

GRANDPARENT-GRANDCHILD RELATIONS IN CONTEMPORARY CHINESE
FAMILIES

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ABSTRACT

Chinese grandparents and grandchildren formed strong intergenerational connections rooted in the long Confucian ethics and patrilineal descent system. However, the rapid changes in contemporary Chinese society impacted the traditional family norms, shifting the family structure, relations, and women's status. The present dissertation explores the demographic influence on the Chinese grandparent-grandchild relationship and the grandparents' role in the parent-child relationship. Six hundred twenty-five Chinese adolescents reported their perceived parental control and relationship with grandparents. Path analysis and multiple group path models were employed to test for the effect of family demographics on the grandparent-grandchild relationship and gender differences in the first study. The findings revealed a negative association between the number of grandchildren and the father-side grandparent-grandchild relationship, a positive association between co-resident length and the grandparent-grandchild relationship, and a positive association between grandparents' educational level and their school involvement. In addition, the multiple-group models found that the gender of grandchildren moderated the demographic effects on the grandparent-grandchild relationship, including the effects of 1) paternal grandfathers' ages on paternal grandfather leisure activities, 2) maternal grandfather co-resident length on maternal grandfather contact and communication, and 3) maternal grandmothers' educational levels on maternal grandmother school involvement, which reflected the son-preference mindset of Chinese grandparents.

Informed by the reviewed literature, I proposed a cycle of parental control and adolescent anxiety in the second study. Based on the same sample, the study examined and confirmed the moderating role of grandparental involvement in the relationship between parental psychological control and adolescent school-related anxiety and stress. The moderation effects include: 1)

paternal grandfather leisure activities moderating the effect of paternal psychological control on adolescent stress of peer pressure, 2) paternal grandmother leisure activities moderating the effect of paternal psychological control on adolescent stress of peer pressure, 3) maternal grandfather school involvement moderating the effect of maternal psychological control on academic anxiety, 4) maternal grandfather emotional closeness moderating the effect of maternal psychological control on adolescent stress of school performance, 5) maternal grandfather leisure activities moderating the effect of maternal psychological control on adolescent stress of teacher interaction, 6) maternal grandmother leisure activities moderating the effect of maternal psychological control on adolescent stress of teacher interaction, and 7) maternal grandmother functional support and caretaking moderating the effect of maternal psychological control on adolescent stress of teacher interaction. Three-way interactions among parental psychological control, grandparent-grandchild relations, and gender were examined. Multiple-group models also identified the gender of grandchildren as a moderator in the intergenerational relations, which, again, implied the mindset of son-preference. Implications for understanding contemporary Chinese intergenerational relationships, future research directions, and policymaking promoting gender equity are discussed.

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This dissertation is dedicated to my grandparents.

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CHAPTER 1. INTRODUCTION

Grandparent-Grandchild Relations in Contemporary China

The long-lasting agricultural production and Confucian ethics, emphasizing filial responsibility, have formed a strong connection between Chinese grandparents and grandchildren. Driven by traditional filial responsibility and the contemporary petty-capitalist kinship, which is “organized around patri-corporations made up of a line of male agnates working and transmitting a body of productive property” (Davis & Harrell, 1993), many Chinese grandparents devote themselves to rearing the younger generation. However, the rapid social and political changes complicated the context of the grandparent-grandchild relationship in Chinese multigeneration families. According to the national census data, the percentage of families which consists of three generations gradually decreased in the past decades (Hu & Peng, 2014), but the traditional family norm still has its grasp upon Chinese families. The Sixth National Population Census of the People’s Republic of China showed that 20.27% of Chinese families consisted of three generations, and another 3% consisted of only grandparents and grandchildren without the middle generation (Hu & Peng, 2014). The present dissertation explores what demographic factors affect the relationship between grandparents and grandchildren in the quick-changing Chinese context.

Modern China witnessed a series of changes in women’s status, which may shape grandparental expectations on, attitudes toward, and way of interacting with their granddaughter. Under the traditional Confucianism doctrine, women’s roles were primarily kinship roles, and they were obligated to accord with the wishes and needs of closely-related men, fathers when young, husbands when married, and sons when widowed (Taylor & Choy, 2005). However, after the Chinese Communist Party took power, communist experiments from the mid-twentieth

century to the late 1970s and the post-Mao reform elevated women's social and family status by legislating against gender inequity by giving men and women equal rights in the 1954 and 1982 Constitutions "women have the same rights as men in all spheres of political, economic, cultural, and social life, including family life," and accepting women into areas that used to be dominated by men, including higher education, professional positions, and political activities (Attané, 2012; Davis & Harrell, 1993; Li, 2013; Yang et al., 1965). Despite the decades of women's movement in China, recent survey data still suggested gender gaps in socioeconomic status, including income, educational level, and labor force participation (Attané, 2012; Li, 2013). Women's inferior status may encourage the traditional mindset of son preference in the intergenerational relationship because, from parents' and grandparents' perspectives, investing in girls is less financially rewarding than in boys. Based on the present dissertation examines gender differences in the effects of demographic factors on the grandparent-grandchild relationship.

