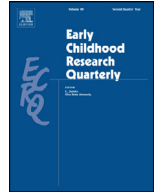




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Family socio-economic status and Chinese Preschoolers' anxious symptoms during the COVID-19 pandemic: the roles of parental investment, parenting style, home quarantine length, and regional pandemic risk[☆]

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ABSTRACT

Using data from 16,161 families with target child of 3–6 years old in Hubei, China during COVID-19 pandemic, this study examined the association between family socio-economic status (SES) and preschoolers' anxious symptoms (PAS). Parental investment and parenting style were tested as mediators for this association. Home quarantine length was tested as a moderator for this direct association and for the associations between family SES and parenting processes, whereas regional pandemic risk was tested as a moderator for the entire model. Results support the utility of Family Stress and Family Investment Models in a Chinese context by identifying unique roles of parental investment and parenting style in mediating the link between family SES and PAS. Quarantine length moderated the link between family SES and authoritarian parenting: Strength of this negative association was stronger for families with longer quarantine than for those with shorter quarantine. Further, family SES was negatively associated with PAS through its negative association with authoritarian parenting, regardless of the quarantine length. Model comparison analyses between high-risk region versus low/medium-risk region groups indicated that the pandemic risk for living regions did not alter any pathway in the model. Such findings inform the designs of targeted interventions to help families cope with pandemic-related challenges. Promoting parental investment and adaptive parenting style represents an avenue to diminish consequences of family economic hardship for young children's mental health, regardless of macrolevel pandemic risk. Interventions should attend to home quarantine duration, as it contextualizes the links among family SES, parenting, and child well-being.

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1. Introduction

The rapid spread of COVID-19 has a profound impact on the daily lives of children and their families worldwide (Brooks et al., 2020; Graber et al., 2021; Nicomedes & Avila, 2020; Wang, Zhang, Zhao, Zhang & Jiang, 2020; Zhang et al., 2021). Both regional and national containment and lockdown measures have been adopted in order to effectively suppress the transmission of virus since January 2020, leading to a significant reduction of economic activi-

ties across industries and economic recession at the global level (United Nations, 2020a, 2020b). Against macrolevel background characterized by increasing unemployment rate and lasting economic downward pressure, numerous families across the globe have been experiencing financial hardship that is tougher than ever before (Campos & Vieira, 2021; Li et al., 2021; United Nations, 2020a, 2020b). As such, the potential developmental consequences of family economic hardship during this special pandemic time need be more systematically examined, especially for the more vulnerable groups such as young children (Cowie & Myers, 2021; Gayer et al., 2020; Graber et al., 2021; Shorer & Leibovich, 2020).

Meanwhile, a rapidly expanding body of research has also extensively demonstrated that the ongoing COVID-19 pandemic has negatively influenced people's mental health by eliciting and el-

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evaluating various forms of internalizing symptoms (e.g., anxiety, panic, and depression) across diverse populations during the challenging quarantine period (Brooks et al., 2020; Gan et al., 2020; Quittkat et al., 2020; Wang et al., 2020; Yin et al., 2020). Notably, preschool young children are particularly vulnerable during this special time probably due to their limited cognitive abilities to process what is happening and higher susceptibility to environmental stressors (Cowie & Myers, 2021; Gayer et al., 2020; Graber et al., 2021; Jiao et al., 2020; Li et al., 2021; Shorer & Leibovich, 2020; Singh et al., 2020). Therefore, amongst various health issues across different populations during this pandemic, preschoolers' internalizing symptoms may merit special attention.

Different from externalizing problems that typically incorporate disinhibited or externally focused behaviors (e.g., conduct problems, delinquent behaviors, and attention problems), internalizing symptoms involve a wide array of overinhibited or internally focused problems, such as anxiety, sadness, fear, depression, social withdrawal, and somatic complaints (Achenbach, Ivanova, Rescorla, Turner & Althoff, 2016; Wang & Liu, 2021; Willner, Gatzke-Kopp & Bray, 2016). Anxiety is one prominent type of internalizing symptoms that are particularly prevalent during the COVID-19 pandemic, given people's increased concerns toward future uncertainty (Paredes, Apaolaza, Fernandez-Robin, Hartmann & Yañez-Martinez, 2021; Rettie & Daniels, 2021). Although there are many subtypes of anxiety, the generalized anxiety symptoms can be defined as excessive and uncontrollable worry about a number of events or activities, contributing to symptoms such as muscle tension, difficulties in attention concentration, and sleep disturbance (Creswell, Waite, & Hudson, 2020). In the present study, we assessed generalized anxiety symptoms among Chinese preschool children. Research has indicated that anxiety disorders have an early age of onset, with prevalence rates around 9% in preschool populations (Beesdo-Baum & Knappe, 2012; Egger & Angold, 200; Rapee, Schniering & Hudson, 2009). Without interventions, early anxiety disorders are likely to become more full-blown symptoms that are persistent well into subsequent developmental periods and foreshadow long-term maladaptation (Bittner et al., 2007; Roza, Hofstra, Van Der Ende & Verhulst, 2003). Thus, identifying critical antecedents of early anxious symptoms is practically important.

Taken altogether, it seems warranted to expect that, in the context of the COVID-19 pandemic, the heightened family economic hardship likely has consequences for young children's affective well-being, including increased anxious symptoms. In addition to the aforementioned background, this expectation is also well grounded in the extensively-demonstrated evidence supporting the links between family SES and child adaptation in various domains (Conger, Conger & Martin, 2010; Masarik & Conger, 2017). In particular, there also exist widely-identified associations between family SES and young children's internalizing psychopathology, albeit predominantly in the Western samples (Ashford, Smit, Van Lier, Cuijpers & Koot, 2008; Bor et al., 1997; Duncan, Brooks-gunn & Klebanov, 1994; Gershoff, Aber, Raver & Lennon, 2007; Mistry, Biesanz, Taylor, Burchinal & Cox, 2004; Papachristou & Flouri, 2020; Park, Fertig & Allison, 2011; Potijik, de Winter, Bos, Kerstjens & Reijneveld, 2015; Strohschein, 2005).

Furthermore, the Family Investment Model (FIM) and the Family Stress Model (FSM) have been among the most prominent frameworks guiding prior research on developmental implications of family SES and the implicated mediating mechanisms (Conger & Donnellan, 2007; Conger et al., 2010). FIM proposes that family SES impacts children's development primarily through shaping parental investment, such as investments in residence, necessities of life, and learning resources (Sohr-Preston et al., 2013). In contrast, FSM proposes family stress processes associated with low family SES as underlying mechanisms. That is, family economic hardship poses

threats to parental psychological well-being and also disrupts parenting behaviors, which in turn contribute to child maladaptation (Masarik & Conger, 2017). Notably, the family investment and stress processes are not completely competing or mutually exclusive but rather complementary with each other when accounting for the associations between family economic conditions and child outcomes (Iruka, LaForett & Odom, 2012; Simons & Steele, 2020; Sosu & Schmidt, 2017). Accordingly, researchers have increasingly advocated for the joint and more integrated tests of FIM and FSM processes in a single model to identify their relative unique implications (Duncan, Magnuson & Votruba-Drzal, 2017; Linver, Brooks-Gunn & Kohen, 2002; Simons et al., 2016; Vratsidis, Clark, Chevalier, Espy & Wiebe, 2020).

