decide who is going to be able to be in her life, and how they're going to be in her life. It was not fun to do, but necessary. You are an autonomous adult, you can do whatever you would like. And, depending on what you choose to do, that will impact the capacity that I will spend time with you, and then I will allow my child to spend time with you. (Participant 180, Minnesota)

Due to the conflicting values arouse from the COVID-19 pandemic and the George Floyd riots in 2020, a number of participants in Minnesota intentionally set healthy emotional boundaries on topics that triggered arguments and intense negative emotions with family members, friends, or affiliated others on social media. One Native American woman admitted:

> The [George Floyd] riots that were close to our house, all the stuff [COVID-19 pandemic] was really hard in managing, and conversations were very strained, especially with my mom and my stepdad, when it was brought up, I shut down,

> because I didn't want to talk about it, and it was too raw and too real… [For] things that I did not agree with, I had to learn through this, it is good to draw healthy boundaries, and new boundaries, with certain people certain things. (Participant 123, Minnesota)

A number of participants in Minnesota were overwhelmed by the negative emotions and debates on controversial topics in social media. Some female participants expressed keeping a distance from their social media accounts to protect their own mental health. One non-Hispanic White American woman eloquently shared how she set explicit emotional boundaries in virtual spaces:

> I don't want to argue with people over social media. I'm noticing [it] becoming such an unhealthy, like distraction coping skill for me, like, I could read books, I could do my coloring worksheets, I could do a puzzle, I could spend time with my daughter. You know, there are so many other things I could be doing with my life besides scrolling social media, and seeing all these toxic opinions, and all this political stuff and COVID stuff all day, every day. It's not good for my mental health. (Participant 180, Minnesota)

Practicing Radical Acceptance for Things That Cannot be Changed or Controlled

When they experienced conflicting values, individuals accepted their limited ability to control, and tolerated things that were beyond control. Their cognitive flexibility helped to alleviate the sense of helplessness over the course of the pandemic. However, it was difficult to control the beliefs and behavior of family members with varied levels of comfort related to protecting people's health and the spread of the

disease. Although family members valued in-person family togetherness, many would not sacrifice their own physical health and safety. Specifically, a retired non-Hispanic White American man in his seventies asked his family members to get vaccinated or perform a COVID19 rapid test before visiting him. However, he had to accept that this was beyond his control:

> I'm pretty upset with people who don't get vaccinated, and I don't understand what their thought processes are, and not much I can do about it. I've tried to persuade my family members who aren't vaccinated, but it's, it doesn't go anywhere. You know, one of my grandsons isn't vaccinated, and he's always, "Oh grandpa, I'll do it for you", but then, I never hear back from him, and the next time, he's still not vaccinated. I know that's kind of kid he is, he has good intentions, but he's not gonna get vaccinated, he just can't say no to my face… There's not much I can do about it. You just have to live with it. (Participant 325, Minnesota)

When individuals could not change the external environment, participants demonstrated cognitive flexibility in their varied levels of acceptance and respect for core value differences between self, others, and social conventions. Some participants were able to override their beliefs to take actions that respected others 'differences. In contrast, some participants respected differences but stayed true to their core values.

In Minnesota, the extent of acceptance and respect was demonstrated at both belief and behavior levels. Although the general understanding of the rationale for wearing masks (i.e., where and why) varied across cultural and social groups, a Hispanic American man acknowledged and respected different comfort levels with precautions:

> I see so many people wearing them outside when nobody is around. For me, I don't understand that, because I feel like I'm suffocating in my mask…. I understand that it's just a difference in values, whether their fear of getting sick, or getting somebody else sick. or who they live with, you know, and what's floating in the air wherever they walk, or you know, there's lots to it, so I don't necessarily judge them for it. (Participant 293, Minnesota)

Additionally, the same Hispanic man overrode his beliefs to take action that respected others' comfort levels regarding social interaction during the pandemic. He tolerated his own discomfort and compromised to a small extent. He specifically articulated how he attempted to strike a balance between self and others' comfort:

> When I'm getting that claustrophobia, or I'm feeling sick because of the mask, I'll get nauseous in cars a lot, just motion sick. I used to take the bus a lot to school so I would wear just the face mask that has a lot more openness to it on the bus, so I try to quell the nausea, or the motion sickness… It [wearing a mask] doesn't give me a necessarily a sense of secure, well, it, it does in a different way, it makes me feel comfortable, while still helping others feel as comfortable as I can be. I still want to do my part, but I have to be considerate about myself as well. (Participant 293, Minnesota)

In contrast, people in Hong Kong offered limited acceptance and respect for different values and beliefs; they expressed no intention to change own behavior. Most participants would not make compromises or change their behavior to accommodate core values of the family systems. One young Hong Kong Chinese woman would keep silent

and defer conversations about a controversial topic to avoid escalating conflict. (Participant 1441, Hong Kong) Another Hong Kong Chinese man stayed securely within his own "safe bubble" with his partner, while acknowledging different comfort levels with social interactions with family members who lived in different households. He clearly articulated his understanding of acceptance and respect for conflicting worldviews across his adult siblings:

> I believe that there was no such thing as compromise. We [adult siblings and I] made our own decision, and there was no space for negotiation. Each of us decided what [family activities] were within our comfort levels. Nobody would argue that one must show up or not. We had never had such debates or decisions as a family…. This type of acceptance and respect is sufficient for me – individuals make their own decisions and inform one another in the family without explanations. (Participant 1445, Hong Kong)

Setting Realistic Expectations and Practicing Self-Compassion

Facing competing lifestyle priorities in the pandemic, individuals needed to be cognitively flexible – setting realistic expectations about self and families, and thus tolerating imperfections. Doing well in the pandemic involved conscious attention to not overexerting oneself and focusing on accomplishing the essentials of life, "letting go and giving oneself grace". One non-Hispanic White American woman described how she handled the extra burden of working remotely with some flexible scheduling needed to take care of her newborn child without daycare support. She eloquently described how she gave herself permission to do minimum household chores:

> As we are moving through the pandemic, doing well has changed significantly for me and for our family. It's okay, if we can grocery shop once a week, if we can do a load of laundry once a week, and if our child's alive and healthy, we're doing well [laughing]. If I feel energized by the work I'm doing, and I feel like I'm getting things done in an okay amount of time. If basic needs are being met, we are doing well. I don't need to overexert myself. (Participant 180, Minnesota)

Family caregivers and homemakers faced multiple challenges over the course of the pandemic. Although they had high standards for themselves as parents, they adjusted their expectations as they balanced the demands of parenting with the need for self-care over the course of the pandemic. An Asian American mother said:

> Technology time, that's an example, okay, we're just gonna give up having the set limits or whatever, we will try, like utilizing every resource, versus at the beginning, that was so different, like also realizing that I need time to take care of myself. My husband also needs time to take care of himself, to be able to be good parents for our children… I don't have time to recharge, I feel like I'm shorter tempered with my kids. So, those expectations changed (Participant 164, Minnesota)

Enhancing Family Hardiness

Family hardiness played a central role in the process of handling family stability disruption and resolving competing life priorities between oneself and social norms in the family. In the face of the uncertainty and ambiguity during the pandemic, family hardiness was seen as family members working cohesively to combat stressors and

actively find solutions to the problems for positive family functioning. Family hardiness was illustrated in four areas: expressing love, care, and/or concerns towards family, mutual accommodation of different opinions, family synchrony in sharing responsibilities, and emotional self-regulation to prevent negative family dynamics.

Expressing Love, Care, and/or Concerns towards Family

When facing disruption of family stability and government-imposed social restrictions in the face of COVID-19, many participants shared actions of expressing love, care, and/concerns towards family members regardless of living in the same or different household. However, the ways participants expressed affection towards family members varied across the two regions.

In Minnesota, a vast majority of non-Hispanic White participants intentionally established a new family routine to regularly check in with family members they loved, cared, and concerned in anticipation of psychological distress in times of uncertainty and ambiguity. One non-Hispanic White American father described how he and his wife expressed emotional care towards their three children since the first month of the pandemic:

> The biggest change is we would meet as a family every morning, that was a routine that we established, just to check in with people [three children], see how people are doing emotionally, just kind of go over stuff for the day… We just get together and read, or we talk about the day or make plans for the evening. We had to have something to look forward to, whether that was playing a board game, or watching a movie together. (Participant 528, Minnesota)

Another non-Hispanic White American mother recalled extended family members virtually met one another to “blend together” and “have the sense of belonging together as a whole family”. She vividly described herself connecting closely with extended family members:

> We [My extended family and my family] did a lot of Zoom dates regularly on Sundays, would talk to them for 30 minutes, be supportive and get to know my nephew, but also my son could continue growing those relationships with his aunt and uncle, and his nana and grandpa, and keep that continuity or that trajectory of those relationships going as best as he could in a regular consistent way. (Participant 331, Minnesota)

In contrast, it was uncommon for participants in Hong Kong to verbally show love and care towards their family members. Prior to the pandemic, extended family members expressed love and togetherness by having family meals on a regular basis or during festivals. Many participants expressed feeling estranged or less close to family members who were not living together during the pandemic. “We would not chit chat on casual topics outside the dining table”. Hong Kong participants limited their texting to practical issues during the pandemic. One Hong Kong Chinese mother described, “With extended family, we usually shared simple messages in WhatsApp, more about practical information, like where to purchase masks during the early outbreak” (Participant 1117, Hong Kong) Therefore, the in-person family togetherness and the symbolic meaning were not replaceable during the pandemic.

Unlike counterparts in Minnesota, most Hong Kong Chinese participants did not get together with extended family virtually but limited to one-to-one with the older generation. One Hong Kong Chinese mother of two adolescent children shared how her regular interactions with non-coresident mother changed: “Prior to the pandemic, mum visited us for dinner every other day. But she no longer visits us now due to physical health concerns. Instead, mum calls us [grandchildren] during mealtime every day. She is so worried and concerned.” (Participant 1565, Hong Kong)

Moreover, participants in Hong Kong showed care and concern towards family members through providing instrumental support and sharing practical information important to their families, “When my husband and I ran out of face masks, [adult] children purchased them online for us. This is how we show care”. Another Hong Kong Chinese woman (mother, grandmother) in her sixties eloquently remarked how she provided respite care for taking care of her grandchildren when her daughter was pregnant in the early outbreak of the pandemic. She said:

> We [my husband and I] took the initiative to support them [daughter’s family], to take care of another grandson. We would not stop visiting them because of the pandemic. As a family, we really want to support them. (Participant 1074, Hong Kong)

Mutual Accommodation of Different Opinions

Different family members have different thoughts, opinions, and comfort levels during the pandemic. Many participants expressed the significance of being mutually understandable and accommodating to the differences among family members. It was not

just a one-way of how participants accepted or tolerated the differences, but a process of balancing different needs of concerns. In Minnesota, a non-Hispanic White American man in his seventies shared how he and his wife had negotiated and compromised for the greater good of the family upon disagreements to mitigate conflicts. He said:

> She [My wife] wanted to have the kids [children and grandchildren] for dinner, this is before vaccines [during Thanksgiving in 2020], and it was really important to her, and she was willing to take the risk. So, it was up to me, I wouldn't have done that, but I went along with it, social and pleasant, and a good host. We didn't want to have anybody to get together [with], but we didn't want them to go without, so we cooked meals and delivered them to everybody. Yeah, it was more work for us. (Participant 325, Minnesota)

Similarly, one young woman in Hong Kong eloquently shared how she took proactive actions to prevent and minimize family conflicts because of sharing the same personal space at home during the pandemic. For example, she paid close attention to the verbal and non-verbal cues of her family members and jumped in to coordinate and intervene potential family conflicts. She would balance family members' needs and concerns in sound simple issues such as ordering takeaway for lunch during remote working and distance learning at home. Obviously, she acted as a peacemaker or moderator to balance the needs and concerns of different family members. She said:

> I find it difficult to handle family conflicts when everyone has strong negative emotions. In order to avoid those family tensions, I would rather coordinate and accommodate family concerns and needs before the conflicts really happened…. I

> believe family accommodations require family members' compromise or sacrifice, as well as mutual understanding and respect (Participant 1184, Hong Kong)

Family Synchrony in Sharing Responsibilities

The outbreak of COVID-19 pandemic disrupted family stability due to distance learning and remote working at home. In Minnesota, many participants intentionally re-organized the family structure and routine by dividing and sharing family responsibilities, such as taking care of children. In Minnesota, a Hispanic American father of four children and also a graduate student expressed sharing childcare and family responsibilities with his wife, a homemaker, during the pandemic. He vividly described:

> Sometimes I take the kids to school, in order to allow my wife to get a little bit more sleep. And then I come home and then I have to do my work…But the young one's still at home, and my wife needs to go grocery shopping, so I'm at home watching the littlest, while she does other errands. I have to take a break during my work to feed him lunch. We just take it day by day, try to balance it all out, rather than having a set schedule. It's not that structured. (Participant 293, Minnesota)