Grandparents' Role in Parent-Child Relations

Grandparental involvement was linked to various outcomes in children, adolescent, and young adults, including psychological well-being (Griggs et al., 2010), life satisfaction (Attar-Schwartz & Huri, 2019; Song et al., 2018), prosocial behavior (Attar-Schwartz & Khoury-Kassabri, 2016), educational attainment (Bol & Kalmijn, 2016; Møllegaard & Jæger, 2015; Zeng & Xie, 2014), and school engagement (Song et al., 2018; Yorgason et al., 2011). In the Chinese left-behind children population, whose parents have left their rural homes to work in economically developed cities, grandparents played protective roles against risk factors, preventing adolescent delinquency and school dropout (Ding et al., 2019; Liu, 2015; Song et al., 2018; Sun et al., 2017; Zeng & Xie, 2014; Zhao et al., 2016). However, there is a lack of

discussion on how grandparental involvement affects adolescents when their parents are around in the Chinese families.

Informed by the existing literature (e.g., Bruggen & Bogels, 2008; Luebbe et al., 2014), parents who perceive stress from the highly competitive social and cultural context may exert high levels of control on children and cause adolescent anxiety. The contemporary Chinese society is witnessing, as described by the recent media (Nast, 2021), a purposeless growing competition for various social resources, including education and work opportunities. This phenomenon has been termed with a buzzword borrowed from anthropology, *involution*. The idea of involution has been widely spread across Chinese social media. Many people, including elites with degrees from top universities and dazzling professional experiences, reveal feeling “anxious, stressed, overworked, and trapped in a status race” (Nast, 2021).

Chinese parents may translate their feeling of pressure and anxiety of *involution* to an intrusive and controlling parenting strategy. Empirical evidence has linked parental anxiety to harsh and intrusive parenting, which further contribute to adolescent anxiety, a common psychiatric disorder in children and adolescents (Barlow, 1988; Bruggen & Bogels, 2008, 2008; Dix, 1991; Luebbe et al., 2014). In China, the prevalence of anxiety disorders was 6.9%, slightly higher than the global average of 6.5% (Polanczyk et al., 2015; Xu et al., 2020). Anxiety in children and adolescents is associated with adverse outcomes in education, psychological well-being, and social adjustments (Siegel et al., 2009; Van Ameringen et al., 2003; Woodward & Fergusson, 2001). Studies also found that poor developmental outcomes in adolescents elevate parental anxiety (e.g., Ahmadzadeh et al., 2019; Lan, 2018; Nelson, 2010), which completes the circulation of anxiety and negative outcomes between the two generations. However, grandparents’ roles in parent-child relations are rarely examined. In the present dissertation, we

seek to provide empirical evidence demonstrating the grandparental role in parent-child relations in Chinese families.

There is a gap in existing literature in providing solid empirical evidence on the impact of demographic factors on the grandparent-grandchild relationship and grandparents' roles in the association of parental control and adolescent anxiety. Grounded in the intergenerational solidarity framework (Szydlik, 2012), the present dissertation features two related studies aiming at 1) examining the demographic predictors of grandparent-grandchild relations in contemporary Chinese multigeneration families with special attention to lineage and gender, and 2) examining grandparents' roles in the association between parental psychological control and adolescent anxiety.

CHAPTER 2. STUDY ONE
DEMOGRAPHIC PREDICTORS OF THE CONTEMPORARY CHINESE
GRANDPARENT-GRANDCHILD RELATIONS

Introduction

Theoretical Foundation: The Intergenerational Solidarity Framework

The solidarity paradigm has guided research on parent-child relations for decades (Szinovcz, 1998). Researchers have applied the concepts of the solidarity model to the study of grandparent-grandchild relations in the US since the early 1990s and later in some European countries, including Sweden, Denmark, Netherlands, and Belgium (Bengtson & Roberts, 1991; Silverstein et al., 1998; Szydlik, 2012). The early Intergenerational Solidarity Model borrows the concept of solidarity rather than the overarching framework of the parent-child solidarity and describes the grandparents-grandchild relationship with six dimensions: 1) affectual solidarity (the degree of emotional closeness), 2) consensual solidarity (the similarity in beliefs and values), 3) structural solidarity (factors enhancing or reducing the opportunity of social interaction), 4) associational solidarity (shared activities), 5) functional solidarity (the transferred help and assistance), and 6) normative solidarity (the perceptions of obligations and expectations). The core components of intergenerational solidarity were later reduced to three dimensions, affectual solidarity, associational solidarity, and functional solidarity, while dropping consensual and normative solidarities and considering structural solidarity along with needs of both parties as factors influencing the grandparent-grandchild relationship (Szydlik, 2012). The core dimensions of intergenerational solidarity are shaped by the interacting opportunity and need structure of both generations. Also, the opportunity and need structure of different generations may be intertwined. For example, Chinese grandparents reported that they

obtained a feeling of fulfillment by providing care and instrumental support to their grandchildren, in which case the needs of both generations are met (Yoon, 2005).