According to FIM (Conger & Donnellan, 2007; Conger et al., 2010), parents with greater economic resources are better able to invest material, social, and human capital to promote the well-being of their children. Guided by this conceptualization and considering the special status of home quarantine during the pandemic, to index parental investment in the present study we used parents' reports on the amounts of toys and picture books available for child to play and the space for child to lie down to play when quarantining at home. As to parenting processes proposed by FSM (Masarik & Conger, 2017), in the present study we focused on parenting style, specifically the authoritarian style and the authoritative style. Parenting style represents "a constellation of attitudes toward the child that are communicated to the child and that, taken together, create an emotional climate in which the parent's behaviors are expressed" (Darling & Steinberg, 1993, p. 488). Baumrind's typology of parenting styles, especially the authoritarian style and the authoritative style, has long guided Chinese literature on parenting, despite the increasingly acknowledged within-culture complexity and heterogeneity (Chuang, Glozman, Green & Rasmi, 2018). Authoritarian parents are highly demanding and also display low responsiveness. They value absolute respect for authority and obedience, favor forceful measures to curb self-will, restrict children's autonomy, and tend to make rules and decisions without considering children's thoughts. In contrast, authoritative parents are highly demanding (i.e., high standards for behavior and firm enforcement of rules), but at the same time they are also responsive. That is, they provide positive encouragement to child autonomy and are usually warm, rational, and open to communicating with children about children's needs and expectations (Baumrind, 1971, 1978, 1991; Darling, 1999; Maccoby, Martin, Mussen & Hetherington, 1983; Pellerin, 2005).

In addition, we also should attend to the factors at different ecological levels that are critical in contextualizing the aforementioned family processes. City lockdown and home quarantine are among the most common measures that governments take to control the pandemic (Brooks et al., 2020; Gan et al., 2020; Quittkat et al., 2020; Wang et al., 2020; Yin et al., 2020). Without interventions, longer duration of home quarantine is associated with elevated levels of psychological distress indexed by poorer mental health, more avoidance behaviors, and higher levels of anger and post-traumatic stress symptoms (Brooks et al., 2020; Ren et al., 2020). For families with young children, as home quarantine extends, parents tend to perceive higher levels of parenting stress related to child increased behavioral and emotional difficulties (Zhang et al., 2021), which may be partly because of the limited access to resources (e.g., playgrounds, parks) that can meet young children's essential needs such as play (Graber et al., 2021). Thus, in the current study, length of home quarantine (counted in days) is used as a proxy for contextual stress during pandemic at the microlevel.

At the macrolevel, there is considerable heterogeneity in the risk of COVID-19 across regions (Brooks et al., 2020; Gan et al., 2020). Recent studies have showed that mental distress of peo-

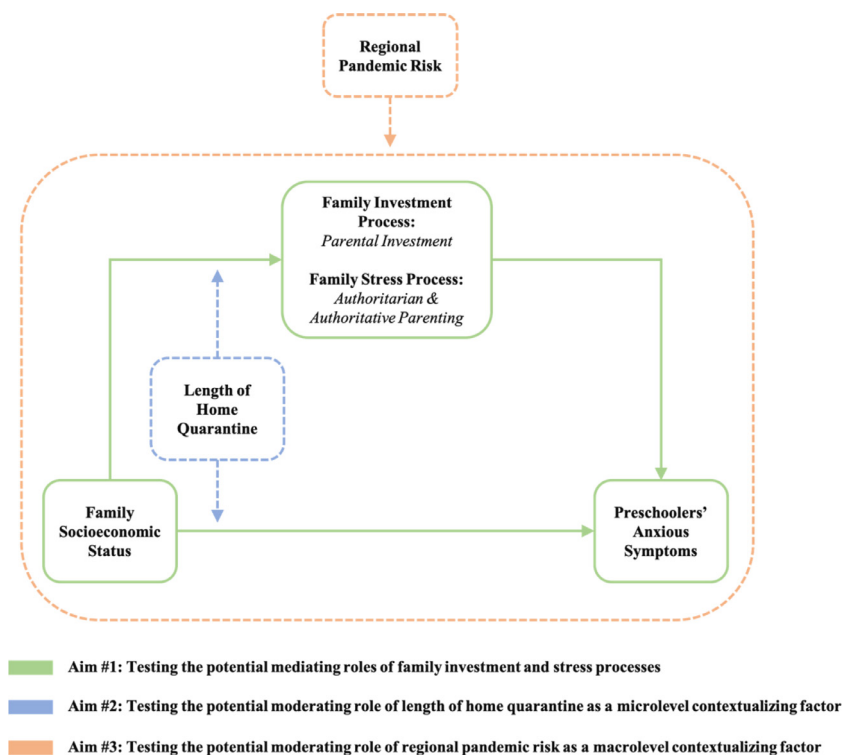


Fig. 1. The conceptual model with study aims.

Notes. For clarity, paths involving covariates are not presented in this figure. Different research aims are depicted in different colors. Moderating paths are displayed in dash lines, whereas the other predicting paths are displayed in solid lines. This is a conceptual model rather an analytic model. For specific details about analytic strategies, please see the relevant parts in the Method section. See the online article for the color version of this figure.

ple living in the higher-risk regions tend to be more severe (Zhao et al., 2020). In China, Hubei province was the most severely affected place by the COVID-19 outbreak. As of 12 PM on March 6, 2020, when the present survey was initiated, a total of 67,666 COVID-19 confirmed cases, including 49,871 in the capital city Wuhan, and 2959 deaths had been reported (Health Commission of Hubei, 2020). The Hubei Provincial Governments had timely imposed strict control measures since January 23–24, 2020 across the entire Hubei province, with the various within-province regions classified into the high-risk, medium-risk, and low-risk regions based on their respective epidemic situation (e.g., the number of confirmed cases) since January 29, 2020 (Chinese Central Government, 2020). As a result, control measures varied across within-province regions with different levels of pandemic risk, and thus people living in different within-province regions likely experienced different levels of pandemic-related pressure. Public areas were all closed and residential communities were under strict lockdown in high-risk regions. In these regions, daily necessities for residents were exclusively handed out by the neighborhood/community committee members who also provided services of purchasing urgently-needed materials (e.g., medicine). In medium-risk or low-risk regions where the most stringent traffic control was not implemented, local residents were required to execute self-quarantine at home; and only one person in each family was allowed to shop necessities once every 2/3 D, except for urgent medical reasons. Against this backdrop, the present survey was conducted in Hubei Province, and we consider regional pandemic risk (i.e., classifying families into different risk groups based on the pandemic risk level for their living regions that were officially reported by the Chinese Hubei Centers for Disease Control) as a proxy for the macrolevel contextual stress.

Based on data obtained from a large sample of 16,161 Chinese families with a target child of 3–6-years old in Hubei, China during the COVID-19 pandemic, the current study seeks to examine the association between family SES and preschoolers' anxious symptoms and also reveal the potential implicated mechanisms (see Fig. 1 for a conceptual illustration of the tested model and three study aims). Guided by FIM and FSM and considering the variability in both pandemic risk across regions in Hubei and the duration of home quarantine across families, we tested parental investment and parenting style (i.e., authoritative parenting or authoritarian parenting) as two potential mediators for the association between family SES and child anxious symptoms (i.e., study aim #1). In addition, the length of home quarantine as a microlevel contextual factor was tested as a moderator for the direct association between family SES and child anxious symptoms as well as for the associations between family SES and parenting processes (i.e., study aim #2), whereas the regional COVID-19 pandemic risk as a macrolevel contextual factor was tested as a moderator for the entire model (i.e., study aim #3). As such, this study likely yields results that hold critical implications for the designs of more targeted and effective interventions to help families with young children successfully cope with challenges during the COVID-19 pandemic.