While family synchrony in sharing responsibilities was not always the option, a negative case was identified in which an Asian American mother felt helpless taking care of her two young children without respites due to social restrictions. She vividly recalled her experiences as a "single parent" because her husband who was a frontline physician was unavailable to support childcare:

> [Prior to the pandemic,] when I reached my breaking point, my husband was able to step in, and give me time to take a bath or a walk, to mentally recharge myself. But that just wasn't available at the beginning of the pandemic. I felt like I wasn't a good parent or partner at that point, because I was just so mentally drained [of] myself that I was shorter with my kids… It was a big turning point for us when everybody's fully vaccinated. We were able to have some childcare relief, for me, to have grandparents entertain my kids while I got housework. (Participant 164, Minnesota)

In contrast, the family synchrony in Hong Kong was more unintentional and family members autonomically served as needed. This is primarily because of the unique family structure, where domestic helpers supported childcare and household chores duty in most middle- and upper-class families in Hong Kong. Unlike the closure of childcare facilities in Minnesota, the presence of domestic helpers in Hong Kong continued to support households during the pandemic. One Hong Kong Chinese woman (a grandmother) shared how she complemented the support from domestic helpers in caring for her grandchildren, “Because they [my daughter and son-in-law] have to work. I help them out for a day or two in order to let the helper have some rest.” (Participant 1074, Hong Kong)

Another Hong Kong Chinese man living with his wife, parents, and adult siblings eloquently shared that there was no key person coordinating family needs, but family members jumped in different roles, “Like buying face masks. We never communicated

‘who is responsible for doing it’. But when I saw running out of face masks, I would buy them. My sister also ordered some.” (Participant 1543, Hong Kong)

Emotional Self-regulation to Prevent Negative Family Dynamics

Since family members spent more time together during the pandemic, one key mechanism was how participants had insights about family tolerance of emotional expression and thus regulated their own negative emotions by not crossing the emotional boundaries. These prevented escalating family conflicts and a spillover of negative emotions to the ones they cared about. The consciousness of emotional self-regulation was prevalent among participants in Minnesota and Hong Kong.

In Minnesota, a number of non-Hispanic White American participants shared their insights about family members’ capacity for negative emotions tolerance. One non-Hispanic White American man in his seventies said, “We [My wife and I] express affection very easily. If either of us is irritable or grumpy, we express that, but we don't actually get into angry fights. We were married for long enough, so we step back before we make each other that mad.” (Participant 325, Minnesota)

Another non-Hispanic White American mother also shared how she consciously monitored her psychological distress to avoid spillover to her family members. She explained her perceptions of doing well in the pandemic, “If I’m doing well, I’m keeping my frustration in check, cause sometimes when I’m frustrated, it shows on my face and it shows in my tone of voice. So, keeping that in check.” (Participant 554, Minnesota)

In Hong Kong, the process of emotional self-regulation in the family was more intentional because Hong Kong Chinese had a tendency to suppress negative emotions to

preserve family harmony. Therefore, the emotional self-regulation served multiple purposes in the families: (a) to minimize family members' concern about oneself, (b) to prevent spillover of negative emotions in the family, and (c) to prevent escalating family conflicts during the pandemic.

Many Hong Kong Chinese participants shared that their family was intolerant of crying and the exhibition of strong negative emotions, such as sadness. One young Hong Kong Chinese woman who lived with parents vividly said, “I worried that my expression of negative emotions would lead to more intense negative responses or blaming from family members consequently.” (Participant 1184, Hong Kong) Similarly, another woman who lived with her parents opted to hide her negative emotions to prevent spillover of distress in the family, “When I was upset or under stress, I would hide in my room to cry. My parents would not tolerate it. They would find me annoying. They are very traditional, ‘What the hell are you crying’ [laughing].” (Participant 1233, Hong Kong).

Moreover, some Hong Kong Chinese participants suppressed strong negative emotions to minimize worries or anxieties from family members they cared about, “You don’t want to be a pessimistic person… because you will become a burden to your family if you can’t sort out your own [emotional] issues.” (Participant ID 1237, Hong Kong)

Discussion

This qualitative study used a critical realism paradigm to illuminate a theoretical framework for discovering resilience mechanisms of Minnesota- and Hong Kong-based adults and their coresident family members during the first two years of the COVID-19 pandemic. As families sought stability and a reduction in cognitive dissonance,

participants activated cognitive flexibility and distress tolerance to reduce their psychological distress. On the family level, individuals demonstrated an enhancement of family hardiness. The individual-level resilience mechanism aligned with the results of a quantitative study that examined Iranians' first year pandemic experiences. The researchers found that psychological flexibility mediated the association between distress intolerance and psychological distress (Akbari et al., 2021).

This study also found that the identified resilience mechanisms worked only under the conditions of cultural and relational identities, over the course of the pandemic as it developed, with physical and emotional proximity to family members, and in personal spaces. Three overarching issues need specific explication: the importance of cognitive flexibility, the importance of distress tolerance in response to the pandemic's changing situational demands, the importance of enhancing family hardiness.

Importance of Cognitive Flexibility in the Pandemic

In the context of rapidly changing situational demands during the pandemic, my empirical findings demonstrated that cognitive flexibility and resulting behavior adjustments involved a combination of the awareness of competing priorities and the ability to perceive multiple perspectives from the social norms in the family, community, society, or affiliated organizations. My findings theoretically extend the current understanding of cognitive flexibility and other similar constructs, such as psychological flexibility, coping flexibility, flexible coping, etc. (Cheng et al., 2014; Cherry et al., 2021; Eto et al., 2022). Qualitative themes and supporting quotes from the current study demonstrate how adults navigated and negotiated multiple aspects of their changing

situational demands. Some demands were life threatening, acute or chronic, involved multiple stressful events at different ecological systems levels (i.e., individuals, family, workplace, community, and/or society), evoked different adaptation domains (i.e., physical, psychological, and social), and developed over the course of the pandemic. My exploration of participants' cognitive flexibility processes amid the prolonged pandemic empirically supports Bonanno (2021) assertion of the need for a flexible mindset and sequencing when faced with dynamic challenges, i.e., what works at one moment may no longer be as effective after a short while. My qualitative findings demonstrated the processes repeated over a period of time ranging from a few days to a few months, or even longer, depending on the nature and intensity of stressful events they encountered, as well as the availability of resources to meet the demands of the stressors.

Additionally, my qualitative findings illuminated that cognitive flexibility was contingent on conditions, particularly cultural identities. Specifically, I demonstrated "how" adults from Minnesota used active approaches to deal with pandemic stressors in contrast to counterparts in Hong Kong who adopted passive approaches over the course of the pandemic (Cheng et al., 2013). It appeared that Minnesota-based participants were more likely to use active strategies to navigate through family conflicts, such as establishing healthy interpersonal boundaries and setting realistic expectations for things beyond their control. However, participants in Hong Kong were more likely to be passive, practicing radical acceptance of their situation with a goal of enduring and avoiding conflicting values to preserve family harmony. The passive acts of keeping silent and suppressing negative emotions and thoughts are consistent with Confucian

doctrines (Cheng et al., 2010). Notably, a number of participants in Hong Kong expressed escalating ambivalence with co-resident family members (i.e., physically close, emotionally distant) as a result of living in constrained apartments with limited personal space. My findings suggest that adults in Hong Kong actively work to establish healthy boundaries in a culturally appropriate manner.

Importance of Distress Tolerance in the Pandemic

In a context of uncertainty and ambiguity during the pandemic, my empirical findings suggest that a definition of distress tolerance is the willingness to withstand and includes the behavioral act of enduring negative emotions elicited by the disruption of family stability and cognitive dissonance. My findings theoretically extend the current understanding of how cultural identities and pre-existing vulnerability influences perceived and behavioral distress tolerance processes in parallel with cognitive flexibility (Andrés et al., 2021; Leyro et al., 2010).

Participants from Hong Kong tended to have higher distress intolerance as they anticipated and experienced that the expression of negative emotions in the family as unacceptable. This was perhaps due to their cultural worldviews. As a result, they might suffer from intense psychological distress due to the paradoxical effect of suppressing or avoiding negative emotions triggered by family conflicts. In comparison, participants in Minnesota were more open to family communication on sensitive topics and established boundaries to protect their own mental health. In terms of pre-existing vulnerability, participants who were cancer survivors tended to have greater tolerance for ambiguity and perceived COVID-19's contagious nature as relatively nonthreatening.

Importance of Family Hardiness in the Pandemic

In the face of family stability disruption and escalating family conflicts, my empirical findings illustrate the central role of family hardiness, that is, the family's inner strengths and sustainability beyond being flexible and tolerant on the individual level (Dunst, 2021). Qualitative themes expand our understanding of three key characteristics of family hardiness, i.e., control, challenge, and commitment, during the pandemic (McCubbin et al., 1986). To exert a sense of control over preventing negative family dynamics, individuals tended to exert emotional self-regulation by having insights about family members' tolerance of emotions and mitigating spillover of strong negative emotions during the pandemic. Suppression and inhibition of strong negative emotions was more prevalent among Hong Kong Chinese as they highly embraced preserving family harmony with reference to the cultural notion of the Confucian doctrines (Cheng et al., 2010).

In order to normalize the changes families faced, individuals from both regions attempted to cohesively work together as a family and make positive changes. In Minnesota, Americans were generally less tolerable to ambiguity and uncertainty (Hofstede & Minkov, 2010), and thus intentionally established new family routines of checking-in to support family members they loved. In contrast, Hong Kong Chinese were fear of contracting COVID-19 because of their prior SARS pandemic experiences in 2003 (Chan-Yeung & Xu, 2003); thus, they purchased face masks and sent them to family members they cared about.

In addition, individuals in both regions actively found solutions to the changing demands. To address the disruption in family stability, individuals would mutually accommodate different opinions and thoughts regarding the conflicting life priorities between sense of safety from the contagion and family togetherness and roles. To address the disruption in family stability, individuals would coordinate as a family and share family responsibilities for positive family functioning.

Implications

There are clear research implications that arise from my study. This explorative qualitative study uncovered resilience mechanisms of adults in Minnesota and Hong Kong during the first two years of the pandemic. These resilience mechanisms offer insights into ways that individuals and families face complex stressors involving competing priorities. Further, the elucidate ways that individuals navigated and negotiated family togetherness and enactment of family roles and responsibilities to align with their personal sense of safety from the infectious nature of COVID-19. However, researchers and practitioners should be cautious about the interpretation and transferability of current findings under specific conditions. This theoretical framework is a first step toward uncovering the underpinnings of resilience processes when individuals face acute-onset and chronic stressors. Future research needs to empirically examine the essence of the theoretical framework in related situations, such as in the context of cancer care (Eto et al., 2022).

My findings also suggest that public health might offer programs that develop adults' cognitive flexibility and distress tolerance to equip them to mitigate psychological

distress triggered by disruption in family stability and cognitive dissonance. Culturally attuned acceptance and commitment therapy (ACT) and dialectical behavior therapy (DBT) may be useful interventions to address psychological flexibility and distress tolerance (Beck, 2011; Lynch et al., 2006). Policy makers and practitioners in Hong Kong may need to culturally-tailor ACT and DBT to incorporate a Chinese dialectical thinking style (i.e., regulating extreme thinking and emotions; Yang et al., 2020).

Limitations

This study has four main limitations. First, I conducted this study amid the COVID-19 pandemic between November and December 2021. Resilience mechanisms might have been different at the peak of the pandemic, which occurred in early 2022 in both regions. Second, the sample size was relatively small, preventing any subgroup analysis by race/ethnicity with the Minnesota sample. Third, a majority of interview participants in both regions were highly educated and middle-class. Implications are that they would be more likely to have greater resources to navigate throughout the pandemic than individuals with lower levels of education and fewer financial resources. Last, this study involved participants living in one Midwest state in the United State and one region in the southern part of China. Thus, resilience mechanisms may not be representative of more diverse American or Chinese experiences.

Conclusions

This study examined the pivotal resilience mechanisms of cognitive flexibility and distress tolerance that the majority of participants enacted to mitigate distress triggered by family stability disruptions and cognitive dissonance during the first two

years of the COVID-19 pandemic. Cultural and relational identities, physical and emotional proximity to family members, and personal space shaped participants' agency as the pandemic developed. Individuals spent varying amounts of time to repeatedly navigate and negotiate responses to the varied nature of the pandemic's changing demands and participants' access to available resources.

Future research should empirically examine the essence of this theoretical framework. Policy makers and practitioners are encouraged to develop culturally attuned programs to enhance three resilience-enhancing skills, namely cognitive flexibility, distress tolerance, and family hardiness, which are important to people's ability resolve family and internal conflicts as they navigate stressful situations.