Recent developments of the solidarity framework make connections with the ecological systems perspectives (Szydlik, 2012). The core dimensions of intergenerational solidarity and the need and opportunity structures are influenced by the surrounding family context and the larger socio-cultural context, where culture and family status play a part in shaping the relations between grandparents and grandchildren (Szydlik, 2012). For example, family size and composition are very likely to affect the need and opportunity structures for both generations. As an element of socio-cultural context, political and economic regimes as well as social welfare shapes the family structure, kinship practice, and probably the relations of family members. For example, the economic reformation in the post-Mao era shaped the production mode of Chinese families and in turn slightly altered the kinship practice including promoting women's family status and opportunities of inheriting family properties (Davis & Harrell, 1993).

Opportunity structure and need structure of both grandparents and grandchildren account for the variation of the dimensions of intergenerational solidarity. Opportunity structure indicates the opportunities and resources for intergenerational solidarity. They enable, facilitate, hinder, or prevent interactions between grandparent and grandchild. For example, closer geographic distance enables grandparents to provide frequent care and daily assistance to their grandchildren; and larger geographical distance was associated with poor grandparent-grandchild relationship quality and low frequency of contact (Dunifon & Bajracharya, 2012; Hakoyama & MaloneBeach, 2013; Mueller & Elder, 2003).

The needs of both grandparents and grandchildren vary but have specific influences on the solidarity between them. In families where grandparents fill the parenting gap, children's

need of being cared for greatly shapes the intergenerational solidarity and changes the opportunity structure by prompting both parties to move closer to each other or even under the same roof. On the other hand, some senior people may need caring for and thus stay close to their descendants. Asian elders prefer to live with their children and grandchildren and consider it as a filial responsibility or obligation to support younger generations and see it as fulfillment in their post-retirement life (Zhu, 2016). With strong culturally based expectations, a certain level of grandparent caregiving is associated with positive psychological and physical well-being, in terms of lower-level depressive symptoms, anxiety, stress, and loneliness, among mainland Chinese grandparents and Chinese American grandparents (Tang et al., 2016; Xu, 2018).

An adapted version of Intergenerational Solidarity Framework is adopted to explain the grandparent-grandchild relationship in Chinese cultural context. According to the Chinese adapted framework, the grandparent-grandchild relationship comprises four dimensions: emotional closeness, financial support and caretaking, school involvement, and common activities. Emotional closeness mapped onto the affectual solidarity, while financial support and caretaking onto functional solidarity described in the original Intergenerational Solidarity Framework. Among the Chinese population, associational solidarity between grandparents and grandchildren was reflected by two separate dimensions, school involvement and leisure activities. The importance of grandparental school involvement in the contemporary Chinese society for adolescents facing keen competition for educational resources which made school involvement as significant as other major dimensions of intergenerational solidarity.

The Traditional Patrilineal Descent System in China

The two major types of descent systems, bilateral and unilineal descent, represent two different ways of how a newborn's family membership is assigned to a kin group (Ikels, 1998).

Traditional Chinese families practice the patrilineal descent system, a sub-type of unilineal descent, in which an individual is affiliated only with the set of kin on their father's side (Szinov  cz, 1998). The distinct terminology for paternal and maternal grandparents reflects the nuance of the grandparent-grandchild relationship in the patrilineal descent system (P. Chao, 1983; Chin et al., 1970; Ikels, 1998). The direct translations of the Chinese term of mother-side grandfather and grandmother are "outer grandfather (*wai-gong*)" and "outer grandmother (*wai-po*)", which potentially indicate that they are collateral relatives and less connected to their grandchildren compared with the father-side grandparents who are considered as immediate relatives. In the same fashion, the daughter's son or daughter is called the grandparents' "outer grandson (*wai-sun*)" or "outer granddaughter (*wai-sun-nv*)". The patrilineal descent system shapes both grandparents' and grandchildren's interpretation of their relations with the other party. Filial obligations have a stronger expectation for the younger generation to serve and support the father-side grandparents than the mother-side grandparents, while grandparents on the father's side correspondingly assume more responsibility of raising, educating, and supporting the younger generation.

The idea of "inner" and "outer" in the Chinese grandparent-grandchild relationship is an extension of the traditional Chinese marriage, through which the relations and obligations of both parties involved in the newly formed union are culturally and legally established. Traditional Chinese marriage grants the bride the membership of her husband's family while removing the membership of her birth family (Chao, 1983; Chin et al., 1970). A widespread Chinese adage describes married daughters as "spilt water", metaphorically suggesting that brides are cut off from their natal families and of no economic value to their birth parents (Zhang, 2009). Such conversion of family membership places women in a disadvantaged position in terms of family

status, power, and financial condition, forming a social norm that values boys more than girls. Grandparents influenced by the traditional social norm may treat their grandsons and granddaughters differently by concentrating more resources on boys than girls. Recent studies found that adolescent boys scored significantly higher in bonds and attachment with paternal grandparents (Liu, 2019; Liu & Chen, 2016). In addition, studies in rural Chinese regions showed that grandsons receive more resources from their paternal grandparents and develop a closer emotional bond with them (Liu, 2015, 2016). In addition to membership conversion, traditional marriages move brides' residence to estates of their husbands' clan, which gives paternal grandparents natural advantages in accessing their grandchildren over the children's maternal grandparents. Although traditional extended families are less favored in industrialized and urbanized regions, the number of children who live with paternal grandparents is still about twice as many as those who live with maternal grandmothers (Chen et al., 2011).