1.1. Family SES and early child internalizing symptoms, including anxious symptoms

The implications of family SES for various child outcomes in different developmental periods, including internalizing symptoms in early childhood, have been extensively demonstrated in prior research with Western samples (for reviews, see Carneiro, Dias & Soares, 2016; Peverill, Dirks, Narvaja, Herts & Mclaughlin, 2020; Piotrowska, Stride, Croft & Rowe, 2015; Reiss, 2013;

Wadsworth et al., 2016). In contrast, research with non-Western samples remains relatively sparse. Notably, our literature search has yielded an even more scant body of studies specifically with samples of Chinese preschoolers (which is the focal population in the present study). Further, the currently available very few studies of Chinese preschoolers have primarily focused on the associations between family SES and child social competence (Liu, Zhou, Cao & Hong, 2020; Wu, Hu, Wu, Winsler & Chen, 2020), cognitive/academic outcomes (Ip et al., 2016; Wu, Wang, Cao & He, 2021; Zhang, Hu, Ren & Zhang, 2019), and composites of various problem behaviors (Li et al., 2021; Luo, Liu & Zhang, 2021). Surprisingly, the implications of family SES particularly for preschoolers' internalizing problems, including anxious symptoms, have been rarely examined in Chinese context. To our knowledge, only one exception can be identified to date. In a sample of 156 Chinese children of 2–3-years old, Zhang (2014) found that family income negatively predicted internalizing symptoms among boys but not girls, whereas maternal education negatively predicted internalizing symptoms among girls but not boys. Further, parent-child conflict at least partially accounted for such effects.

Also considering the widely-identified association between family SES and young children's internalizing psychopathology in Western samples (e.g., UMB_12364), more efforts are clearly needed to examine such effects in Chinese samples of preschoolers. As such, the current study seeks to narrow this gap by linking family SES to Chinese preschoolers' anxious symptoms, which is one prominent type of internalizing problems that has an early age of onset (Beesdo-Baum & Knappe, 2012; Egger & Angold, 2006; Rapee et al., 2009) and can significantly predict long-term maladaptation if without effective interventions (Bittner et al., 2007; Roza et al., 2003).

1.2. Parental investment and parenting process as potential mediators

As noted earlier, the FIM and FSM suggest that the relation between family SES and child psychopathology can be mediated through various family processes, including both parental investment and parenting processes (Conger & Donnellan, 2007). According to FIM, family economic hardship likely contributes to a number of deficits in parental investment processes that may elevate the risk of child psychopathology, including internalizing symptoms. Children from families with lower SES, as compared with their peers from families with higher SES, are more likely to lack access to healthy food and high-quality medical care (Adler & Newman, 2002; Gershoff et al., 2007), receive less cognitive stimulations from home learning materials (e.g., books, toys, and media) (Linver et al., 2002; Mistry, Biesanz, Chien, Howes & Benner, 2008), and get less engaged in indoor and outdoor adaptive parent-child joint activities (Iruka, Dotterer & Pungello, 2014; Vasilyeva, Dearing, Ivanova, Shen & Kardanov, 2018). According to the FSM (Masarik & Conger, 2017), family economic hardship poses significant threat to parental psychological well-being (e.g., maternal depression) as well as disrupts parenting quality (e.g., harsh discipline, highly intrusive behaviors, and low responsiveness), which in turn are likely to place children at heightened risk for a wide array of developmental difficulties, including internalizing symptoms, conduct problems, cognitive deficits, and poor socioemotional competence (Bøe et al., 2014; Hosokawa & Katsura, 2017; Linver et al., 2002; Liu et al., 2020; Luo et al., 2021; Peng, 2021; Wu et al., 2020; Zhang, Krishnakumar & Narine, 2020).

Although FIM and FSM respectively proposes relatively unique perspectives for understanding the explanatory pathways underlying the relation between family SES and child development (Conger & Donnellan, 2007), researchers have increasingly called for joint tests of both in a single combined model to more adequately identify their relative, unique developmental implications

(Masarik & Conger, 2017; Simons & Steele, 2020; Simons et al., 2016; Vrantsidis et al., 2020). However, research in this emerging direction still remains relatively scant. Existing studies have primarily focused on child cognitive abilities, academic outcomes, or conduct problems in Western samples (e.g., Simons et al., 2016, 2020; Vrantsidis et al., 2020), with the other important child development domains such as internalizing psychopathology under-examined. Further, the cross-cultural applicability of the combined model also awaits to be more systematically tested in non-Western contexts.

1.3. Days of home quarantine and regional risk of COVID-19 as potential moderators

During the recent years, researchers have increasingly advocated for the identification of factors that may serve as moderators for the relation between family SES and child development and contend that the potential moderators can be derived from contexts at different ecological levels (Masarik & Conger, 2017). In the present study, we tested Days of Home Quarantine as a potential contextual moderator at the microlevel and Regional Risk of COVID-19 as a potential contextual moderator at the macrolevel. Specifically, the length of home quarantine was tested as a moderator for the direct association between family SES and child anxious symptoms as well as for the associations between family SES and parenting processes, whereas the regional COVID-19 pandemic risk was tested as a moderator for the entire model. Due to the scarce of prior relevant research, such moderation examination is somewhat exploratory and specific hypotheses are not offered.

The processes through which family SES impacts preschoolers' anxious symptoms may vary as a function of the duration of home quarantine because it can be viewed as a proxy for (the accumulation of) family members' home quarantine stress. Without interventions, as the home quarantine extends, parents may themselves be suffering from bad mood or even emotional distress (Ren et al., 2020), such as anxiety, fear, and depression (Sher, 2020) and also experience increased levels of parenting stress (Cluver et al., 2020; Graber et al., 2021; Spinelli, Lionetti, Setti & Fasolo, 2020; Zhang et al., 2021). Although family SES should be negatively associated with child internalizing problems regardless of the duration of home quarantine, it is possible that the protective effects of family SES on both parenting processes and child mental well-being can become more salient under the context of longer duration of home quarantine because families with higher SES can be more resilient from the high levels of quarantine-associated stress due to their possessing of more coping resources. In terms of the currently examined associations, it is possible that, as the home quarantine extends, the beneficial/protective effects of higher family SES (which is typically associated with more coping resources) in facilitating the successful navigation of life troubles during the challenging times (like the pandemic) are likely to be increasingly amplified. As such, it may not be difficult to expect that the strength of the negative link between family SES and maladaptive parenting styles/practices was significantly stronger for families with longer duration of home quarantine than those with shorter duration of home quarantine.

Similarly, the associations between family SES, parenting processes, and preschoolers' anxious symptoms are also likely to vary in regions with different levels of pandemic risk. Families in high-risk regions where the lockdown measures were stricter are likely to experience higher pressure than those living in low/medium-risk regions (Gan et al., 2020; Hou et al., 2021; Huy et al., 2021). Recent studies showed that the mental distress of people in high-risk region was relatively more severe (Zhao et al., 2020). The protective effects of family SES on both parenting and child mental well-being can become more expressed in the high-risk regions.

2. Methods

2.1. Participants

The ultimate sample were 16,161 families with the target children aged 3–6-years old ($M = 4.89$, $SD = 0.966$). Among the children, 10.1% were 3-years old, 29.2% were 4, 32.52% were 5, 28.3% were 6, and 8749 (54.1%) were boys. The sample consisted of 12,368 mothers (76.5%) and 3793 fathers (23.5%), and 5316 (32.9%) families were living in rural areas. More detailed demographic characteristics of participants are presented in Table S1 in the Supplementary Document. According to the pandemic risk assessment report released by the Hubei Centers for Disease Control on March 7, 2020 (Hubei Provincial Government, 2020), families in high-risk regions, medium-risk regions, and low-risk regions were 8950 (55.4%), 2964 (18.3%) and 4247 (26.3%), respectively. The list of specific regions classified into each risk group and details about the sample sizes across different specific regions can be found in Table S2 and Figure S1 in the Supplementary Document.