General Discussion

Overall, this complex mixed methods research provides significant theoretical, methodological, and empirical contributions to our current understanding of resilience mechanisms within sociocultural contexts. First, I proposed a conceptual framework – the Multisystemic Resilience Framework (Chapter 1) which integrates the current literature of resilience in the fields of Psychology and Family Science. The Multisystemic Resilience Framework informed and was empirically examined in Study 1 (Chapter 2) and Study 2 (Chapter 3). Second, across both studies, I demonstrated the use of complex mixed methods to uncover the complexity of resilience as a process under the rapidly changing COVID-19 pandemic. Moreover, I illustrated the applicability of critical realism paradigm to explore the unknown unknowns in the pandemic. Third, Study 1 and Study 2 identified resilience mechanisms involving the interplay of individual and family processes. Flexibility in coping was emerging in Study 1. In Study 2, the identified resilience mechanisms involve distress tolerance and cognitive flexibility in resolving competing life priorities, as well as enhancing family hardiness. Future work should examine the transferability of other acute onset and chronic stressors. In the following section, I will discuss the insights from the current research and future directions.

Multisystemic Resilience Framework

The proposed conceptual framework – the Multisystemic Resilience Framework (Chapter 1) – connected the literature of resilience processes in the fields of Psychology and Family Science (Boss, 2002; Boss et al., 2016; Masten, 2021; McCubbin & Patterson, 1983). The Multisystemic Resilience Framework posits that resilience is a

developing capacity, manifested in the process of the intersection of resources and perceptions in the multisystem embedded in the sociocultural context. Such processes are triggered in responses to stressors leading to different trajectories of adaptations. Specifically, this conceptual framework captures the complexity of the resilience processes in four respects. First, this framework captures the interactions between different layers in the ecological system, i.e., the interactions between individual, family, community, and society levels. This element stresses the importance of capturing the stressors, resources, perceptions, and adaptations from the sources of multiple layers of systems in the sociocultural context. Second, this framework captures the cumulative stressors and experiences occurring in the past and current timeframes, as well as the acute onset and chronic nature of stressors. In particular, past experiences may influence the perceptions of current stressors and awareness to navigate resources. Third, this conceptual framework illuminates the interplay of rationality and emotions in the face of uncertainties and ambiguities under stressors (Simon, 1990). The acute onset of stressors may trigger intense psychological distress, in which individuals may use rationality to control their own distress. On the other hand, the triggered negative emotions may limit individual abilities to solve problems and use optimal judgement. Fourth, the adaptation process consists of different domains, including physical, psychological, social, and economic wellbeing. Individuals are committed to different social and relational roles, such as functioning in their job/occupation, family as parents, daughters/son, etc. This conceptual framework expands on the dichotomy of the presence or absence of psychopathology within individuals or the narrow focus on functioning only within

specific family roles (Luthar & Cicchetti, 2000; McCubbin & Patterson, 1983). The adaptation process emphasizes that domains and functioning are potentially in competition in the face of stressors, in which the upholding of physical well-being or occupational success may come with a cost of psychosocial well-being or family roles.

This conceptual framework can inform the design and operationalization of variables in quantitative and/or qualitative designs for future empirical studies. In Study 1, 1 examined the conceptual framework through careful study of its key components, that is, pandemic-related stressors, resources, and mental health in two regions, i.e., Minnesota and Hong Kong. Different individual and family coping resources buffered the association between cumulative pandemic-related stressors and psychological distress in the sociocultural context of each region. In Study 2, the conceptual framework informed my semi-structured interview protocol to dive into the resilience mechanisms in the pandemic by disentangling the complexity and interactions of different elements of the resilience processes over the pandemic. The derived theoretical framework from Study 2 provided more depth in revealing the complexity of multisystemic resilience. First, cognitive dissonance was shown between conflicting views about sense of safety from contagion and social norms in the family and community. Second, while individuals attempted to enact their family roles and responsibilities as family caregivers, some sacrificed their work productivity and own mental health to maintain family functioning. Thus, the disruption in family stability led to a ripple effect on individual adaptations.

Complex Mixed Methods Research

This complex mixed methods research demonstrated how to use different phases of quantitative and qualitative data collection and analysis to uncover the complexity of dynamic resilience capacity (Kallemeyn et al., 2020). The longitudinal quantitative surveys examined the moderating role of coping resources during the early outbreak in buffering or exacerbating adults' mental health over the course of the pandemic. While the moderation analysis in Study 1 considered different individual and family coping strategies as predictors, it did not examine the interaction between different coping strategies. Moreover, the quantitative analysis accounted for individual differences in the resilience processes by controlling for demographic variables as covariates. The subsequent qualitative interviews holistically illuminated resilience processes using a critical realism paradigm and stratified realities (Maxwell, 2012). The qualitative research in Study 1 used the empirical reality from the larger qualitative study (i.e., observable events people experience) and further explained the culture-specific and context-specific coping resources of the moderation findings (Creswell & Clark, 2017). The primary qualitative research in Study 2 acknowledged the complexity of reality through nonlinear relationships, multiple causality, as well as social interactions of agency and structure and individual and family processes in the sociocultural context (Kallemeyn et al., 2020). This enabled me to explore the unknown unknowns in the resilience mechanisms and derive a theoretical framework of resilience mechanisms with the interplay of individual and family processes. While resilience mechanisms were identified, the identified

processes supported individuals only under specific situational conditions (Elder-Vass, 2010).

Resilience Mechanisms in Cultural Contexts

Study 1 and Study 2 demonstrated coping flexibility and cognitive flexibility as the key resilience mechanisms in the face of the acute onset and chronic stressors in the pandemic. Coping flexibility focuses on the ability to relinquish an ineffective coping strategy and implement a more effective coping strategy in different situations (Cheng et al., 2014). Cognitive flexibility emphasizes the flexibility in cognitive appraisals in shifting different responses in the face of changing demands (Cherry et al., 2021). Both processes are important to stress regulation in which individuals are able to assess the changing demands, flexibly switch between multiple coping strategies and its threshold of adoption, as well as disengage from source of stressors (Cheng et al., 2014; Cherry et al., 2021; Eto et al., 2022). Particularly, Study 1 illuminated the moment-to-moment coping flexibility in buffering psychological distress. For example, individuals kept reflecting on how the intensive use of avoidance coping strategies (e.g., self-distraction) might hinder individual and family functioning and intentionally adjusted the threshold of adopting specific strategies. Study 2 showed how long-term cognitive flexibility helped resolve competing life priorities during the pandemic. For example, individuals who established healthy interpersonal boundaries and set realistic expectations with self-compassion seemed to experience less role conflict. In addition, Study 2 built upon Study 1 by uncovering the importance of distress tolerance in resolving cognitive dissonance as well as promoting family hardiness in returning to family stability during the pandemic.

In the face of things beyond one's control, some individuals practiced radical acceptance and family members accommodated different opinions. In terms of emotional management, individuals used emotional self-regulation strategies to prevent escalating family conflicts.

Moreover, the ways individuals manifested their behavior in the resilience processes varied by different conditions, such as physical proximity and cultural identities. For family members living in different households, it was more manageable to intentionally establish emotional boundaries when confronting certain sensitive topics. However, for family members in the same household, it was more challenging for individuals to regulate their emotions and prevent escalating family conflicts when family members spent more time together during the period of social restrictions. In addition, the cultural norms in Minnesota generally encourage open communication and emotional expression (Hofstede & Minkov, 2010). Therefore, most participants took proactive action, such as establishing healthy boundaries, having honest conversations and using collaborative problem solving as a family unit. On the other hand, the cultural norms in Hong Kong generally encourages suppression of emotions and negative thoughts to preserve family harmony (Cheng et al., 2010). Even when facing intense conflict with family members, most participants somewhat passively accepted things beyond their own control and endured discomfort as a result of escalating conflicts.

Moving forward, these empirical findings have practical implications for how to support individuals when faced with stressors such as a pandemic. Some interventions such as acceptance and commitment therapy and dialectical behavior therapy may

capture the essence of relevant skills such as practicing cognitive flexibility and distress tolerance (Hayes et al., 2006; Lynch et al., 2006). However, it is also important to culturally tailor clinical practices to align with the affective, cognitive, and behavioral tendencies of adults in each region. It is significant to strike a balance a between retaining the key efficacious elements while implementing them in a culturally appropriate manner.

Limitations

Several limitations of both studies were noted. As this research focused only on the first two years of the pandemic, these findings might not capture the entire resilience process, particularly sustainability and enhancement of functioning (Reich et al., 2010). Moreover, pre-existing vulnerabilities (e.g., cancer survivors) were not measured quantitively in the survey, However, experiences of other non-pandemic-related past or current stressors (e.g., facing terminal illness) was captured in qualitative interviews. This permitted some exploration of how individuals generalized their perceptions and resources from past stressors when navigating the pandemic. Future work should systematically explore and examine how past stressors may influence resilience processes in the face of new stressors of a similar or different nature. Furthermore, data was collected between six-month and one-year intervals. An intensive longitudinal study design may better capture the fluidity of resilience processes (e.g., change of perceptions, availability of resources) in response to the rapidly changing circumstances over the course of the pandemic (Bolger & Laurenceau, 2013). In addition, this research involved self-report by one person in each family. Future research may consider using multimethod measurement strategies (e.g., family observations) and recruiting multiple

family members to further explore the family dynamics. Last, I acknowledged that the samples in both Minnesota and Hong Kong were privileged with relatively high educational backgrounds and generally representing middle- or upper-income families. The sample in Minnesota lacked racial/ethnic diversity. Therefore, it will be important to examine the replicability of the findings with a more diverse sample.

Future Directions

The development of resilience capacity is an ongoing process in the face of acute onset and chronic stressors. The first two years of the pandemic may not be sufficient to allow the full growth and enhancement of individual and family functioning. Longitudinal studies that extend into the third year of the pandemic will allow for a better understanding of long-term resilience processes and an examination of how these processes evolved as the COVID-19 moved to an endemic phase. While the theoretical framework from Study 2 illuminated the resilience mechanisms of family hardiness, distress tolerance, and cognitive flexibility in the unique context of the COVID-19 pandemic, future research should explore the transferability of these resilience mechanisms in other acute onset and chronic stressors, such as family members having a terminal illness or chronic condition, immigration and refugee status, military deployment, etc. Moreover, future work should explore more heterogenous samples, such as those with different gender, racial/ethnic, socioeconomic status, and educational backgrounds. The diverse sample are likely to have different resources and perceptions in utilizing, navigating, and negotiating throughout the processes.

This complex mixed methods research uncovered aspects of resilience mechanisms in the face of acute onset and chronic stressors associated with the pandemic. Future research may consider using the postpositivist critical realism paradigm (illustrated in **Chapter 3**), which is distinct from the common approach of grounded theory. One major difference is that critical realism draws on existing theory and literature and aims to find the best explanation of reality through exploring and examining existing (fallible or modifiable) theories about reality (Fletcher, 2017). The use of critical realism also enables us to empirically explore new theoretical framework, that is the causal mechanisms under conditions. This approach is compatible to the moderated mediation analysis in the postpositivist quantitative research.

Conclusion

In response to calls to address theoretical, methodological, and empirical gaps in understanding resilience as a process, this complex mixed methods research opens the black box of resilience mechanisms facing both acute onset and chronic stressors during the COVID-19 pandemic. Over the first two years of the pandemic, the uncertainties and ambiguities of the pandemic had disrupted family stability and increased cognitive dissonance, triggering more psychological distress. Resilience mechanisms were demonstrated through practicing family hardiness, distress tolerance, and cognitive flexibility in resolving competing life priorities. While these empirical findings align with existing psychological treatments, findings are suggestive of culturally-tailored interventions to effectively ameliorate the negative impacts of a global pandemic and future related crises.

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Appendices

Table 1

Participant Characteristics, Pandemic-Related Stressors, Mental Health, Individual and Family Resources by Region.