The traditional gender norm expects men to be the bread winner, which requires knowledge and training, while women engage in domestic work, such as weaving, cooking, laundry, and rearing children (Chao, 1983; Lamb, 2004; Lang, 1946). Davis and Harrell (1993) pointed out that the principal contribution of a married woman to the family is the children, preferably boys, that she bears and rears. Such gender expectation creates a gap in the resources and skills of grandfathers and grandmothers. For example, grandfathers possessing knowledge are more capable of helping with grandchildren's schoolwork, while grandmothers familiar with housework, such as cooking and laundry, are naturally better caretakers. Although the gender equity movement cast off the shackles on contemporary Chinese women to some extent, the gender difference in childrearing is still seen in Chinese families. Grandmothers were more

likely to engage in grandchild care at a higher intensity and longer duration than grandfathers (Zhao et al., 2021).

Modern Changes in Patrilineage and Kinship System

The social and cultural changes in China in recent decades have impacted the grandparent-grandchild relationship. Starting in the mid-twentieth century, Mao tried to replace traditional social and family structures deeply rooted in Confucianism within his communist ideals (Yang et al., 1965). Although the communist experiments on politics and economy shook the traditions, Confucianism and filial piety still considerably influenced Chinese families in the post-Mao era (Ikels, 2004). However, filial obligations have been recalibrated due to social and cultural changes. The national social security system shifts elder care from family-dependent to intergenerational independence and interdependence. The increasing household services, institutional care, and commercial elder-care insurance lifted the burden from individual families and redefined the filial obligation of the younger generation (Santos & Harrell, 2017). Covered by the modern pension system, senior citizens do not need to rely on their children and adult grandchildren to financially support their later life.

Changes in the status of women may lead to the diminishing of the gap in grandparental expectations between boys and girls. Communist experiments shook the traditional patriarchal family system, where a distributive and collaborative economy undermined the patriarchal authority (Santos & Harrell, 2017). In the Mao era, a series of political campaigns and legislations promoted women's social status by banning concubinage, child marriages, and arranged marriages (Guthrie, 2006). At the same time, the government encouraged women to engage in professional jobs that were only available to men and provided women access to

education and allowed them to participate in politics and other domains traditionally dominated by men (Pun, 2005; Yao, 1983).

Traditional Chinese kinship evolves to fit the contemporary petty-capitalist production to keep up with the post-Mao era's social and economic changes. The petty-capitalist kinship emphasizes the ties of contracts and market transactions, not only the family bloodline (Davis & Harrell, 1993). The changes in the kinship system generated new dynamics in women's position in households because the industrialization and urbanization of China opened doors for women to have their own careers, transiting from unpaid hands in the family to skilled wage-earning workers and even professionals in domains that used to be controlled by men, such as higher education, senior executive boards, and government officials. For example, women's average length of education raised from 4.7 years in 1990 to 8.8 years in 2010 (Attané, 2012). By securing financial capability and social power, contemporary Chinese women can be more independent than their ancestors.

In addition to the evolution of kinship, the modern inheritance law, the "one-child" population planning policy, and the government-encouraged gender equity in recent decades further elevated women's status (Mjelde-Mossey, 2007). Daughters in urban and rural families are considered equally reliable and filial as sons (Santos & Harrell, 2017). Gender equity in China may change grandparents' expectations of granddaughters since they now have equal rights to claim their share of the inheritance and equal obligation and capability to support the elders. Moreover, the "one-child" policy unintentionally strengthened the tie between married daughters and their birth parents (Zhang, 2009). However, despite the decades of women's movement in China, survey data still suggested gender gaps in socioeconomic status, including income, educational level, and labor force participation (Attané, 2012; Li, 2013). For example,

according to the 2010 national survey data, the average length of education for Chinese women was 8.8 years compared to 9.1 years for men; 73.6% of women were employed compared to 88.7% of men; and the average income for women was equal to 67.3% of that for men in urban areas and 56.0% in rural areas (Attané, 2012). Therefore, the changes in women's social and family position may redefine grandparent-granddaughter relations, probably grandparent-grandson relations as well, because daughters now share the same legal rights in inheritance, capabilities in supporting the elders, and access to social and financial power. On the other hand, the traditional patriarchal value still holds some of its influence on contemporary Chinese families and society, embodied in the son preference and other gender biases in the intergenerational relationship.

Family Demographics and Grandparent-Grandchild Relationship

The intergenerational solidarity framework granted a variety of demographic factors of grandparents, grandchildren, and family the theoretical foundation as determinants of the grandparent-grandchild relationship. The demographic determinants include family structure, the number of grandchildren, and the grandparents' educational levels. The traditional Chinese patrilineal descent system differentiates family roles, power, responsibilities, expectations on children, and domestic labor distribution by family members' genders and lineages, which makes genders of grandparents and grandchildren, as well as the gender of the middle generation that connects them essential in understanding the nuances of Chinese grandparent-grandchild relationship. In addition, the rapid social changes in recent decades, such as communist experiments, women's movements, economic reform and flourish, and the family planning policies, greatly influenced the dynamics of Chinese families and the members within. The

following paragraphs will review the theoretical and empirical foundation of how demographic factors shape the relationship between grandparents and grandchildren.