2.2. Procedures

The current data were collected via an Internet-based survey that was conducted from March 7 to March 14, 2020, in Hubei province, China during lockdown period because of the outbreak of COVID-19. To control the epidemic, Wuhan, which is the capital city of Hubei province and also the city that was most seriously affected by the COVID-19 in China, was listed as a high-risk region by the Hubei Centers for Disease Control and was announced to enter the state of lockdown on January 23, 2020. The lockdown measures were successively implemented in the other cities in Hubei province on January 24 and 25. As a result, all kindergartens and childcare centers in these areas were shut down, and young children had to go back homes for self-quarantine under the care of their adult family members.

Data were collected by a digital anonymous parent-reported questionnaire through an online crowdsourcing platform (<https://www.wjx.cn>) in China. The questionnaire link was distributed via the social media APP WeChat (i.e., a prevailing interpersonal message communication application in China) primarily by sending survey postings in kindergartens' home-institution communication WeChat Groups (of which the members were almost all parents with preschool children) and by sharing the survey postings on the personal WeChat Moments of preschool principals and teachers (who might have a number of WeChat friends that were parents for preschool children) so that potential participants could see the posting.

Parents who were interested in this survey could get access to a detailed introduction of the larger project and participating in the survey by clicking the questionnaire link enclosed in the posting. The inclusion criteria of parents were as follows: (1) having a child from 3 to 6 years old; (2) children were without any special needs. Before filling the survey, parents were required to carefully read the introduction of this project and then submitted their informed consent forms if agreeing to participate in this survey.

It took about 10 minutes to fill out the entire survey and all questions were answered according to the situation during the past two weeks. In case of more than one preschool children in a family, the parent was asked to select one child as the target when responding to child-related items. The anonymous e-questionnaires were filled on smart mobile phone or computers. Thanks to pre-setting techniques at the backstage of the online platform, a questionnaire can be successfully submitted only when the entire questionnaire was filled out without missing any item; responses from each unique assigned ID on an electronic device could not be repeatedly submitted; and pausing and resuming the survey at any time were

allowed. As soon as the survey was submitted, parents would receive a list of professional advice for parent-child interactions during the lockdown as a reward. Ultimately, 16,413 e-questionnaires were collected. We removed 252 questionnaires in which parents gave invalid information (i.e., reporting the duration of home quarantined over 60 days). All procedures were approved by the authors' home institution ethics review committee.

2.3. Measures

Family SES. Family SES is represented by a combination of parents' education, occupation, and household income (Cohen, Doyle & Baum, 2006; Liu et al., 2020). Parents were asked to complete a family background questionnaire. Parents' education levels were scored on 1–6 scale ranging from "primary school and below" to "graduate degree and above"; parental occupation status was coded into 6 categories (1–6) from "unemployment or part-time job" to "senior management personnel and senior professional"; and annual family income after tax was measured on five levels (1–5) from "less than Chinese ¥ 30,000" (approximately US \$4600) to "more than Chinese ¥ 250,000" (approximately US \$38,600). The overall family SES scores were derived from a principal component analysis of standardized variables (average scores of parents' educational levels, average scores of parents' occupations and annual family income) according to PISA index of ESCS (economic, social and cultural status) (OECD, 2014), with a higher score reflecting higher levels of family SES.

Parenting Style. Parenting style was assessed using the Parenting Styles and Dimensions Questionnaire (PSDQ; Robinson, Mandleco, Olsen & Hart, 1995). The original questionnaire includes three subscales: Authoritative Parenting, Authoritarian Parenting and Permissive Parenting. As some studies show that Permissive Parenting subscale may not be applicable in Chinese cultural context (e.g., Wu et al., 2002), only Authoritative and Authoritarian Parenting subscales were used to measure positive parenting style and negative parenting style in the current survey, respectively. There are 4 dimensions of Authoritative Parenting, including "Warmth and Involvement" (11 items), "Reasoning/Conduction" (7 items), "Democratic Participation" (5 items) and "Good natural/Easy going" (4 items). The authoritarian parenting subscale consists of 20 items and 4 dimensions: "Verbal Hostility" (4 items), "Non-reasoning, Punitive Strategies" (6 items), "Corporal Punishment" (6 items), and "Directiveness" (4 items). Parents responded to the items on a 5-point Likert scale ranging from (1) *never* to (5) *always*. In the current sample, Cronbach's α of the scales of Authoritative Parenting and Authoritarian Parenting was 0.916 and 0.901, respectively.

Parental Investment. According to FIM (Conger & Donnellan, 2007) and also considering the special status of home quarantine in the pandemic, we used parents' reports of two items on a 4-point Likert scale ranging from (1) *none* to (4) *great many/very large* to represent parental investment: "How many the toys and picture books available for children to play when quarantining at home?" and "How large is the space for children to lie down to play when quarantining at home?" Higher scores reflected higher levels of parental investment in resources for child development in the household during the home quarantine.

Preschoolers' Anxious Symptoms. Child anxious symptoms were measured by the Preschool Anxiety Scale (PAS; Spence, Rapee, McDonald & Ingram, 2001). In this study, only the dimension of generalized anxiety with 5 items was used for assessing children's anxiety during staying-at-home under the lockdown, such as the child "Is tense, restless or irritable due to worrying." On a 5-point Likert scale ranging from (1) *never* to (5) *always*, parents report their children's feelings and emotions over the past two weeks, with higher scores indicating more frequently experienced anxious symptoms. In this sample, Cronbach's α was 0.855.

Length of Home Quarantine and Regional Pandemic Risk. Due to the COVID-19 pandemic, Chinese families had been required by the government to carry out strict self-quarantine at home. The days of quarantine at home and the COVID-19 risk for regions where families were living were considered in analyses as they may be proxy indicators for the pandemic-related stress during the lockdown at the microlevel and the macrolevel, respectively. In terms of the length of home quarantine, parents were asked to report “Up to now, how many days in total have you and your child self-quarantined at home together during the COVID-19 pandemic?”.

In order to implement tailored measures to more effectively control the COVID-19 epidemic, Hubei province were further divided into low-, medium- and high-risk regions at the county level. Regions with no COVID-19 confirmed cases or with no new confirmed cases for the past 14 consecutive days were considered as low-risk regions, while those with more than 50 cases in total and outbreaks in clusters in the past 14 consecutive days were defined as high-risk regions. Medium-risk regions were those with new cases in the past 14 consecutive days but no more than 50 cases in total, or those with more than 50 cases in total, but no outbreaks in clusters in the past 14 consecutive days. The pandemic risk status in every county-level region was dynamically monitored to timely adjust the control measures. According to the risk-level evaluation by the Hubei Centers for Disease Control, March 7, 2020 (Hubei Provincial Government, 2020), we classified all families into three subgroups based on the pandemic risk characteristics of their living regions. Considering the relatively small sizes of families in the low-risk region group ($n = 2964$) and the medium-risk region ($n = 4247$) group, we combined the participants from the two regions as a single group ($n = 7211$) in order to make a much more balanced comparison with the high-risk region group ($n = 8950$) (1 = high-risk regions, 2 = low/medium-risk regions)

Demographic Covariates. Parents reported child’s age (1 = 3–4-years old, 2 = 4–5-years old, 3 = 5–6-years old), and gender (0 = girl, 1 = boy). Both were included as covariates.

Detailed items for all the currently used measures can be found in the Supplementary Document. To ease reading of the broader audience, all measures are presented in a Chinese-English bilingual form. Any additional information with respect to these measures can be obtained from the corresponding author upon reasonable request.