		Minnesota (n = 442)		Hong Kong (n = 597)	
Wave 1					
Personal characteristics	Range	*n*	%	*n*	%
Female		382	86.4	428	71.7
Age (*M, SD*)		41.89	12.86	31.6	12.51
18-39		221	50.0	455	76.2
40-59		171	38.7	122	20.4
60-85		50	11.3	20	3.4
White non-Hispanic		355	80.3	-	-
Married / cohabitated		350	79.2	185	31.0
Bachelor's degree or above		342	77.4	256	42.9
Household characteristics					
Household income below poverty level		24	5.4	87	14.6
Household income above 75th percentile		214	48.4	89	14.9
Primary caregivers for children or grandchildren		235	53.2	118	19.8
Primary caregivers for adult family members		44	10.0	125	20.9
Number of people living at home *(M, SD)*		3.54	1.48	3.56	1.16
Individual resilience (CD-RISC) *(M, SD)*	0-40	26.71	5.83	22.66	6.31
Individual resources (BCOPE)					
Approach coping	8-32	20.56	4.57	20.54	4.99
Avoidance coping	12-48	21.42	5.06	22.03	5.47
Support seeking	4-16	9.25	3.01	9.01	2.95
Family resources (FRAS) *(M, SD)*					
Communication and collaborative problem-solving	23-92	71.18	10.58	64.28	10.89
Maintaining a family-level positive outlook	6-23	19.45	2.65	17.61	3.64
Psychological distress (DASS-21)					
Depression *(M, SD)*	**0-21**	**5.91**	**5.05**	**4.89**	**4.73**
Normal	0-4	206	46.6	349	58.5
Mild	5-6	82	18.6	76	12.7
Moderate	7-10	75	17.0	91	15.2
Severe	11-13	34	7.7	37	6.2
Extremely severe	14-21	45	10.2	44	7.4
Anxiety *(M, SD)*	**0-21**	**3.30**	**3.87**	**3.70**	**4.21**
Normal	0-3	289	65.4	370	62.0
Mild	4-5	47	10.6	77	12.9
Moderate	6-7	38	8.6	56	9.4
Severe	8-9	28	6.3	25	4.2
Extremely severe	10-21	40	9.0	69	11.6
Stress *(M, SD)*	**0-21**	**7.73**	**5.04**	**5.79**	**4.86**
Normal	0-7	100	22.6	229	38.4
Mild	8-9	66	14.9	100	16.8
Moderate	10-12	61	13.8	86	14.4
Severe	13-16	69	15.6	59	9.9
Extremely severe	17-21	146	33.0	123	20.6

Wave 2					
Pandemic-related stressors *(M, SD)*	0-7	2.64	1.43	1.57	1.10
Depression *(M, SD)*	**0-21**	**4.41**	**4.97**	**5.20**	**5.23**
Normal	0-4	141	64.4	120	54.5
Mild	5-6	21	9.6	30	13.6
Moderate	7-10	29	13.2	36	16.4
Severe	11-13	15	6.8	9	4.1
Extremely severe	14-21	13	5.9	25	11.4
Anxiety *(M, SD)*	**0-21**	**2.56**	**3.20**	**3.82**	**4.52**
Normal	0-3	156	71.2	136	61.8
Mild	4-5	29	13.2	28	12.7
Moderate	6-7	15	3.8	16	7.3
Severe	8-9	6	2.7	11	5.0
Extremely severe	10-21	5	2.3	29	13.2
Stress *(M, SD)*	**0-21**	**6.11**	**4.87**	**6.19**	**5.36**
Normal	0-7	143	65.3	86	39.1
Mild	8-9	28	12.8	27	12.3
Moderate	10-12	25	11.4	31	14.1
Severe	13-16	15	6.8	22	10.0
Extremely severe	17-21	8	3.7	54	24.5

Note. BCOPE-28 = Brief Coping Orientation to Problems Experienced–28; CD-RISC-2 = Connor–Davidson Resilience Scale–2; DASS-21 = Depression Anxiety Stress Scale–21; FRAS-32 = Family Resilience Assessment Scale–32.

Table 2

Minnesota Interview Participants Characteristics by Resilience in Wave 1

ID	Age / Gender/ Race and Ethnicity/ Marital Status	Avoidance Coping in Wave 1[a]	Family Communication and Collaborative Problem-solving in Wave 1[a]	Number of pandemic-related stressors in Wave 2[b]	Psychological distress in Wave 1 and 2[c]
HIGH RESILIENCE[a]					
450	64 / Female / multiracial / Married	Moderate	Low	High	Severe / Severe
285	25 / Female / Non-Hispanic White / Single	Low	Low	High	Moderate / Severe
123	43 / Female / Native American / Married	Moderate	High	High	Normal / Mild
325	74 / Male / Non-Hispanic White / Married	Moderate	High	Moderate	Normal / Normal
554	42 / Female / Non-Hispanic White / Married	Moderate	Moderate	High	Moderate / Mild
2	51 / Male / Non-Hispanic White / Married	Low	Moderate	Moderate	Mild / Normal
MODOERATE RESILIENCE					
528	43 / Male / Non-Hispanic White / Married	Moderate	High	Moderate	Normal / Normal
293	39 /Male / Hispanic / Married	High	Moderate	Moderate	Severe / Normal
311	31 / Female / Non-Hispanic White / Married	Low	High	High	Moderate / Normal
331	36 / Female / Non-Hispanic White / Married	Low	High	Moderate	Normal / Normal
543	41 / Male / Asian / Married	Moderate	Low	Moderate	Moderate to Severe / Moderate to Severe
180	28 / Female / Non-Hispanic White / Married	High	High	Moderate	Mild / Mild

595	36 / Female / Non-Hispanic White / Married	Low	High	Moderate	Normal / Normal
164	38 / Female / Asian / Married	High	Moderate	Moderate	Mild / Normal
LOW RESILIENCE					
455	36 / Female / Non-Hispanic White / Married	Low	High	Moderate	Normal / Normal

[a]High levels referred to 0.5 standard deviation (SD) above the mean or higher in Minnesota; moderate levels referred to within 0.5 SD of the mean; low levels referred to 0.5 SD below the mean or lower.
[b]High levels referred to 1.5 standard deviation (SD) above the mean or higher in Minnesota; moderate levels referred to within 0.5 SD below the man and 1.5 SD above the mean; low levels referred to 0.5 SD below the mean or lower.
[c]The severity levels of psychological distress are based on normed cut-off scales (Lovibond & Lovibond, 1996).

Table 3

Characteristics of Interview Participants in Hong Kong by Resilience in Wave 1

ID	Age / Gender/ Marital Status	Support Seeking in Wave 1[a]	Family Positive Outloook in Wave 1[a]	Number of pandemic-related stressors in Wave 2[b]	Psychological distress in Wave 1 / Wave 2[c]
HIGH RESILIENCE[a]					
1237	61 / Male / Married	High	Low	Moderate	Severe / Extremely severe
1466	35 / Female / Single	High	High	Moderate	Normal / Normal
1280	25 / Female / Single	Low	Moderate	High	Normal / Normal
1264	56 / Male / Married	Low	Moderate	Low	Severe / Extremely severe
1565	49 / Female / Married	High	Moderate	Moderate	Normal / Normal
1423	19 / Female / Single	High	Moderate	Moderate	Mild / Normal
MODOERATE RESILIENCE					
1074	62 / Female / Married	High	Moderate	Moderate	Normal / Normal
1233	29 / Female / Married	Low	Moderate	Moderate	Normal / Mild
1543	43 / Male / Married	Low	Moderate	Moderate	Normal / Mild
1184	25 / Female / Single	Moderate	High	Moderate	Mild / Mild
LOW RESILIENCE					
1117	40 / Female / Married	High	Moderate	Moderate	Normal / Moderate to Severe
1445	43 / Male / Cohabitated	Moderate	Moderate	Moderate	Moderate / Mild to Moderate
1441	20 / Female / Single	High	Low	Moderate	Moderate / Moderate to Severe
1108	37 / Male / Single	Low	Moderate	High	Extremely severe / Extremely severe

[a]High levels referred to 0.5 standard deviation (SD) above the mean or higher within the corresponding region; moderate levels referred to within 0.5 SD of the mean; low levels referred to 0.5 SD below the mean or lower

[b]High levels referred to 1.5 standard deviation (SD) above the mean or higher in Minnesota; moderate levels referred to within 0.5 SD below the man and 1.5 SD above the mean; low levels referred to 0.5 SD below the mean or lower.

[c]The severity levels of psychological distress are based on normed cut-off scales (Lovibond & Lovibond, 1996).

Table 4

Descriptive statistics and Correlations of Minnesota and Hong Kong Study Variables

Study variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Age	1	-.07	.11*	.21**	.02	-.23**	.17**	-.01	-.20**	-.18**	.04	.08	-.16**	-.20**	-.27**	-.21**	-.19**	-.21**	-.24**
2. Female[a]	.01	1	.07	-.01	.00	.02	-.03	.02	.05	.07	-.08	-.08	-.01	.03	.08	.01	.04	.01	.14*
3. Non-Hispanic White[b]	--	--	1	.11*	-.13**	-.20**	.04	-.09	-.03	-.03	.03	.01	.02	-.10*	.05	-.14*	.01	-.10	.04
4. Married or cohabitated[c]	.70**	.02	--	1	-.22**	-.07	.02	.04	-.12**	-.02	.08	.21**	-.15**	-.18**	-.09	-.04	-.12	-.23**	-.04
5. Below poverty level status[d]	-.08	.10*	--	-.16*	1	.11*	-.10*	-.09	.01	-.04	-.12*	-.09	.08	.06	.01	-.04	.07	.10	.05
6. Number of family members in the household	-.11**	.06	--	-.12**	-.06	1	.01	.05	-.04	-.04	-.10*	-.18**	-.08	-.08	-.01	.10	-.11	-.07	-.08
7. Resilience capacity (W1)	.11**	-.11*	--	.06	.01	-.05	1	.38**	-.23**	.11*	.45**	.42**	-.34**	-.20**	-.24**	-.01	-.21**	-.15*	-.20**
8. Approach coping (W1)	.14**	.05	--	-.02	.06	-.05	.36**	1	.08	.49**	.25**	.28**	-.09	.08	.09	.12	-.07	-.02	.05
9. Avoidance coping (W1)	-.04	.10*	--	-.11*	.09*	.07	-.22**	.36**	1	.24**	-.13*	-.17**	.68**	.56**	.65**	.03	.54**	.43**	.52**
10. Support seeking (W1)	-.10*	.17**	--	-.15**	.12**	.02	-.01	.49**	.57**	1	.23**	.27**	.09	.15**	.22**	.09	.01	-.01	.11
11. Family positive outlook (W1)	.04	.03	--	.08	-.06	-.01	.36**	.14**	-.16**	.04	1	.80**	-.22**	-.10*	-.13**	-.03	-.08	-.12	-.04
12. Family communication and collaborative problem solving (W1)	.16**	.05	--	.22**	.00	-.09*	.33**	.13**	-.20**	.02	.52**	1	-.27**	-.14**	-.20**	-.02	-.18**	-.24**	-.16*
13. Depressive symptoms (W1)	-.20**	-.01		-.14**	.05	.04	-.42**	.04	.54**	.12**	-.28**	-.29**	1	.62**	.71**	.04	.61**	.39**	.52**
14. Anxiety symptoms (W1)	-.14**	.03	--	-.10*	.09*	.04	-.33**	.01	.53**	.16**	-.23**	-.22**	.82**	1	.69**	.10	.46**	.59**	.52**
15. Stress symptoms (W1)	-.16**	.04	--	-.11**	.07	.03	-.39**	.05	.57**	.23**	-.23**	-.24**	.85**	.84**	1	.06	.49**	.43**	.65**
16. Number of pandemic-related stressors (W2)[e]	-.02	.01	--	.02	.01	.18**	-.04	.11	.11	.03	.01	-.01	.09	.14*	.12	1	.15*	.20**	.16*

17. Depressive symptoms (W2)		-.07	-.09	--	-.05	.12	-.04	-.30**	.01	.39**	.00	-.11	-.18**	.59**	.46**	.49**	.15*	1	.62**	.76**
18. Anxiety symptoms (W2)		-.07	-.02	--	-.06	.15*	.00	-.25**	.02	.32**	.01	-.09	-.11	.51**	.58**	.54**	.11	.81**	1	.64**
19. Stress symptoms (W2)		-.09	-.02	--	-.08	.14*	-.02	-.22**	.06	.39**	.10	-.07	-.12	.54**	.49**	.59**	.15*	.87**	.85**	1
Minnesota	*Mean*	41.89	0.87	0.80	0.79	0.05	3.48	26.71	20.56	21.42	9.25	19.47	71.18	5.91	3.30	7.73	2.64	4.41	2.56	6.11
	SD	12.86	0.33	0.40	0.41	0.23	1.45	5.83	4.57	5.06	3.01	2.67	10.58	5.05	3.87	5.04	1.43	4.97	3.20	4.87
Hong Kong	*Mean*	31.60	0.72	--	0.31	0.15	3.45	22.66	20.54	22.03	9.01	17.61	64.28	4.89	3.70	5.79	1.57	5.20	3.82	6.19
	SD	12.51	0.45	--	0.46	0.35	1.11	6.31	4.99	5.47	2.95	3.64	10.89	4.73	4.21	4.86	1.10	5.23	4.52	5.36

Note. The results for the Minnesota sample (n = 442) are shown above the diagonal. The results for the Hong Kong sample (n = 597) are shown below the diagonal. W1 = Wave 1; W2 = Wave 2.