Family Structure and the Grandparent-Grandchild Relationship. Given limited resources, larger population results in smaller shares per capita. To explain the relationship between grandparental involvement and the number of grandchildren, we borrow the Parental Investment Theory presuming that investable parental resources are limited and a sizeable parental investment in one child largely decreases the parents' chances of investing in other offspring (Trivers, 1972, 1974). In the same fashion, the investable resource of grandparents, such as time, energy, and money, are limited, too. The key point is that the cost of grandparental investment is the grandparent's ability to invest in other offspring. Although grandparents may have their favorite grandchild, who is advantaged in competing for grandparental investment, the larger number of grandchildren in total means a smaller portion received per child.

Grandparent-grandchild co-residence, generally defined as the two generations sharing the same residence, will no doubt maximize the opportunity for interactions between the two generations. Co-resident grandparents also enrich family resources by increasing total family income, lowering the dependent-to-earner ratio, taking care of housework, and filling the parenting gap (Biblarz et al., 2009; Tan et al., 2010). A study in Taiwan found that grandparent-grandchild co-residence was associated with higher academic achievement in adolescents (Pong & Chen, 2010). However, the researchers treated co-residence as a dichotomous variable with only two options, co-residence or not. We see no discussion on the length of co-residence of grandparents and grandchildren in the reviewed literature.

Grandparent's Education and School Involvement. Education has long been considered an essential social capital of an individual in multiple sociocultural contexts. Parental

education level has been associated with educational aspirations, occupational aspirations, occupational prestige, education level, and motivation to pursue higher education achievement in adolescence and early adulthood (Dubow et al., 2009; Kodde & Ritzen, 1988; Schlechter & Milevsky, 2010). Studies also identified similar effects of grandparental education level on children and adolescent outcomes, including school achievements, linguistic ability, and the demand for higher education (Modin et al., 2013; Pfeffer, 2014). Yet, other studies testing the effect of grandparental education level on adolescents returned null findings (e.g., Bol & Kalmijn, 2016). The inconsistent findings may result from overlooking some vital variations of individual and family demographics or the effects of gender and lineage in the specific cultural context.

Gender and Grandparent-Grandchild Relationship. Gender affects the grandparent-grandchild relationship in three ways, the gender of the grandparent, the gender of the grandchild, and the gender of the parent. First, empirical studies suggested that grandmothers were more engaged in interactions with their grandchildren and developed closer relationships with them (Hodgson, 1992; Kennedy, 1992; Roberto & Stroes, 1992; Uhlenberg & Hammill, 1998; Zhao et al., 2021). Gender-associated family roles were believed to be the source of this phenomenon, where grandmothers were more characterized as family caretakers, while outdoor, craft, and community activities were more likely to be associated with grandfathers (Kennedy, 1992). Uhlenberg and Hammill (1998) proposed that grandmothers assisted their spouses in maintaining kinship ties because widowed, separated, remarried, and divorced grandfathers were found to be less likely to have frequent contact with their grandchildren compared to married ones, while the effect of marital status is considerably smaller for grandmothers.

Second, grandparents are sometimes biased in favor of a particular gender in their grandchildren. From an evolutionary perspective, Trivers and Willard (1973) hypothesized that biasing investment toward male or female offspring may increase the probability of continuing the bloodline. So, offspring of a particular gender may find favor with their parents and grandparents. However, the literature provides contradictory evidence of the sex-biased grandparental investment. For example, grandsons and granddaughters equally participated in activities with their grandparents (Eisenberg, 1988). Thomas (1988) reported no significant difference in grandparent satisfaction reported by grandsons and granddaughters. On the other hand, grandparental involvement was more influential within the same-sex grandparent-grandchild dyads (V. L. Bengtson & Robertson, 1985). Block (2000) proposed that the clash between values created by the women's movement in the 1960s and 1970s and traditional gender norms resulted in less rigid gender expectations in the sample grandparents.

The unbalanced sex ratio at birth (SRB) may also imply the widespread son-preference mindset. The normal range of SRB is between 103 to 107 male births to 100 female births, while China's SRB first became abnormal in 1982 at a ratio of 108.47 male to female births (M. Tang, 2021). The ratio peaked at 121.18 in 2004 and stayed around 120 for some years until it began to decline from 120.56 in 2008 to 110.14 in 2019 (M. Tang, 2021). Scholars believe that the high SRB in China results from a combination of the deeply rooted son-preference mindset, easy access to sex-selective abortion, the one-child policy, and discrimination against and abuses of women (Chi et al., 2013).

Third, the gender of the middle generation determines the lineage in the grandparent-grandchild relationship in families practicing unilineal descent systems. Block (2000) suggested that the influence of individual's gender on parental behaviors extends to the relationship

between their parents and offspring. Eisenberg (1988) found that grandchildren contacted their maternal grandparents more frequently than their paternal grandparents and reported closer maternal-grandparent-grandchild relationships. Uhlenberg and Hammill (1998) reported similar findings and highlighted the role of the mother in the intergenerational relationship.