2.4. Analytic strategies

There were no missing values for all the used variables. Preliminary analyses were conducted using SPSS 22.0, including Descriptive statistics and Pearson correlations. Primary analyses were conducted in Mplus 8.3. (Muthén & Muthén, 1998–2017). First, structural equation modeling (SEM) was used to test the mediation model, which included one observed manifest variable as the independent predicting variable (i.e., family SES), three mediating latent variables (i.e., parental investment, authoritative parenting style and authoritarian parenting style), and one latent variable as the dependent outcome variable (i.e., preschoolers’ anxious symptoms). The demographic variables (i.e., child gender and age) were controlled for as covariates. The significance of the indirect effects was tested using bootstrapping technique (with 20,000 times replicates) to calculate the bias-corrected 95% confidence interval (CI) (Preacher & Hayes, 2008). The 95% CIs that do not include a zero value indicate statistically significant indirect effects.

Two types of moderators were tested in analyses: “Length of Home Quarantine” as a continuous moderator and “Regional Pandemic Risk” as a categorical moderator. Within the SEM framework, tests of an observed categorical moderator can be performed by utilizing the moderator to divide the full sample into subgroups and performing the multi-group SEM analyses (Kline, 2016),

whereas tests of a continuous moderator can be performed by specifying the effect of an interaction term in predicting the focal outcome, in which the interaction term is typically produced by multiplying mean-centered predictor by mean-centered moderator when predictor and moderator are both continuous manifest variables (Fritz, Arthur & Braddick, 2017; Little et al., 2007; Little et al., 2007).

As depicted in the conceptual model (Fig. 1), we aimed to test the moderating roles of “Length of Home Quarantine” in four associations: the association between family SES and child anxious symptoms; the association between family SES and parental investment; the association between family SES and authoritarian parenting style; and the association between family SES and authoritative parenting style. As such, four interaction terms between the mean-centered family SES and the mean-centered “Length of Home Quarantine” were added to the model. We did not test the moderating roles of “Length of Home Quarantine” in the second half part of the mediating pathways (i.e., the associations between parental investment/authoritarian parenting/authoritative parenting and child anxious symptoms), because theoretically we expect that the “Length of Home Quarantine” as a microlevel contextual stress index may operate in conjunction with family SES to directly contribute to child anxious symptoms and indirectly exert such effects through shaping parental investment and parenting styles (i.e., the moderation effects were mediated). In addition, albeit not as important as theoretical considerations, from a statistical perspective, adding another three interactions involving latent variables would make the already complicated model become overwhelmingly complicated. Tentative analyses have shown that it would lead to technique issues such as nonconvergence, poor model fit, unexpected estimates, and interpretation difficulties.

Given that “Regional Pandemic Risk” is a factor at the macrolevel that constitutes an overarching context for the currently examined model and the pilot nature of such analyses (with no prior research), we decided to first explore its moderating role for the whole model to see if any of the examined paths varied significantly across groups of families living in areas with different levels of pandemic risk (Fig. 1). For the multi-group SEM analyses, we followed the procedures used in recent studies (e.g., Cao, Liang & Zhou, 2021). First, measurement invariance of the latent constructs was examined across groups. Configural, metric (i.e., item loading), and intercept invariance were examined sequentially. The first model allowed the loadings of the latent constructs to vary across groups (i.e., the baseline model). The second model constrained the loadings of latent constructs as equal across groups (i.e., the first constrained model as compared with the baseline model to test metric invariance). The third model constrained the intercepts of the indicators for latent constructs as equal across groups (i.e., the second constrained model as compared with the first constrained model to test intercept invariance). After measurement invariance was established across groups, we proceeded to examine the differences in structural coefficients. Specifically, the structural paths were freely estimated for each group in the first model and constrained to be equal across groups in the second model. As recommended by Meade, Johnson and Braddy, (2008), changes in CFI and RMSEA were used as more optimal indices, as compared to the Chi-Square differences, to evaluate the measurement and structural invariance across groups. A change of no more than 0.01 in CFI and RMSEA values between two models indicates no significance change of the fit.

Model fit adequacy for all tested models was evaluated using multiple indices, including comparative fit index (CFI), root-mean-square error of approximation (RMSEA), and standardized root-mean-square residual (SRMR). CFI > 0.90, RMSEA < 0.08, and SRMR < 0.08 indicate an acceptable model fit (Kline, 2016). When the sample size is relatively large, a significant χ^2 should be ex-

Table 1
Descriptive statistics and zero-order bivariate correlations between variables (N 16,161).

	1	2	3	4	5	6	7	8	9
1. Parental investment	–								
2. Authoritative parenting	0.041***	–							
3. Authoritarian parenting	–0.027***	–0.420***	–						
4. Child anxious symptoms	–0.086***	–0.187***	0.343***	–					
5. Days of home quarantine	–0.062***	0.053***	–0.009	–0.037***	–				
6. Family SES	0.473***	0.091***	–0.056***	–0.069***	–0.032***	–			
7. Pandemic risk region ^a	0.117***	0.005	–0.014	–0.022***	0.034***	0.306***	–		
8. Child gender ^b	0.01	0.029***	–0.091***	–0.006	0.092***	–0.005	–0.005	–	
9. Child age ^c	–0.091***	–0.030***	0.050***	0.092***	–0.032***	–0.183***	–0.114***	–0.038***	–
Mean	–0.005	0.011	–0.041	0.244	39.451	0.005	55.40% ^d	54.10% ^e	32.50% ^f
Standard Deviation	0.368	0.133	0.304	0.385	13.727	0.998	–	–	–

^a 1 = high-risk region, 2 = medium-risk region, 3 = low-risk region
^b 1 = boy, 2 = girl
^c 1 = 3-years old, 2 = 4-years old, 3 = 5-years old, 3 = 6-years old.
^d This statistic represents the percentage of boys in the sample.
^e This statistic represents the percentage of children from high-risk region in the sample.
^f This statistic represents the percentage of children aged 5-years old in the sample.
 *** $P < 0.001$ (two-tailed).

pected for most models, thus we did not refer to χ^2 when evaluating model fit adequacy in the present analyses.

4. Results

4.1. Preliminary analyses

Bivariate correlations among key study variables as presented in Table 1 were generally in expected directions. Family SES were significantly correlated with parental investment ($r = 0.473, P < 0.001$), authoritative parenting ($r = 0.091, P < 0.001$), authoritarian parenting ($r = -0.056, P < 0.001$), and child anxious symptoms ($r = -0.069, P < 0.001$). Child anxious symptoms were significantly correlated with family process variables ($r = -0.086$ for parental investment, -0.187 for authoritative parenting, and 0.343 for authoritarian parenting, with all P s < 0.001).

4.2. Testing the mediating roles of parental investment and parenting style

In Fig. 2, we reported the standardized coefficients for paths in the mediation model tested with the full sample. This model demonstrated an adequate fit to the data: $\chi^2(127) = 9370.771$, CFI = 0.924, RMSEA = 0.067 with 90% CI [0.066, 0.068], SRMR = 0.054. Family SES was positively related to parental investment and authoritative parenting ($b = 0.286, 95\% \text{ CI } [0.274, 0.299]$, $\beta = 0.475, 95\% \text{ CI } [0.452, 0.497]$, $P < 0.001$; $b = 0.033, 95\% \text{ CI } [0.027, 0.040]$, $\beta = 0.091, 95\% \text{ CI } [0.074, 0.107]$, $P < 0.001$, respectively), and negatively related to authoritarian parenting ($b = -0.031, 95\% \text{ CI } [-0.040, -0.021]$, $\beta = -0.055, 95\% \text{ CI } [-0.072, -0.038]$, $P < 0.001$). Further, parental investment and authoritative parenting were negatively related to child anxious symptoms ($b = -0.071, 95\% \text{ CI } [-0.101, -0.042]$, $\beta = -0.069, 95\% \text{ CI } [-0.097, -0.041]$, $P < 0.001$; $b = -0.080, 95\% \text{ CI } [-0.117, -0.044]$, $\beta = -0.047, 95\% \text{ CI } [-0.069, -0.026]$, $P < 0.001$, respectively), whereas authoritarian parenting was positively related to child anxious symptoms ($b = 0.360, 95\% \text{ CI } [0.334, 0.386]$, $\beta = 0.320, 95\% \text{ CI } [0.299, 0.342]$, $P < 0.001$).