[a]0 = male, 1 = female. [b]0 = non-White, 1 = White non-Hispanic. [c]0 = single, divorced/separated, widowed, 1 = married or cohabitated. [d]0 = no, 1 = yes. [e]pandemic-related stressors (yes/no): personally experienced or suspected of having symptoms of COVID-19, family members inside/outside the home experienced or suspected of having symptoms of COVID-19, family members inside/outside the home died from COVID-19 or its related complications, family members inside the home experienced reduced employment as a result of COVID-19, family members inside the home currently working in healthcare or other high risk jobs for contracting COVID-19, family members currently working from home in response to COVID-19, and personally currently practicing social distancing or quarantining.

*p < .05. ** p < .01.

Table 5

Regression Predicting Perceived Resilience Capacity (Wave 1) in Minnesota and Hong Kong

Predictors	**Minnesota Model:** Perceived Resilience Capacity			**Hong Kong Model:** Perceived Resilience Capacity		
	b	*SE* (b)	β	*b*	*SE* (b)	β
Approach copping (W1)	**.45**	**.06**	**.35*****	**.58**	**.05**	**.46*****
Avoidance coping (W1)	**-.21**	**.05**	**-.19*****	**-.33**	**.05**	**-.29*****
Support seeking (W1)	**-.21**	**.09**	**-.11***	-.17	.10	-.08
Family positive outlook (W1)	**.65**	**.15**	**.30*****	**.38**	**.09**	**.19*****
Family communication and collaborative problem solving (W1)	.05	.04	.08	**.06**	**.03**	**.11***
Adjusted R^2	.32			.33		

Notes: W1 = Wave 1.

*p<0.05. ** p<0.01. *** p<0.001.

Table 6

Minnesota Structural Equation Models: Main Effects and Interaction Effects of Different Resources on Psychological Distress (Wave 2)

	Model 1: Main effects without any interaction effects			**Model 2:** Interaction effects of pandemic-related stressors and approach coping			**Model 3:** Interaction effects of pandemic-related stressors and avoidance coping			**Model 4:** Interaction effects of pandemic-related stressors and support seeking			**Model 5:** Interaction effects of pandemic-related stressors and family positive outlook			**Model 6:** Interaction effects of pandemic-related stressors and family communication and collaborative problem solving		
	b	*SE* (b)	β	*b*	*SE* (b)	β	*b*	*SE* (b)	β	*b*	*SE* (b)	β	*b*	*SE* (b)	β	*b*	*SE* (b)	β
Main effects																		
Number of pandemic related stressors (W2)	**.39**	**.16**	**2.47***	**.39**	**.16**	**2.47***	**.46**	**.16**	**2.90****	**.41**	**.16**	**2.56***	**.37**	**.16**	**2.37***	**.38**	**.16**	**2.40***
Approach copping (W1)	.08	.06	1.29	.08	.06	1.27	.07	.06	1.16	.07	.06	1.25	.07	.06	1.20	.06	.06	1.09
Avoidance coping (W1)	**.16**	**.08**	**2.00***	**.16**	**.08**	**2.00***	.11	.08	1.33	**.16**	**.06**	**1.97***	.15	.08	1.90	.16	.06	1.93
Support seeking (W1)	-.08	.08	-0.97	-.08	.09	-0.97	-.06	.08	-.71	-.08	.08	-.97	-.08	.09	-.89	-.06	.08	-.74
Family positive outlook (W1)	**.33**	**.13**	**2.57***	**.33**	**.13**	**2.57***	**.36**	**.13**	**2.80****	**.33**	**.13**	**2.54***	**.34**	**.13**	**2.65****	**.32**	**.13**	**2.51***
Family communication and collaborative problem solving (W1)	**-.09**	**.04**	**-2.58***	**-.09**	**.04**	**-2.58***	**-.10**	**.04**	**-2.82****	**-.09**	**.04**	**-2.54***	**-.10**	**.04**	**-2.68****	**-.10**	**.04**	**-2.62****
Covariates																		
Age	**-.05**	**.02**	**-2.30***	**-.05**	**.02**	**-2.27***	**-.05**	**.02**	**-2.44***	**-.04**	**.02**	**-2.22***	**-.05**	**.02**	**-2.44***	**-.05**	**.02**	**-2.33***
Gender	.60	.71	.85	.59	.71	.84	.73	.70	1.04	.61	.71	.86	.67	.70	.96	.56	.70	.80
Race	-.41	.60	-.69	-.42	.61	-.69	-.58	.60	-.96	-.42	.60	-.69	-.23	.61	-.38	-.40	.60	-.67
Marital status	.30	.61	.49	.30	.62	.49	.27	.60	.42	.33	.61	.54	.34	.60	.56	.35	.60	.58
Below poverty level status	1.21	1.09	1.11	1.21	1.09	1.11	.87	1.09	.80	1.17	1.09	1.07	1.16	1.08	1.08	1.09	1.09	1.00
Number of family members in the household	-.31	.16	-1.91	-.31	.16	-1.91	-.30	.16	-1.86	-.31	.16	-1.92	-.29	.16	-1.77	-.29	.16	-1.78
Psychological distress (W1)	**.54**	**.11**	**5.16*****	**.54**	**.11**	**5.16*****	**.58**	**.11**	**5.43*****	**.55**	**.11**	**5.18*****	**.57**	**.10**	**5.79*****	**.55**	**.11**	**5.28*****
Interaction effect				-.00	.04	.07	**.08**	**.04**	**2.32***	-.04	.05	-.70	-.05	.06	-.93	**-.03**	**.01**	**-2.00***

Notes: W1 = Wave 1; W2 = Wave 2. For each model, the endogenous latent variable was psychological distress, while covariates included age, gender (non-female = 0, female =1), race (non-Hispanic White = 0, person of color = 1), marital status (single/divorced/widow = 0, married/partnered = 1), below poverty level status (no = 0, yes =1), number of family members living in the same household, and psychological distress at Wave 1.
For each model with an interaction effect, the two predictors for the interactive term were mean-centered.
*p<0.05. ** p<0.01.

Table 7

Hong Kong Structural Equation Models: Main effects and Interaction effects of Different Resources on Psychological Distress (Wave 2)

	Model 1: Main effects without any interaction effects			**Model 2:** Interaction effects of pandemic-related stressors and approach coping			**Model 3:** Interaction effects of pandemic-related stressors and avoidance coping			**Model 4:** Interaction effects of pandemic-related stressors and support seeking			**Model 5:** Interaction effects of pandemic-related stressors and family positive outlook			**Model 6:** Interaction effects of pandemic-related stressors and family communication and collaborative problem solving		
	b	*SE* (b)	β	*b*	*SE* (b)	β	*b*	*SE* (b)	β	*b*	*SE* (b)	β	*b*	*SE* (b)	β	*b*	*SE* (b)	β
Main effects																		
Number of pandemic related stressors (W2)	.18	.24	.73	.22	.24	.92	.19	.24	.79	.10	.24	.43	.18	.24	.74	.18	.24	.75
Approach copping (W1)	.04	.06	.58	.03	.06	.51	.04	.06	.63	.05	.06	.80	.04	.06	.58	.04	.06	.57
Avoidance coping (W1)	.02	.08	.30	-.03	.08	-.34	.04	.08	.49	.00	.08	.01	.02	.08	.29	.03	.08	.32
Support seeking (W1)	-.20	.12	-1.73	-.20	.12	-1.65	-.22	.12	-1.88	-.17	.12	-1.48	-.20	.12	-1.73	-.21	.12	-1.79
Family positive outlook (W1)	.28	.15	1.84	.29	.15	2.88	.28	.15	1.82	.23	.15	1.47	.28	.15	1.83	**.31**	**.16**	**1.97***
Family communication and collaborative problem solving (W1)	-.05	.04	-1.55	-.06	.04	-1.62	-.05	.04	-1.53	-.04	.04	-1.26	-.06	.04	-1.56	-.06	.04	-1.65
Covariates																		
Age	-.02	.03	-.57	-.02	.03	-.61	-.02	.03	-.63	-.02	.03	-.53	-.02	.03	-.57	-.02	.03	-.51
Gender	-.37	.63	-.59	-.27	.63	-.43	-.45	.63	-.71	-.37	.62	-.59	-.37	.63	-.59	-.44	.63	-.70
Marital status	.44	.81	.54	.55	.81	.68	.47	.81	.59	.44	.80	.56	.45	.81	.55	.39	.81	.48
Below poverty level status	**1.69**	**.76**	**2.22***	**1.72**	**.75**	**2.27***	**.70**	**.76**	**2.24***	**1.71**	**.75**	**2.28***	**1.67**	**.77**	**2.18***	**1.74**	**.76**	**2.28***
Number of family members in the household	.10	.26	.39	.09	.26	.36	.07	.26	.28	.14	.26	.55	.10	.26	.27	.11	.26	.43
Psychological distress (W1)	**.62**	**.09**	**7.12*****	**.62**	**.09**	**7.14*****	**.62**	**.09**	**7.20****	**.64**	**.09**	**7.42*****	**.67**	**.08**	**8.12*****	**.62**	**.09**	**7.16*****
Interaction effect				-.09	.06	-1.54	-.03	.03	-1.00	**-.18**	**.08**	**-2.36****	-.02	.10	-.18	.02	.02	.80

Notes: W1 = Wave 1; W2 = Wave 2. For each model, the endogenous latent variable was psychological distress, while covariates included age, gender (non-female = 0, female =1), marital status (single/divorced/widow = 0, married/partnered = 1), below poverty level status (no = 0, yes =1), number of family members living in the same household, and psychological distress at Wave 1. For each model with an interaction effect, the two predictors for the interactive term were mean-centered.

*p<0.05. ** p<0.01.

Table 8

Characteristics of Interview Participants in Minnesota by Resilience in Wave 1

ID	Age / Gender/ Race and Ethnicity/ Marital Status	Education / Employment status / Socioeconomic status (below poverty / upper income)	Number / Coresident family members
HIGH RESILIENCE[a] (Score: 29-40)			
450	64 / Female / multiracial / Married	Bachelor degree / Work part-time / Upper income	4 / Spouse, 3 adult children
285	25 / Female / Non-Hispanic White / Single	Bachelor degree / Work full-time / Upper income	5 /Parents, 2 adult siblings
123	43 / Female / Native American / Married	Graduate degree / Work part-time	4 / Spouse, 2 young children
325	74 / Male / Non-Hispanic White / Married	Graduate degree / Work part -time / Upper income	2 / Spouse
554	42 / Female / Non-Hispanic White / Married	Graduate degree / Work part -time	4 / Spouse, 2 young children
2	51 / Male / Non-Hispanic White / Married	Graduate degree / Work full-time / Upper income	3 / Spouse, 1 adoelscent child
MODOERATE RESILIENCE (Score: 24-28)			
528	43 / Male / Non-Hispanic White / Married	Graduate degree / Work full-time	5 / Spouse, 1 young and 2 adolescent children
293	39 /Male / Hispanic / Married	Graduate degree / Student / Below poverty	6 / Spouse, 2 young and 2 adoelscent children
311	31 / Female / Non-Hispanic White / Married	Graduate degree / Work full-time	4 / Spouse, 2 young children
331	36 / Female / Non-Hispanic White / Married	Graduate degree / Student / Upper income	3 / Spouse, 1 young child
543	41 / Male / Asian / Married	Graduate degree / Work full-time	5/ Spouse, 3 preadolescent children
180	28 / Female / Non-Hispanic White / Married	Graduate degree / Work full-time	3 / Spouse, 1 young child

595	36 / Female / Non-Hispanic White / Married	Graduate degree / Work full-time	4 / Spouse, 2 young children
164	38 / Female / Asian / Married	Graduate degree / Homemaker / Upper income	4 / Spouse, 2 young children
LOW RESILIENCE (Score: 0-23)			
455	36 / Female / Non-Hispanic White / Married	Bachelor degree / Work full-time	5 / Spouse, 3 young children

[a]High levels referred to 0.5 standard deviation (SD) above the mean or higher within the corresponding region; moderate levels referred to within 0.5 SD of the mean; low levels referred to 0.5 SD below the mean or lower

Table 9

Characteristics of Interview Participants in Hong Kong by Resilience in Wave 1

ID	Age / Gender/ Marital Status	Education / Employment status / Sociosconomic status (below poverty / upper income)	Number / Coresident family members
HIGH RESILIENCE[a] (Score: 27-40)			
1237	61 / Male / Married	Graduate degree / Work full-time / Upper income	3 / Spouse, 1 adult child
1466	35 / Female / Single	Bachelor degree / Work part-time	5 / Parents, adult sibling, 1 young niece
1280	25 / Female / Single	Graduate degree / Work full-time / Upper income	4 / Parents, 1 adult sibling
1264	56 / Male / Married	Graduate degree / Work full-time / Upper income	2 / 1 adolescent child
1565	49 / Female / Married	Graduate degree / Work full-time / Upper income	4 / Spouse, 1 young and 1 adoeslcent children
1423	19 / Female / Single	Some college / Student	5 / Grandparent, parents, adult cousin
MODOERATE RESILIENCE (Score: 20-26)			
1074	62 / Female / Married	Associate degree / Homemaker / Below poverty	3 / Spouse, 1 adult child
1233	29 / Female / Married	Bachelor degree / Work full-time / Below poverty	4 / Parents, 1 adult sibling
1543	43 / Male / Married	Bachelor degree / Work full-time	6 / Parent, spouse, adult sibling, adult cousin, 1 young neice
1184	25 / Female / Single	Bachelor degree / Work full-time / Upper income	4 / Parents, 1 adult sibling
LOW RESILIENCE (Score: 0-19)			
1117	40 / Female / Married	Associate degree / Work full-time	3 / Spouse, 1 young child
1445	43 / Male / Cohabitated	Associate degree / Work full-time / Upper income	2 / Spouse
1441	20 / Female / Single	Some college / Student / Below poverty	4 / Grandparent, parents, 1 adult cousin
1108	37 / Male / Single	Some college / Work full-time	3 / Parents

[a]High levels referred to 0.5 standard deviation (SD) above the mean or higher within the corresponding region; moderate levels referred to within 0.5 SD of the mean; low levels referred to 0.5 SD below the mean or lower

Table 10

Interview Protocol

This is a follow-up to the survey you completed in summer 2021. Since everyone's pandemic experience is unique, I really want to learn more in depth what you have shared in the survey.