Grandchildren were also more likely to live closer to their maternal grandparents (Eisenberg, 1988; Hodgson, 1992). Parents are generally considered the bridge generation in the grandparent-grandchild relationship, and females are more involved in family relations (Block, 2000). Therefore, in Western families, the connection between grandparents and grandchildren seems to be stronger through the children's mother. However, the pattern may not hold in societies practicing the patrilineal descent system, such as China, where family continuation is carried through the male offspring.

The Present Study

Although grandparental effects on grandchildren's outcomes are examined in multiple contexts, the existing literature contains some inconsistent findings. For example, Chiang and Park (2015) found that, after controlling for parents' education, the effect of grandparents' years of schooling on grandchildren's high school attendance was tenuous, while a European study found grandparents' cultural capital, including their educational attainment, newspaper subscription, and participation in classes or courses, increase the likelihood of their grandchildren attending secondary education (Møllegaard & Jæger, 2015). Scholars suspected that such opposite findings may imply the demographic and contextual influence on the association between grandparenting and adolescent outcomes, and found the educational level of co-resident grandparents had a direct positive effect on their grandchildren's educational attainment with a similar effect size as that of parental education, while, in contrast, no

significant effect was found among non-co-resident grandparents (Zeng & Xie, 2014). The series of empirical findings highlighted the importance of the context and family demographics to which intergenerational interactions are exposed. Meanwhile, some questions emerge, what is the mechanism of the demographic effects? Does the relationship between grandparents and grandchildren vary in family and social contexts?

In a patriarchal society, it is theoretically plausible that grandparent grandchildren relations vary by children's gender. But it remains uncertain whether the traditional inequity between boys and girls generated in the traditional patriarchal society still grasps contemporary Chinese grandparents' mindset. In the intergenerational relationship context, the question about the mechanism of how such gender inequity affect the grandparent-grandchild relationship remains to be explored. Will grandparents treat their grandsons and granddaughters differently, or boys and girls react differently in intergenerational relations to contextual influences in the patrilineal kinship system?

The first study has two goals, first, to examine the relations between demographic factors (including the number of grandchildren, grandparent-grandchild co-residence length, as well as grandparents' educational level) and the grandparent-grandchild relationship; second, to examine whether the demographic influences vary across grandsons and granddaughters. Informed by the overarching intergenerational solidarity framework and the reviewed literature, we hypothesize that 1) a larger number of grandchildren negatively predicts the grandparent-grandchild relationship in general; 2) the length of grandparent and grandchild living in the same household positively predicts their relations in general; 3) higher educational level of grandparents predicts higher school involvement; 4) grandparents favor boys rather than girls in two ways, involving more frequently in their grandsons' affairs and prioritize their investments in boys.

Method

Sample

Participants ($n = 625$) were recruited from four high schools located in an inland prefecture-level city in northern China. The city has three districts that are considered the central urban area, holding a population of 941,000. The total population was over 9 million, including all the outskirts and rural districts attached (City Bureau of Statistics, 2012). All schools were located at the edge of the central urban area and enrolled students from both the urban districts and the outskirts. The head teachers of classrooms helped organize the participants and distribute the study materials. Parental consent and participants' assent were collected.

Among the adolescent participants, 53.3% ($n=333$) were female and 46.6% ($n=291$) were male. Demographic information of the participants, including age, home location, number of children in the household, and number of grandchildren of their grandparents on both paternal and maternal side, is reported in Table 1. Ages, educational level, and co-residence length of participants' grandparents were presented in Table 2, including the number of deceased grandparents. In order to eliminate the influence of the time point of the death of grandparents, the analyses only included data from living grandparents.

Measures

Family demographics. Family demographics include the number of grandchildren of participants' paternal grandparents, the number of grandchildren of their maternal grandparents, and whether the participants lived with their grandparents during different periods.

The number of grandchildren. The number of grandchildren of their paternal and maternal grandparents were recorded on 5-point Likert scale, with possible options including 1 as "one or two", 2 as "three", 3 as "four", 4 as "five", and 5 as "six or more".

Grandparent-grandchild co-residence time. The variable on living with grandparents was recorded on a checklist including 5 stages of participant's life: before kindergarten, kindergarten, elementary school, junior high school, and high school till now. Participants were instructed to check the corresponding box for each grandparent if they lived together with the grandparent during one or multiple stages listed above. The checklist was recoded into twenty dichotomous variables, five for each grandparent. The dichotomous variables were whether the participants lived with each of their four grandparents during the stages listed above, with 0 standing for unchecked and 1 standing for checked. The dichotomous variables were then transformed into four ordinal variables by adding up the five dichotomous variables for each grandparent. The results, ranging from 0 to 5 indicate how many stages the participants lived together with each of their grandparents. The four ordinal variables were used in the data analysis.