Three indirect pathways between family SES and child anxious symptoms through family processes were identified using bootstrapping techniques. Family SES was negatively associated with child anxious symptoms: via its positive association with authoritative parenting ($b = -0.003, 95\% \text{ CI } [-0.004, -0.001]$, $P < 0.001$); via its negative association with authoritarian parenting ($b = -0.011, 95\% \text{ CI } [-0.014, -0.008]$, $P < 0.001$); and via its positive association with parental investment ($b = -0.020, 95\% \text{ CI } [-0.029, -0.012]$, $P < 0.001$). The proportion of mediating effect to total effect was 7.4%, 30.6%, and 56.4%, respectively.

As shown in Fig. 3, the product term of Family SES \times Days of Home Quarantine was added into the mediation model and this model demonstrated an adequate fit to the data: $\chi^2(147) = 8907.498$, CFI = 0.928, RMSEA = 0.061 with 90% CI [0.060, 0.062], SRMR = 0.049. It was identified as a significant predictor to authoritarian parenting ($b = -0.010, 95\% \text{ CI } [-0.019, -0.001]$, $\beta = -0.019, 95\% \text{ CI } [-0.036, -0.002]$, $P = 0.030$). To illustrate this interactive effect, simple slope analyses were conducted by dividing the full sample into longer duration and shorter duration groups by adding and subtracting one standard deviation from the mean for the variable of Days of Home Quarantine. As depicted in Fig. 4, for families with shorter duration of quarantine, family SES was negatively associated with authoritarian parenting ($b = -0.022, 95\% \text{ CI } [-0.034, -0.009]$, $P = 0.001$); for families with longer duration of quarantine, although family SES was also negatively associated with authoritarian parenting, the strength of this association was stronger ($b = -0.042, 95\% \text{ CI } [-0.055, -0.028]$, $P < 0.001$). A significant difference between the two slopes was found ($b = -0.020, 95\% \text{ CI } [-0.038, -0.002]$, $P = 0.030$).

4.3. Testing the potential moderating effects for days of home quarantine

Bootstrapping analyses indicated that family SES was negatively associated with child anxious symptoms via its negative association with authoritarian parenting for both groups of families with either shorter or longer duration of quarantine ($b = -0.008, 95\% \text{ CI } [-0.012, -0.003]$, $P = 0.001$; $b = -0.015, 95\% \text{ CI } [-0.020, -0.010]$, $P < 0.001$, respectively). The proportion of mediating effects to total effect were 21.9% and 41.5%, respectively. There was a difference between the two indirect effects ($b = 0.007, 95\% \text{ CI } [0.001, 0.014]$, $P = 0.030$).

Multi-group SEM analyses were performed to examine whether any path in the tested model varied significantly between two region groups with different levels of risk of COVID-19 (i.e., high-risk region group versus low/medium-risk region group). The statistics for model comparisons are presented in Table 2. Despite significant differences in Chi-Square values, a change of no more than 0.01 in CFI and RMSEA values between models indicated no significance change of model fit (Meade et al., 2008). Accordingly, no

4.4. Testing the potential moderating role of regional pandemic risk

Multi-group SEM analyses were performed to examine whether any path in the tested model varied significantly between two region groups with different levels of risk of COVID-19 (i.e., high-risk region group versus low/medium-risk region group). The statistics for model comparisons are presented in Table 2. Despite significant differences in Chi-Square values, a change of no more than 0.01 in CFI and RMSEA values between models indicated no significance change of model fit (Meade et al., 2008). Accordingly, no

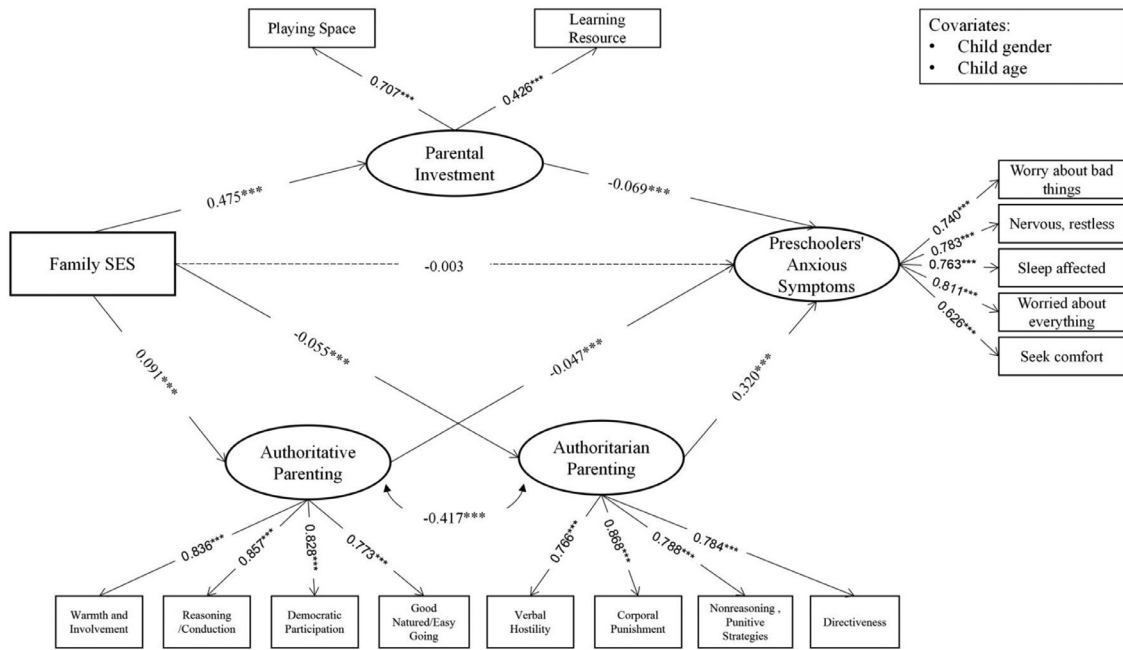


Fig. 2. Indirect effect model from family SES to preschoolers' anxious symptoms via parental investment and parenting style in full sample.

Note. All estimated parameters were standardized. For clarity, (a) pathways with $P > 0.05$ were depicted in dash lines, whereas pathways with $P < 0.05$ are depicted in solid lines; and (b) pathways and correlations involving covariates were not reported. * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$ (two-tailed).

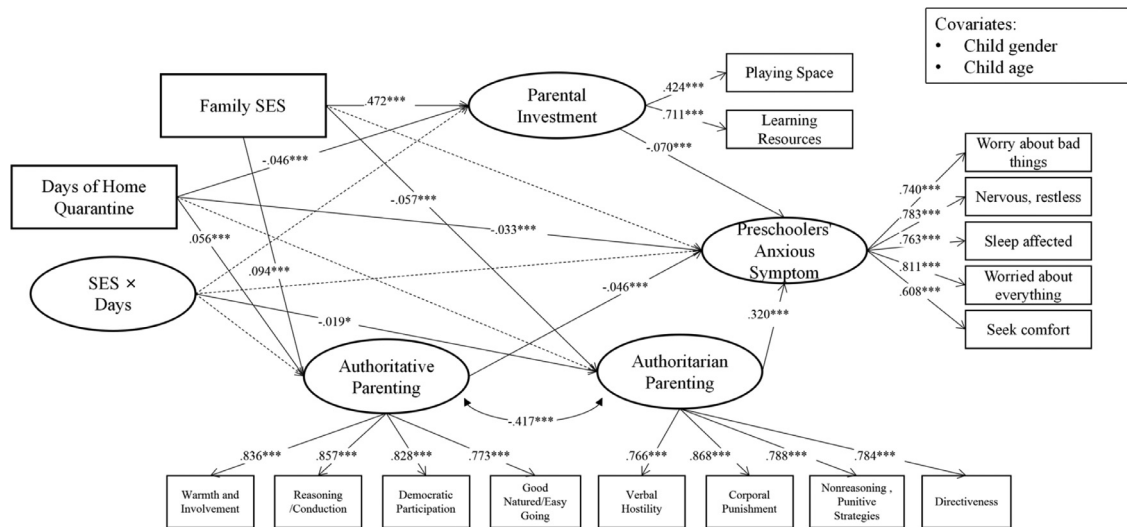


Fig. 3. Days of Home Quarantine as a moderator in the associations between family SES and parental investment/parenting styles/child anxious symptoms in full sample.