Specifically, I will ask you about your challenges and stressful things over the course of the pandemic (i.e., the transition from the pre-pandemic to go virtual in the first year - 2020, second year with vaccine available in 2021, and right now kind of in the "new normal"). What roles have your family played in your process of coping and adjustment.

Focus	Questions
Understanding your family	(a) Tell me some basic information about you and your family. (b) Have your family structure and living arrangements changed over the course of the pandemic? If so, how and why? (c) What changes in family routines and daily life have you made over the course of the pandemic and why? (d) How have your roles and responsibilities in your family changed in response to the pandemic? (e) Tell me a time you "sacrificed" your own needs over your family members in the pandemic. (f) How have your relationships and interactions (communication) with your family changed over the course of the pandemic? (g) Describe the process of how your family makes important decisions. (h) How did the pandemic affect your other family functioning?
Pandemic-related challenges and struggle	(a) Tell me what aspects of pandemic have been challenging to you and your family (Note: Capturing both chronic and acute stressors). (b) How did you feel about the pandemic-related event? (c) How has the event impacted you and your family? (d) Are these events still impacting you and your family? (e) Were there additional significant events happened over the course of the pandemic?
Adaptation	(a) You talked about (event A) as one of the challenges. What made it better? And what made it worse? (b) How did the rest of your family accommodate to the circumstances? (c) Do you plan to continue the changes you made because of the pandemic? Why? (d) What does "doing well" look like for you over the course for the pandemic?

	(e) Did your expectations of yourself change? (f) What does good mental health look like for you? (g) How does your mental health change over the course of the pandemic? What does your mental health look like in the pre-pandemic? (h) How stressful they were for you personally and your family members in the past 18 months? Why?
Coping experiences	(a) How did you cope with the challenges you described? (b) How did you maintain your well-being facing all these stressors? (c) Did your coping strategies change over the course of the pandemic, compared to the pre-pandemic? How? (d) Were there any cultural, religious, or spiritual resources that help you cope with? (e) What's your family supportive of you over the course of the pandemic? (f) What ways do you wish your family could have done differently/better?
Lesson learned and what resilience meant to you	(a) We all have some successful coping experiences. I am really interested in what makes you bounce back and become successful despite challenges or hardships. What are the positive forces that have worked for you thus far? (b) Is there thing that could help you to bounce back and become successful after challenges? (c) What were the most important resources and support for you during the pandemic? Examples and why? (d) Have you lost or sacrificed anything because of your efforts to cope with the pandemic? (e) Let's think about your family as a unit. What are the positive forces that make your family successfully cope with the pandemic in general? (f) What resources would be nice to have to help you and your family become resilient during the pandemic? (g) To wrap up, use three words or phrases to describe your experiences of coping with stress and changes during the pandemic. (h) What are the key takeaways you learned from your pandemic experiences that might help other families facing similar challenges?

Figure 1

Proposed Multisystemic Resilience Framework

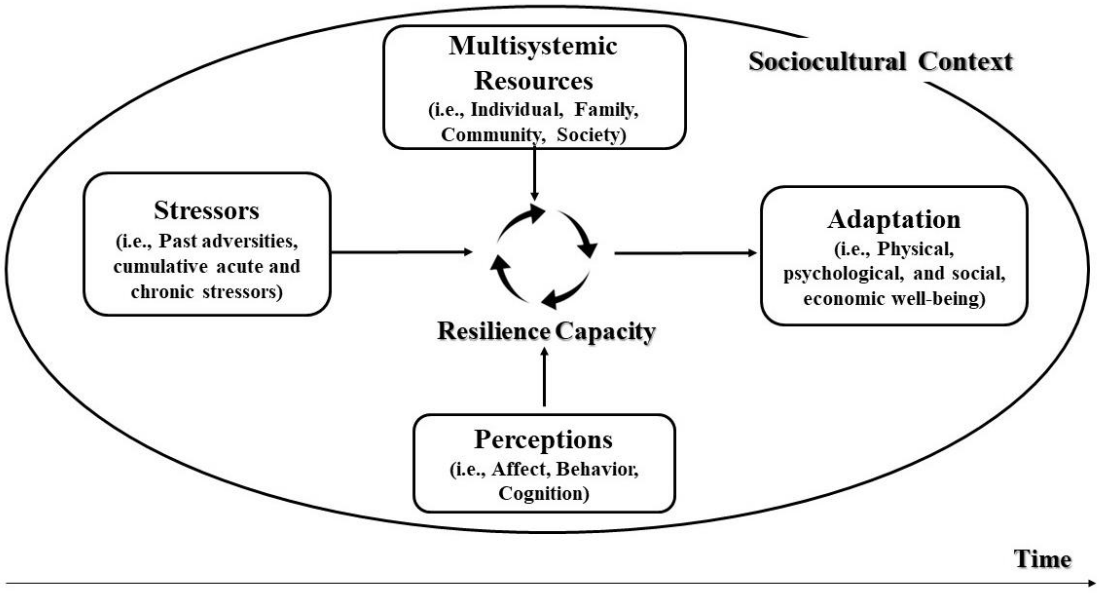


Figure 2

Number of COVID-19 Cases in the Two Regions

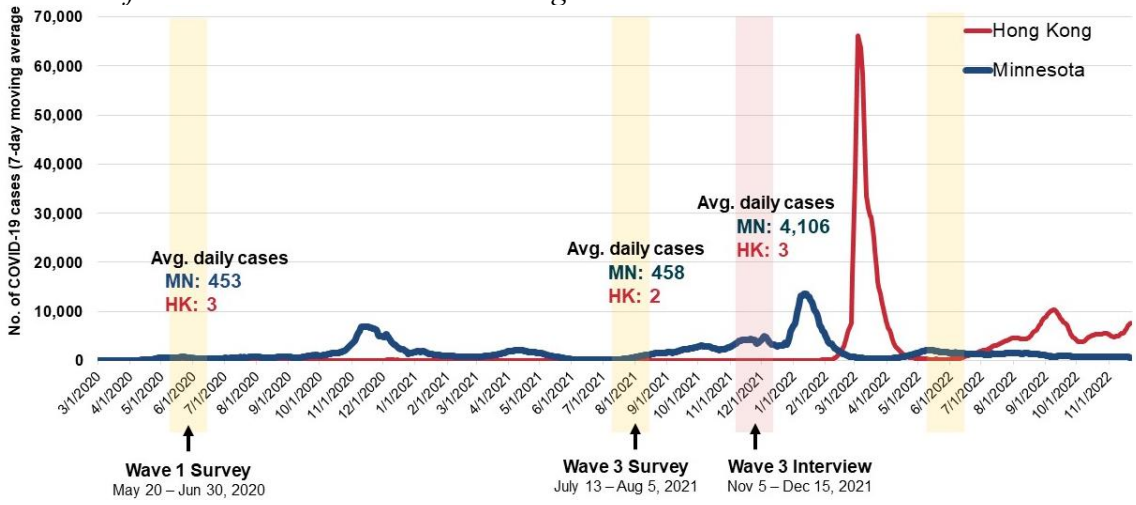


Figure 3

Study Design Flow Diagram

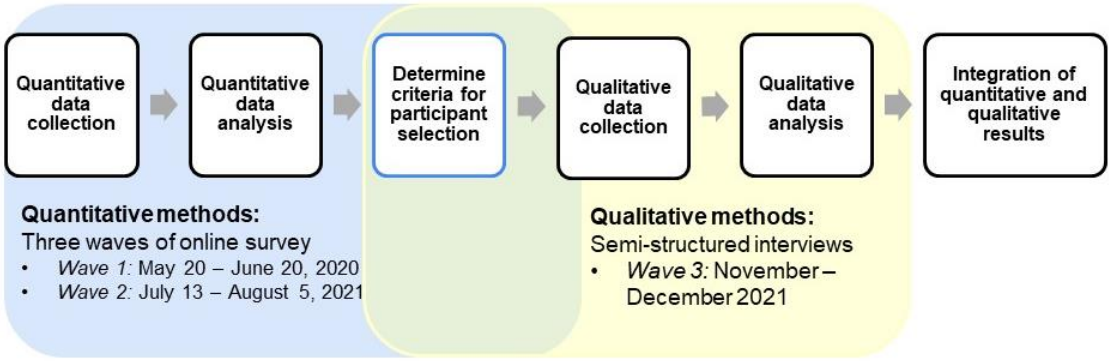
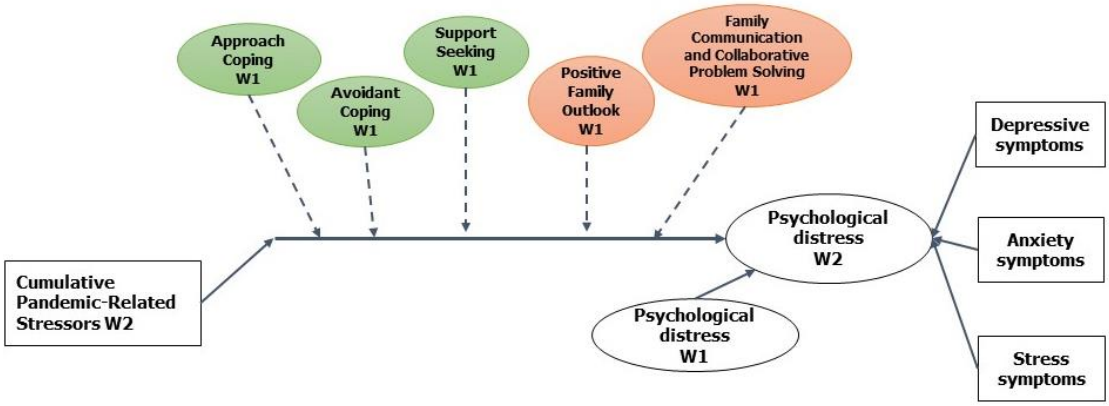


Figure 4

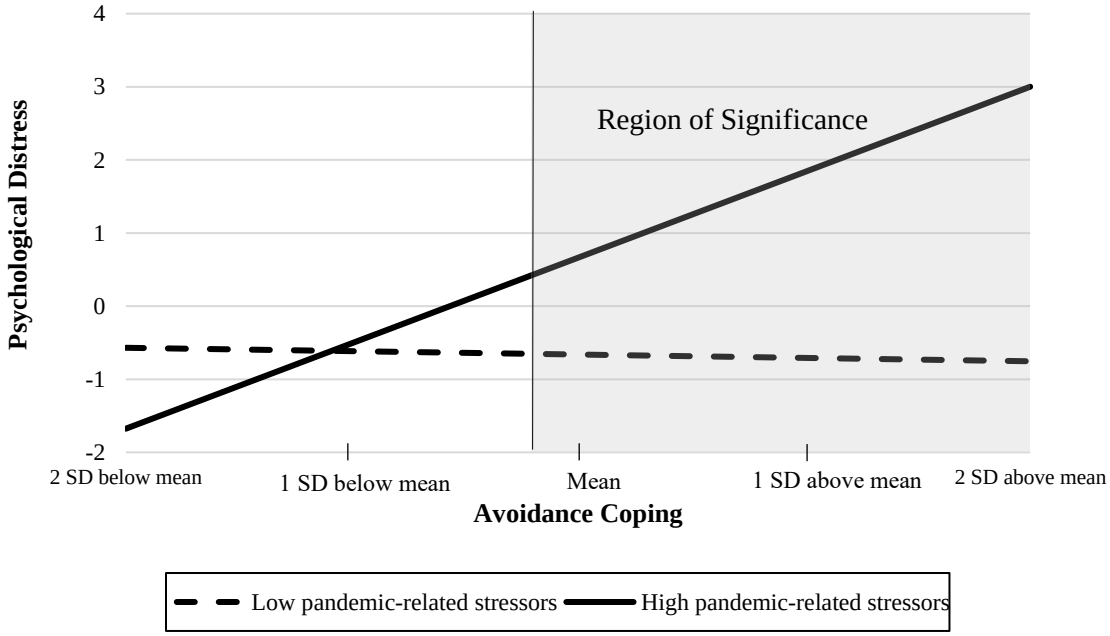
Proposed structural equation modeling in each region.