Demographics of grandparents. Demographic variables of grandparents included education level, age, and health condition. The education levels of grandparents were recorded on a 4-point Likert scale with possible options including 1 as "elementary school or lower", 2 as "junior high school", 3 as "high school", and 4 as "college, some college, or above". Grandparents' age was recorded on a five-point Likert scale with possible options including 1 as "65 years old or under", 2 as "66-70 years old", 3 as "70-75 years old", 4 as "76-79 years old", and 5 as "80 years old or above". Grandparents of different lineages and genders were recorded as different variables, for example, the education levels of paternal grandfather and grandmother, as well as maternal grandfather and grandmother were recorded as four separate variables.

Contact and communication between grandparents and grandchildren. Two items were developed to assess the face-to-face contact, "I met my (target grandparent) over the past year", and remote communication, "I talked to my (target grandparent) over the phone or other

media over the past year”, between adolescents and their four grandparents of different lineages and genders. These items were designed to reflect the opportunity structure of intergenerational solidarity. Five-point Likert scales, ranging from “1 = never” to “5 = all the time”, were used to record participants’ frequency of contact and communication with their four grandparents.

Grandparent-grandchild relationship. The relations of grandparents and grandchildren were measured using the Chinese Grandparent-Grandchild Relationship Scale (Duan et al., in prep). The scale covers four dimensions of grandparent-grandchild relationship, including school involvement, leisure activities, financial support and caretaking, and emotional closeness (see below for sample questions). Participants were instructed to report their relationship with each of their four grandparents, i.e., paternal grandfather and grandmother, and maternal grandfather and grandmother. The scale was designed and applied in simplified Chinese. The Cronbach’s alphas of the subscales ranged from .63 to .91, indicating acceptable to excellent internal consistency (see Table 2.3 and 2.4).

School involvement. Grandparental school involvement was measured with 4 items (e.g., “My (target grandparent) helps me with my homework or other academic tasks”). Participants reported their responses on a five-point Likert scale, ranging from “1 = never” to “5 = all the time”.

Leisure activities. The leisure activities participated by grandparents and grandchildren jointly were measured with 4 items (e.g., “I watch TV or movies with my (target grandparent)”). Participants reported their responses on a five-point Likert scale, ranging from “1 = never” to “5 = all the time”.

Financial support and caretaking. Financial support received from grandparents and grandparental caretaking behaviors were measured with 3 items (e.g., “My (target grandparent)

buys me things that I want or need”). Participants reported their responses on a five-point Likert scale, ranging from “1 = never” to “5 = all the time”.

Emotional closeness. The intergenerational emotional closeness between grandparents and grandchildren were measured with 5 items (e.g., “To what degree can you depend on your (target grandparent) when you need them?”). Participants reported their responses on a five-point Likert scale, ranging from “1 = very low” to “5 = very high”.

Analytic Strategy

To rule out the influence of the bias caused by the decease of grandparents, we recoded all responses on the relationships between participants and deceased grandparents into -99, representing structurally missing data (see Table 2.2 for the number of deceased grandparents). For example, if a participant reports his/her paternal grandfather deceased, items reflecting his relationship with his paternal grandfather would be recoded into -99 and treated as structurally missing data in the following analyses.

Mplus 8.3 (Muthén & Muthén, 2017) was used to fit models to the data. Second-order confirmatory factor analyses were performed to examine the factorial validity of the Chinese Grandparent-Grandchild Relationship Scale on paternal and maternal grandparents. Each model consisted of eight first-order factors, including school involvement, leisure activities, functional support and caretaking, and emotional closeness for grandfathers and grandmothers. Second-order factors were the grandfather-grandchild relationship and the grandmother-grandchild relationship. Non-independence in the data was addressed by allowing for covariances between the variables in the model. The first indicator of each factor was fixed at one. A combination of CFI and TLI above .90 and RMSEA under .08 was used as the criterion for good model fit (Hu & Bentler, 1998, 1999). Preliminary analyses also included the bivariate correlations of

demographic variables and domains of the grandparent-grandchild relationship, group comparisons on grandparent demographics, and mean comparisons on domains of the grandparent-grandchild relationship.

We employed path analysis and multiple group path analysis to test the demographic effects on the grandparent-grandchild relationship and the moderating effect of grandchildren's gender. Domains of the grandparent-grandchild relationship were regressed on family and grandparent demographics. In multiple group models, gender of adolescents was used as a grouping variable. Wald tests were used to test the differences of the effect sizes between male and female groups. A significant Wald test suggests statistically meaningful difference in the test coefficients.

Results

Preliminary Analyses

Crosstabulation and chi-square tests revealed that the number of grandmothers with elementary school or lower educational level is larger than the number of grandfathers of the same educational level, while the number of grandmothers with higher educational levels are smaller than grandfathers ($\chi^2(6) = 84.49, p < .01$), which suggests, in general, grandmothers tend to have lower educational level than grandfathers. Similarly, the number of participants who had never lived with their maternal grandparents was larger than the number of those who had never lived with their paternal grandparents, while the number of participants who had lived with their paternal grandparents for at least two stages was larger than the number of those who lived with their maternal grandparents ($\chi^2(15) = 217.05, p < .01$). The differences suggested that participants were more likely to live with their paternal grandparents rather than maternal grandparents. However, no significant difference was found in the age distribution of

grandparents ($\chi^2(12) = 19.51, p = .08$). We also compared the level of each domain of the grandparent-grandchild relationship across four grandparents - paternal grandfather and grandmother, and maternal grandfather and grandmother (see Figure 2.1). In general, grandparents on the father's side are more involved in the interactions with their grandchildren.