Note. All estimated parameters were standardized. For clarity, (a) pathways with $P > 0.05$ were depicted in dash lines, whereas pathways with $P < 0.05$ are depicted in solid lines; and (b) pathways and correlations involving covariates were not reported. * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$ (two-tailed).

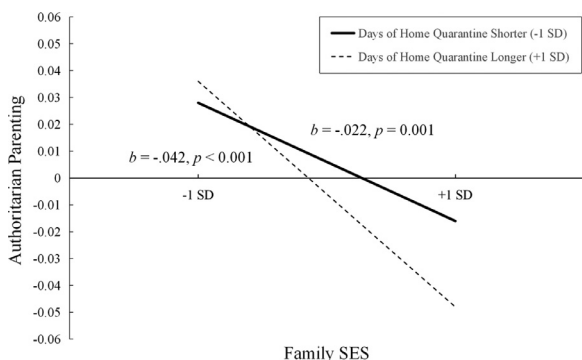


Fig. 4. Illustration of the moderating effect of Days of Home Quarantine in the association between family SES and authoritarian parenting.

significant differences emerged in measurement models or structural paths between two region groups that varied in the levels of pandemic risk, suggesting no moderating role of the Regional Pandemic Risk.

5. Discussion

Using data from 16,161 families with the target child of 3–6 years-old in Hubei, China during the COVID-19 Pandemic, this study examined the association between family SES and child anxious symptoms, and also tested parental investment and parenting style as potential mediators and the length of home quarantine and regional pandemic risk as potential moderators. Our results support the utility of Family Stress Model and Family Investment Model in Chinese culture context by identifying unique roles

Table 2
Model comparisons between two pandemic risk region groups (i.e., high-risk region group versus low/medium-risk region group).

Models	χ^2	df	AIC	BIC	CFI	TLI	SRMR	RMSEA 90%CI	Δ CFI	Δ TLI	Δ RMSEA	Δ Chi-Square(Δ df)
Measurement model												
Configural	6743.434	168	395,493	396,278	0.945	0.931	0.040	0.070 [0.068, 0.071]				
Metric	6775.147	179	395,503	396,203	0.944	0.935	0.041	0.068 [0.066, 0.069]	0.001	0.004	0.002	31.713(11) ***
Scalar	7112.777	190	395,819	396,434	0.942	0.935	0.041	0.067 [0.066, 0.068]	0.002	< 0.001	0.001	337.63(11) **
Structural model												
Structural paths free estimated	9149.782	272	394,406	395,083	0.927	0.920	0.054	0.064[0.062, 0.065]	–	–	–	
Constrained structural paths	9186.438	282	394,422	395,022	0.927	0.922	0.054	0.063[0.062, 0.064]	< 0.001	0.002	0.001	36.656(10) ***

** $P < 0.01$,

*** $P < 0.001$ (two-tailed).

of parental investment and parenting style in mediating the link between family SES and child anxious symptoms. Results also indicate that the length of quarantine moderated the link between family SES and authoritarian parenting. Although family SES was negatively associated with authoritarian parenting regardless of the length of home quarantine, the strength of this association was stronger for families with longer duration of quarantine than those with shorter duration. Multi-group structural equation modeling analyses demonstrate that the tested model did not vary across regions with different levels of pandemic risk (i.e., high-risk versus low/medium-risk regions). Such findings have implications for the development of more targeted and effective interventions to help families cope with challenges during the pandemic. Promoting parental investment and adaptive parenting styles are potential avenues to diminish the consequences of family economic hardship for young children's mental health, regardless of the macrolevel pandemic risk for regions where families locate. Interventions should also sensitively attend to the length of home quarantine, as it may play critical roles in contextualizing the links among family SES, parenting, and child mental well-being.

5.1. Family SES, parental investment, parenting style, and preschoolers' anxious symptoms during the COVID-19 pandemic

Both FSM and FIM have been widely shown as two useful theoretical frameworks for understanding how family SES affects child development (Conger & Donnellan, 2007; Conger et al., 2010; Masarik & Conger, 2017). In this study, we applied both FSM and FIM to examining the associations among family SES, parental investment, parenting style, and preschoolers' anxious symptoms particularly during the special time of COVID-19 pandemic and with an historically underrepresented sample of Chinese families with young children. As such, this study contributes to the literature by testing the importance of family SES for understanding the etiology of internalizing symptoms among Chinese children specifically in early childhood (Zhang, 2014). It well complements prior research primarily focusing on the links between family SES and Chinese children's social competence (Liu et al., 2020; Wu et al., 2020) and cognitive development (Ip et al., 2016; Wu et al., 2021; Zhang et al., 2019).

Joining an emerging (yet still scant) body of research (e.g., Wu et al., 2020; Zhang et al., 2020), our results provide initial support for the utility of FSM and FIM in a Chinese cultural context. In particular, by combining FSM and FIM processes simultaneously in a single model, this study provides evidence showing the unique roles of parental investment and parenting style above and beyond each other in accounting for the link between family SES and preschoolers' anxious symptoms. Thus, overall, our findings suggest that FSM and FIM are likely complementary with each other and can be effectively integrated into a more comprehensive frame-

work. Considering them together would yield a more complete and accurate delineation of the implicated processes through which family economic conditions shape child psychopathology. Interestingly, this pattern is inconsistent with findings of some prior studies of Western samples that also combined FSM and FIM (Simons & Steele, 2020; Simons et al., 2016; Vrantisidis et al., 2020). In general, these prior studies suggest that the processes proposed by FSM, as compared with FIM processes, appear to provide more powerful explanations for why family economic hardship is associated with child outcomes.

The different cultural settings may explain this inconsistency. Influenced by Confucian culture and traditions that place the next generation's academic success on the front burner for the whole family (e.g., Ng & Wei, 2020), Chinese parents tend to do their utmost to promote children's academic achievement, including investments in residence (i.e., a house in the catchment area for a school), extra-curricular activities, and learning resources. In order to avoid losing at the starting line of the life course, fierce competitions in family investments start as early as the preschool period. This is true even for many Chinese parents living in poverty, who often spare no effort to invest in children's education-related materials and activities sometimes even at the cost of cutting budgets on food and other life necessities. These cultural characteristics may justify the importance of FIM processes for Chinese young child development, even after controlling for the effects of FSM processes, in the current study. As such, our findings also highlight the necessity of considering parental goals and values for childrearing and the broader cultural contexts when using FIM and FSM to examine the implications of family economic conditions for child development.