Note. W1 = Wave 1; W2 = Wave 2. Ccovariates included age, gender (non-female = 0, female =1), race (non-Hispanic White = 0, person of color = 1), marital status (single/divorced/widow = 0, married/partnered = 1), below poverty level status (no = 0, yes =1), number of family members living in the same household, and psychological distress at W1.

Figure 5

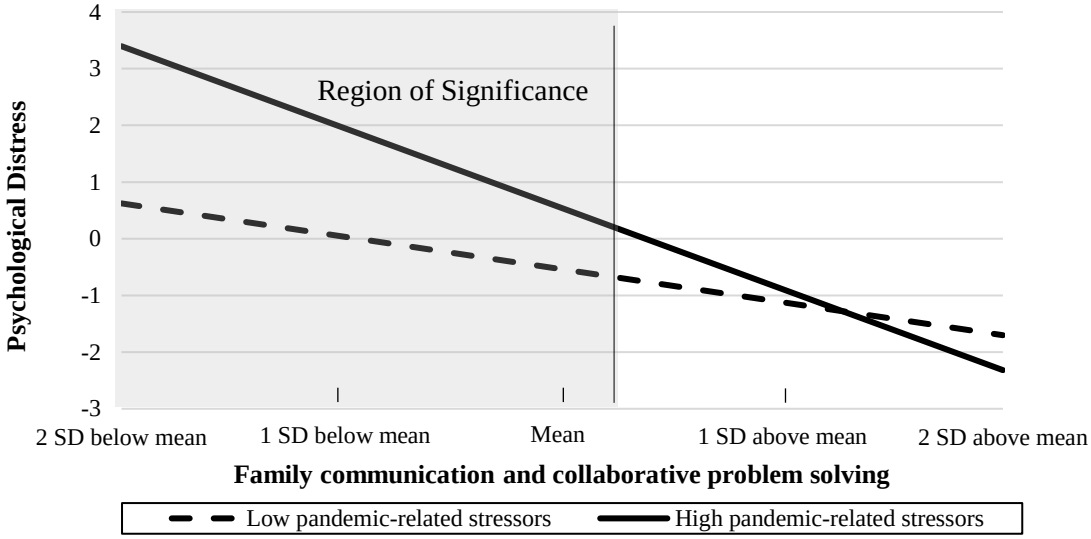
Pandemic-related Stressors (Wave 2) Predicting Severity of Psychological Distress (Wave 2) by Individual Avoidance coping (Wave 1) in Minnesota



Note. Number of pandemic-related stressors at Wave 2 (M = 2.64, SD = 1.43) and avoidance coping at Wave 1 (M = 21.42, SD = 5.06) were mean-centered. Low pandemic-related stressors and high pandemic-related stressors referred to 1 *SD* below mean and 1 *SD* above mean, respectively.

Figure 6

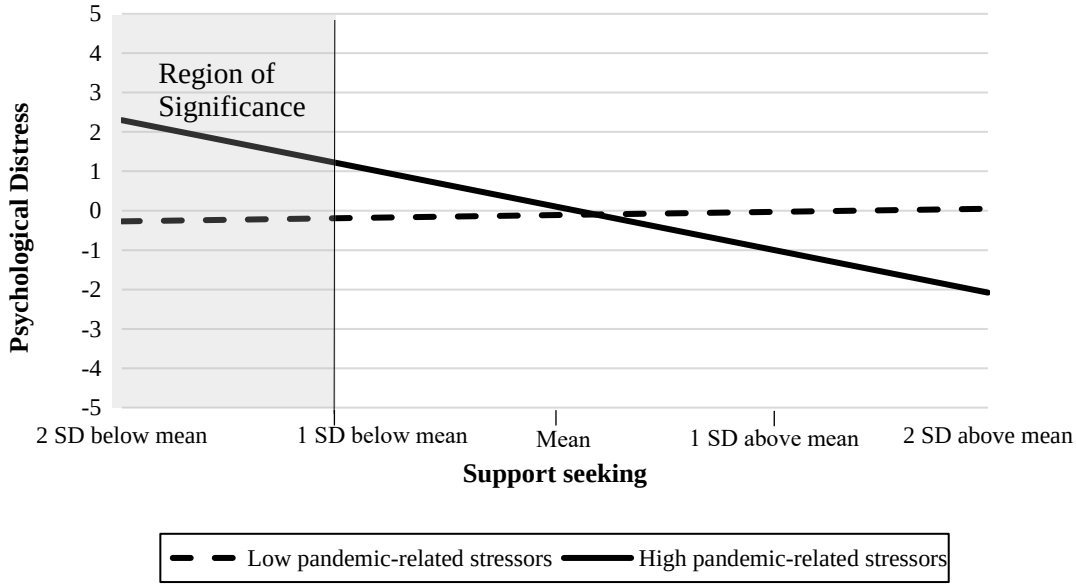
Pandemic-related Stressors (Wave 2) Predicting Severity of Psychological Distress (Wave 2) by Family Communicaiton and Collaborative Problem Sovling



Note. Number of pandemic-related stressors at Wave 2 (M = 2.64, SD = 1.43) and family communication and collabortaive problem sovling at Wave 1 (M = 71.18, SD = 10.58) were mean-centered. Low pandemic-related stressors and high pandemic-related stressors referred to 1 *SD* below mean and 1 *SD* above mean, respectively.

Figure 7

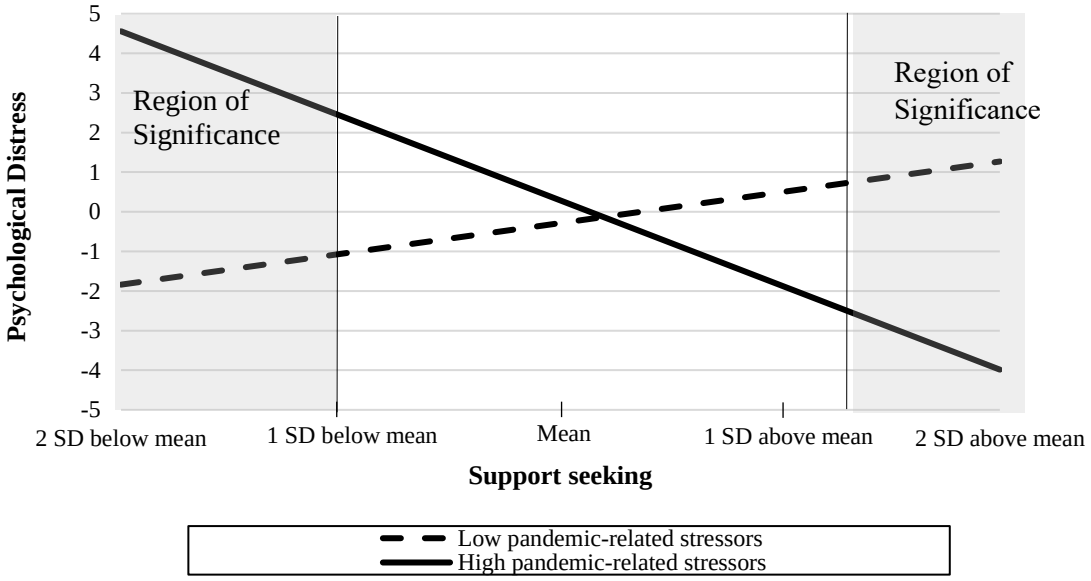
Pandemic-related Stressors (Wave 2) Predicting Severity of Psychological Distress (Wave 2) by Support Seeking (Wave 1) in Hong Kong



Note. Number of pandemic-related stressors at Wave 2 (M = 1.57, SD = 1.10) and suppport seeking at Wave 1 (M = 9.01, SD = 2.95) were mean-centered. Low pandemic-related stressors and high pandemic-related stressors referred to 1 *SD* below mean and 1 *SD* above mean, respectively.

Figure 8

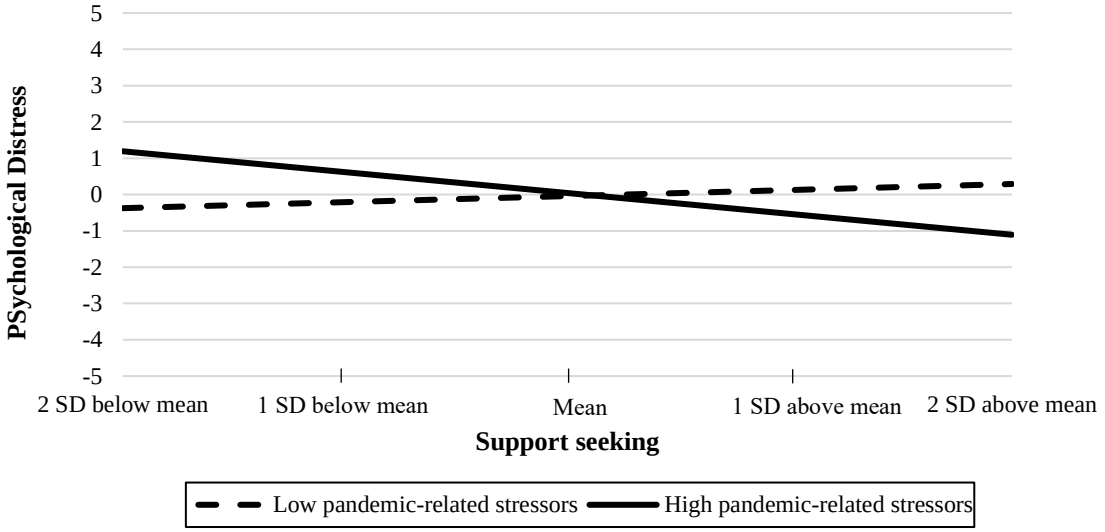
Pandemic-related Stressors (Wave 2) Predicting Severity of Psychological Distress (Wave 2) by Support Seeking (Wave 1) for Males in Hong Kong



Note. For males, number of pandemic-related stressors at Wave 2 (M = 1.55, SD = 1.24) and suppport seeking at Wave 1 (M = 8.20, SD = 2.98) were mean-centered. Low pandemic-related stressors and high pandemic-related stressors referred to 1 *SD* below mean and 1 *SD* above mean, respectively.

Figure 9

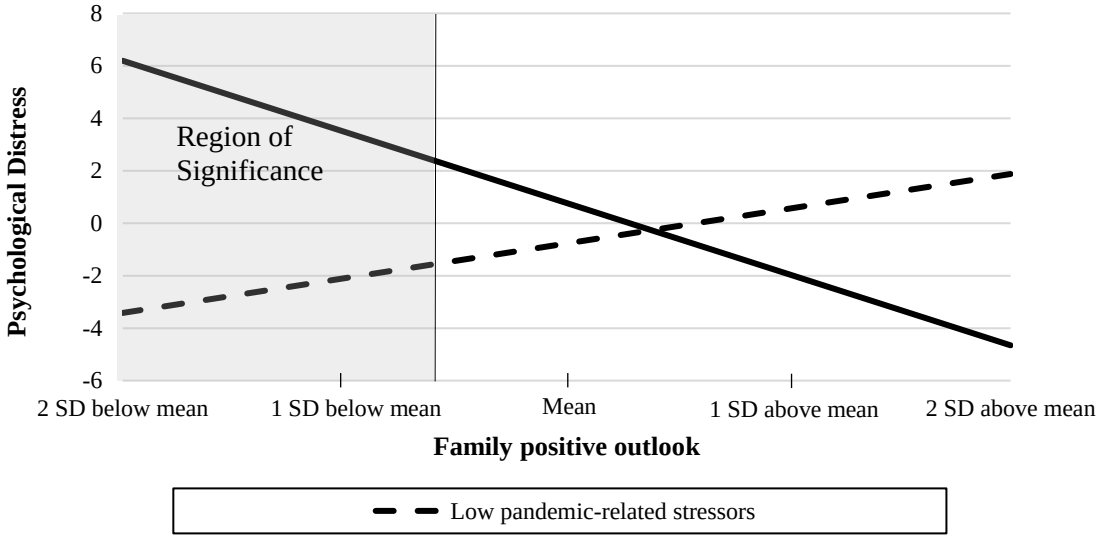
Pandemic-related Stressors (Wave 2) Predicting Severity of Psychological Distress (Wave 2) by Support Seeking (Wave 1) for Females in Hong Kong



Note. For females, number of pandemic-related stressors at Wave 2 (M = 1.58, SD = 1.06) and suppport seeking at Wave 1 (M = 9.33, SD = 2.88) were mean-centered. Low pandemic-related stressors and high pandemic-related stressors referred to 1 *SD* below mean and 1 *SD* above mean, respectively.