5.2. Effects for the length of home quarantine and regional pandemic risk

Although a large body of research has examined the association between SES and child psychopathology (Conger et al., 2010), more research is needed to reveal the heterogeneity inherent within such associations by identifying contextualizing factors (Masarik & Conger, 2017). In the present study, we focus on two potential contextualizing factors: the length of home quarantine as a microlevel contextual factor and the regional pandemic risk as a macrolevel contextual factor. Our results indicated that the length of home quarantine counted in days, as a proxy for quarantine stress, conditioned the link between family SES and authoritarian parenting, such that although family SES was negatively associated with authoritarian parenting regardless of the length of home quarantine, the strength of this association was much stronger for families with longer duration of quarantine than those with shorter duration of quarantine. The finding is consistent with prior studies showing that contextual stress may exacerbate the negative impact

of family economic hardship on child well-being via contributing to negative parenting (e.g., White, Liu, Nair & Tein, 2015).

Further, without interventions, longer home quarantine is generally associated with higher psychological distress (for a review, see Brooks et al., 2020). For families with young children, as the home quarantine extends, parents tend to report higher parenting stress related to children's increased behavioral and emotional difficulties (Zhang et al., 2021). In addition to psychological stress, the length of quarantine might also reflect other important information that merits consideration when interpreting the current results. First, in regions with higher severity of pandemic, much stricter government control measures and policies for lockdown and quarantine were implemented (Gan et al., 2020). As such, families with longer duration of mandatory home quarantine were likely living in higher risk regions. Second, despite the periodic government and community support in daily life supplies (e.g., food, water), as the home quarantine extended, many families might still face shortage of life resources that are essential for their effective coping, especially for those already living in poverty before outbreak of pandemic (Brooks et al., 2020; Gayer et al., 2020). Last, although the home quarantine requirement applied to everyone living in Hubei province, people varied considerably in their vulnerabilities to consequences of prolonged quarantine and in their capabilities of handling the prolonged quarantine (Gayer et al., 2020; McNeely, Schintler, & Stabile, 2020). For example, for disadvantaged populations (who were often low in SES) such as those living with mental or physical health issues before the outbreak of pandemic (Quittkat et al., 2020) and people living in houses with limited space (who were probably those in low SES), their quarantine life is likely to be much more challenging as the home quarantine extended. Taken altogether, it seems warranted to expect that as the home quarantine extends, the beneficial/protective effects of higher family SES (which is typically associated with more coping resources) in facilitating the successful navigation of life challenges during the challenging times (like the pandemic) are likely to be increasingly amplified. As such, it might not be difficult to understand that the strength of the link between family SES and authoritarian parenting was significantly stronger for families with longer duration of home quarantine than those with shorter duration of home quarantine.

In contrast to our prediction, the current results of multi-group structural equation modeling demonstrated that the tested model as a whole did not vary across regions with different levels of pandemic risk (i.e., high-risk region group versus low/medium-risk region group). Due to the timely control and various support measures implemented by the Chinese governments and Chinese people's complying with home quarantine rules, regions with different levels of pandemic risk within Hubei province might actually have limited differences in the stress that the pandemic risk brought to families. As compared to the more proximal and immediate home quarantine stress, the more distal regional pandemic risk (which had already effectively mitigated by the government pandemic-related measures) might have very minor effects in shaping the within-family dynamics (i.e., the links among family SES, parenting and child anxious symptoms in the present examination).

5.3. Implications for assisting families with young children during the COVID-19 pandemic

Our findings have important implications for the designs of more targeted and effective interventions to assist families to successfully cope with challenges during the COVID-19 pandemic. Under the lockdown, governments should provide support especially to those economically disadvantaged families with young children. Specifically, as the home quarantine extends, intervening family processes, such as providing subsidies to promote parental invest-

ment in resources for child play and facilitating more adaptive parenting style, are possible avenues to diminish the potential consequences of family economic hardship for young children's mental health. Tailored to the needs of parents and their young children during home quarantine, parental training and intervention programs via various online social medium can be offered by professionals to parents, particularly those families with low SES, such as E-guidance about parent-child interactions, teaching videos on games playing at home, online educational counseling and courses through TVs, smart phones, and computers. Notably, families living in regions with different levels of pandemic risk may all benefit, to some extent, from these support measures.

5.4. Limitation and future directions

Some limitations of the present study and related directions for future research should be noted. First, parents' mental health issues, especially parents' own anxious symptoms, were not assessed in our survey. Thus, we could not include them as critical covariates in analyses or even examine their more substantive roles in shaping children's anxious symptoms. However, prior research has indicated the important effects of parents' mental health issues in shaping the development of internalizing symptoms in childhood, including child anxiety disorders (Burstein, Ginsburg & Tein, 2010; Murray, Creswell & Cooper, 2009). In addition, in the present survey, young children's anxious symptoms were reported by their parents, but it should be acknowledged that parents' reports of child emotional symptoms might be affected by their own emotional status during the home quarantine due to pandemic, especially their own levels of anxiety (e.g., Niditch & Varela, 2011). Future research is thus warranted to test the potential effects of parents' mental health issues in the currently examined models. More direct assessments of young children's anxious symptoms with more objective methods also should be adopted in future examinations, such as online storytelling, drawing, and video observations.

Second, the sample size of the present study is large, but our data collection exclusively via online social media might contribute to some bias in the ultimate sample composition, which should limit the generalizability of our results. For example, although the E-links of anonymous questionnaires were well available through smart mobile phones and could be widely distributed across families with different levels of SES and living in different areas across the target province, data for some families still could not be effectively obtained due to various conditions, such as the lack of access to smart phones or Internet for that moment because of either extreme poverty or the accidental loss of electricity or cellular data signals. Third, this study was cross-sectional in design and the collected survey data are correlational in nature, precluding us from making any strong causal inferences. Relatedly, all constructs were assessed with self-report surveys. Thus, the currently identified effects might be inflated due to shared-informant and shared-method bias. Future research with multiple-method, multiple-informant, and longitudinal designs is therefore pressing.

Fourth, limited by scope, the current study only tested potential moderators that serve as risk factors and did not test the protective factors in the association between family SES and preschoolers' anxious symptoms under the pandemic lockdown. Future studies may benefit from further revealing the complexity inherent within the tested associations by considering various alternative risk factors and also resilience moderators (Masarik & Conger, 2017). Last, according to the work by Duane F. Alwin and others (e.g., Alwin, 2001; Alwin & Tufis, 2021; Park & Lau, 2016), SES also greatly shapes parents' child-rearing values and thus is associated with parenting priorities concerning child socialization (e.g., obedience versus autonomy). As such, in addition to the currently tested

authoritarian and authoritative parenting styles, parental childrearing values could be one of the critical, alternative mechanisms that are also implicated in the association between family SES and child psychopathology. For example, parental goals and values for child socialization that are shaped by family SES influence both parenting styles and parenting practices, which in turn influence child outcomes (Darling & Steinberg, 1993). We did not specifically assess parental childrearing values in the present survey, but we encourage future researchers to address the related intriguing questions.

6. Conclusion

The current study yielded evidence supporting the utility of FSM and FIM in a Chinese context during the COVID-19 pandemic by identifying the unique mediating roles of parental investment and parenting style in the link between family SES and preschoolers' anxious symptoms. Our results also extended prior research by showing that the length of home quarantine, as a proxy for quarantine stress, conditioned the link between family SES and authoritarian parenting such that although family SES was negatively associated with authoritarian parenting regardless of the length of quarantine, the strength of this association was much stronger for families with longer quarantine than for those with shorter quarantine. Results of multi-group analyses indicated that the tested model did not vary across regions with different levels of pandemic risk (i.e., high-risk versus low/medium-risk regions). Such findings have important practical implications for the designs of more targeted and effective interventions to assist families to cope with the challenges during the COVID-19 pandemic.

Data statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Ethical statement

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation [Guangzhou University, Guangdong Province, China] and with the Helsinki Declaration of 1975, as revised in 2000.

Disclosure

None.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.ecresq.2022.01.007](https://doi.org/10.1016/j.ecresq.2022.01.007).

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