Figure 10

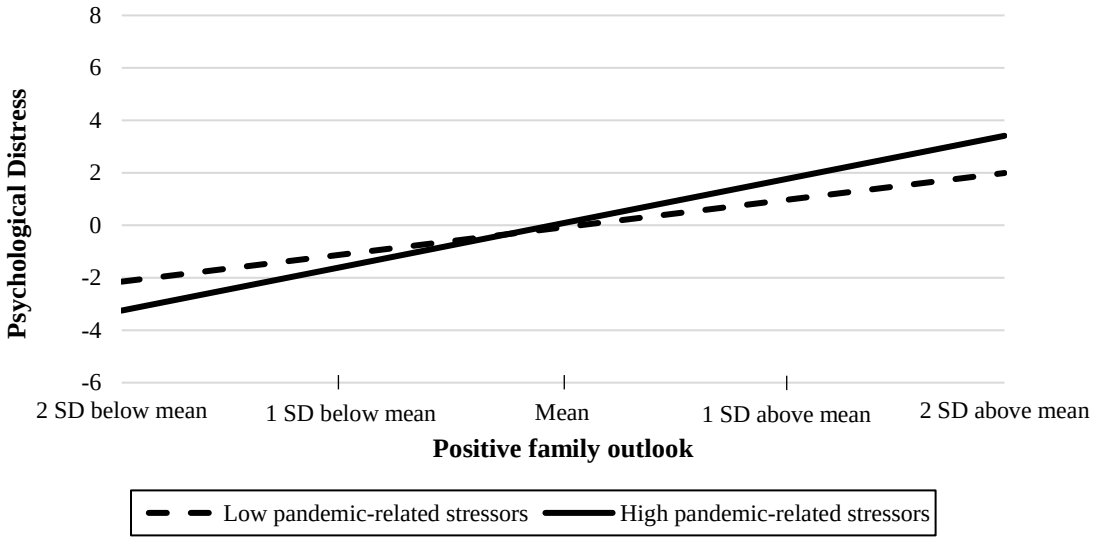
Pandemic-related Stressors (Wave 2) Predicting Severity of Psychological Distress (Wave 2) by Positive Family Outlook (Wave 1) for Males in Hong Kong (n = 165).



Note. For males, number of pandemic-related stressors at Wave 2 (M = 1.55, SD = 1.24) and positive family outlook at Wave 1 (M = 17.45, SD = 4.18) were mean-centered. Low pandemic-related stressors and high pandemic-related stressors referred to 1 *SD* below mean and 1 *SD* above mean, respectively.

Figure 11

Pandemic-related Stressors (Wave 2) Predicting Severity of Psychological Distress (Wave 2) by Positive Family Outlook (Wave 1) for females in Hong Kong



Note. For females, number of pandemic-related stressors at Wave 2 (M = 1.58, SD = 1.06) and positive family outlook at Wave 1 (M = 17.67, SD = 3.73) were mean-centered. Low pandemic-related stressors and high pandemic-related stressors referred to 1 *SD* below mean and 1 *SD* above mean, respectively.

Figure 12

Illustration of Stratified Reality Informed by Critical Realism

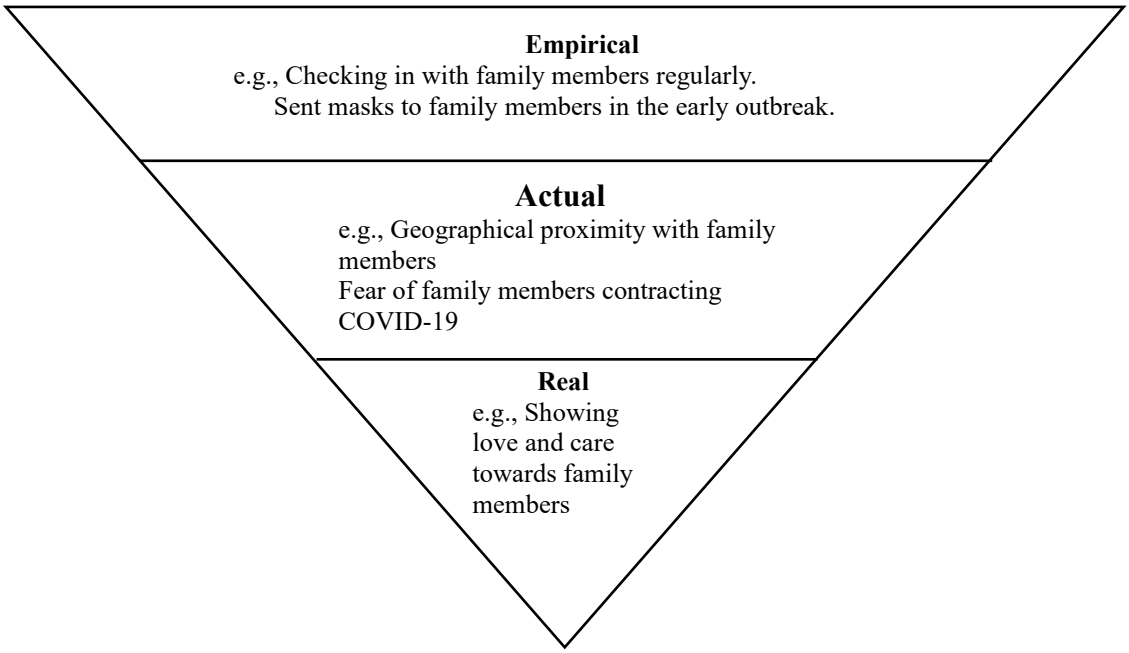


Figure 13

Synthesis of Codes using Multisystemic Resilience Framework: An Example.

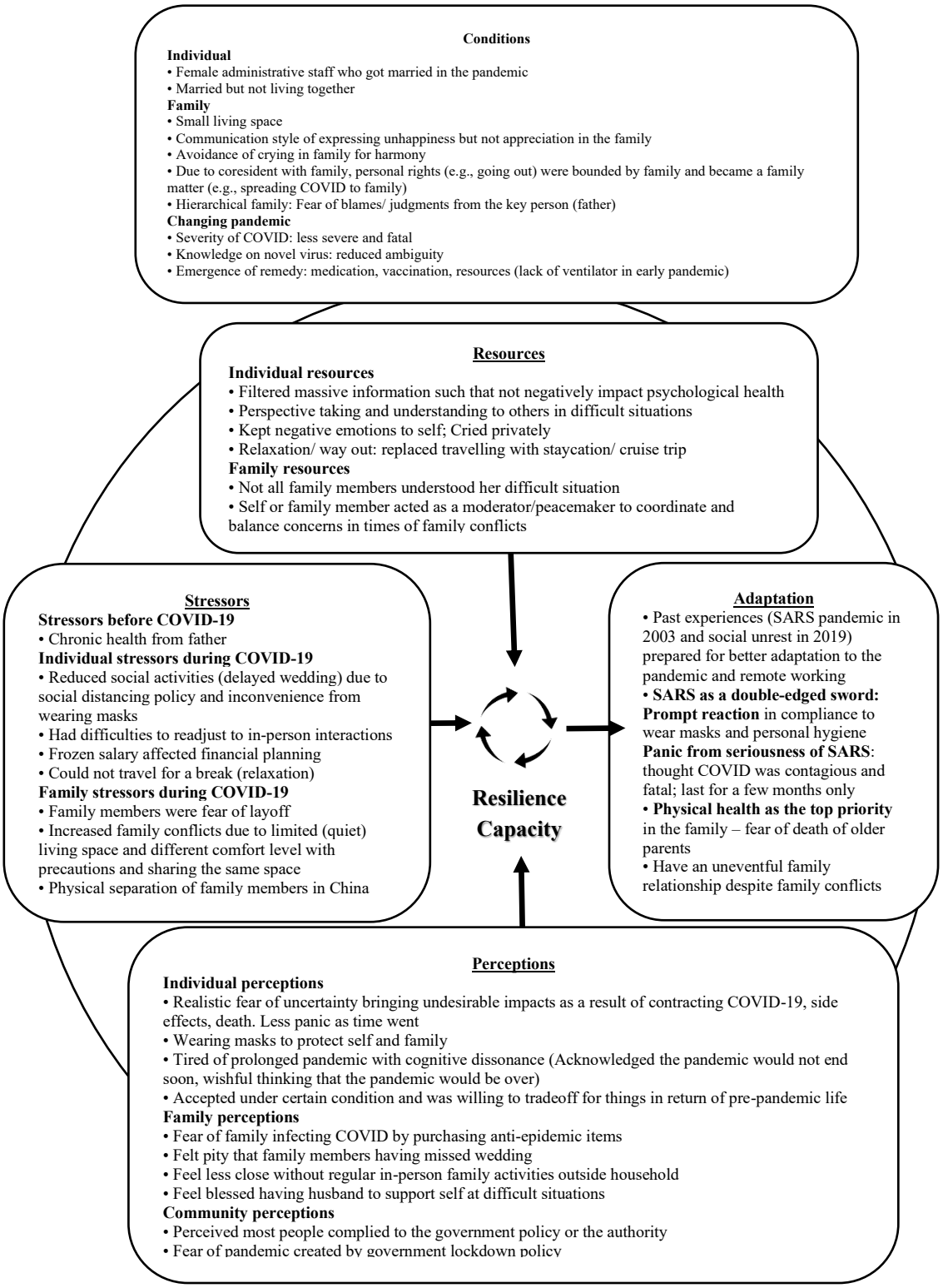


Figure 14

Synthesis of Codes using Stratified Realities: An Example

Empirical

Individual

- Social distancing policies imposed restrictions to daily routine (remote working) and life events (delayed wedding)
- Tired of prolonged pandemic and wish it to be over. Accept under certain condition and willing to tradeoff for things in return of pre-pandemic life

Family

- Increased family conflicts due to different comfort level with precautions and sharing the same space in the pandemic
- Self or family member acted as a moderator to coordinate and balance concerns in times of family conflicts
- Complementary characters as a couple alleviated distress in the pandemic (Spouse provided source of support and comfort)
- Fear of family infecting COVID by purchasing anti-epidemic items (not because of showing love and care)

Actual

Social structure

- Female administrative staff who got married during COVID-19
- Family role: Daughter, moderator/ peacemaker in the family
- Married but not living with spouse for a brief period
- Showing filial piety – taking care of elders at home
- Communication style of expressing unhappiness but not appreciation in the family
- Prohibition of crying in family

Individual agency

- Critical thinking to determine what information supports own adjustment (both physical and psychological wellbeing) in the pandemic
- Perspective taking and understanding to others in difficult situations
- Fear of contracting COVID-19 and possible death
- Emerging gratitude: Did not take for granted for small things under restrictions

Real

- **Flexibility** changed as the pandemic persisted. When the pandemic emerged, she started with "forced to accept the new normal" attitude to "gain" the sense of control in hope of better adaptation. As the pandemic persisted for almost two years, the participant internalized such attitude into behavior by embracing challenges with "go with the flow".
- **Cognitive dissonance** exacerbated over time, and she wished to return to pre-pandemic life.
- **Expectation management**: Believed that it was up to oneself to stay okay - feel okay to live separately from husband for a brief period of time, lower expectation due to uncontrollability.
- **Sense of control**: Used critical thinking to determine what available information is beneficial or harmful to psychological well-being
- **Insights about family**: Acknowledged family roles and different comfort level of family members in expressing negative emotions
- **Physical health as top priority**: In view of chronic condition of older parents, went to great length to minimize the risk of contracting COVID-19, including a tradeoff of family harmony. She started to ponder about psychological well-being, not just being a passive recipient of information about the pandemic.
- **Prioritized family over self**: Respected older parents out of filial piety instead of showing love and care emotionally.

Figure 15

Theoretical Model: Resilience Mechanism in the Face of the COVID-19 Pandemic -The Interplay of Individual and Family Process