Second-order confirmatory factor analysis models demonstrated good psychometric properties of the Chinese Grandparent-Grandchild Relationship Scale. The model fit indices showed that the two models fitted well into the data (paternal grandparent model: $\chi^2(420) = 931.98$, RMSEA (90% C.I.) = .048 (.043 - .052), CFI = .96, TLI = .95; maternal grandparent model: $\chi^2(420) = 893.85$, RMSEA (90% C.I.) = .046 (.042 - .050), CFI = .97, TLI = .96).

Effects of Demographics on Chinese Grandparent-Grandchild Relations

Number of grandchildren. In the path model for paternal grandparents (displayed in Figure 2.2, model fit: $\chi^2(40) = 59.25$, RMSEA (90% C.I.) = .043 (.016 - .065), CFI = .99, TLI = .98), the number of paternal grandparents' grandchildren was found to be a significant negative predictor of various domains of father-side grandparent-grandchild relationship. The larger number of grandchildren of paternal grandparents was associated with lower contact and communication, school involvement, functional support and caretaking of both paternal grandfather and grandmother. However, the result from the structural equation model (displayed in Figure 2.3, model fit: $\chi^2(40) = 52.37$, RMSEA (90% C.I.) = .036 (.000 - .061), CFI = 1.00, TLI = .98) found no significant effect of the number of maternal grandparents' grandchildren on grandchildren's relations with their maternal grandparents.

Co-residence time. For grandparents on both paternal and maternal side, co-residence time of grandparents and grandchildren was found to be a vital factor predicting positive grandparent-grandchild relations in most domains. Results of the model displayed in Figure 2.2

found that co-residence time of grandchildren and their paternal grandfather predicted positive paternal grandfather contact and communication, school involvement, leisure activities, functional support and caretaking, and emotional closeness between them. The same model also found that the co-residence time of the participants and their paternal grandmother predicted positive paternal grandmother contact and communication, school involvement, leisure activities, functional support and caretaking, and emotional closeness between them.

The path model displayed in Figure 2.3 discovered similar effects in the intergenerational relationship with maternal grandparents. Co-residence time of grandchildren and their maternal grandfather positively predicted maternal grandfather contact and communication, school involvement, leisure activities, functional support and caretaking, and emotional closeness. In addition, co-residence time of participants and their maternal grandmother contributed to positive intergenerational relationship in terms of maternal grandmother contact and communication, school involvement, leisure activities, functional support and caretaking, and emotional closeness.

Education levels of Grandparents. Education levels of grandparents were found to associate with the degree to which the corresponding grandparent was involved in their grandchildren's schoolwork (see Figure 2.2). The education levels of paternal grandfather predicted increased school involvement. The education level of parental grandmother also predicted positive school involvement. On the maternal side (see Figure 2.3), education level of maternal grandfather predicted positive school involvement. However, no significant association was found between maternal grandmother's education level and their school involvement in their grandchildren.

Gender Differences in Grandparent-Grandchild Relationship

The correlation analyses and path models showed that the perceived grandparent-grandchild relationship differed between grandsons and granddaughters in many domains. Females tend to report lower paternal grandfather school involvement, leisure activities, functional support and caretaking, maternal grandfather school involvement, and emotional closeness with all four grandparents (see Table 2.3 & 2.4).

Multiple group path analyses identified gender as a significant moderator in some demographic effects on the grandparent-grandchild relationship. The Wald's test revealed significant differences in the effects of paternal grandfathers' age on shared leisure activities between grandsons and granddaughters, where paternal grandfathers' age significantly predicted less shared leisure activities in the male adolescents ($\beta = -.09, p = .03$), however the effect of age on shared leisure activities was not statistically significant in the female adolescents ($\beta = .04, p = .41$; see Figure 2.4).

The effects of co-residence time with maternal grandfather significantly predicted frequent contact and communication in both grandsons and granddaughters, but the effect size was significantly larger in the female adolescents ($\beta = .33, p < .001$) than that in the males ($\beta = .12, p = .04$) according to the Wald test (see Figure 2.5).

As stated above, no significant association was found between maternal grandmother's education level and their school involvement in their grandchildren. However, the multiple group path analysis and Wald test revealed a positive effect of maternal grandparents' education level on their school involvement in their granddaughters ($\beta = .08, p = .02$). On the other hand, the effect of maternal grandmothers' education levels on school involvement was not significant in

male adolescents ($\beta = -.04, p = .41$), where the Wald test indicated a significant difference in the effect sizes (see Figure 2.6).

Discussion

The present study examined the demographic influences on aspects of the perceived grandparent-grandchild relationship among Chinese adolescents. The number of grandchildren and co-residence time are the two most influential family demographics in terms of their effect sizes and variety of grandparent-grandchild relationship aspects. Moreover, these two demographic factors affect intergenerational relations in different directions.

The negative effects of the number of grandchildren on grandparent-grandchild relationship supported our adaptation of Parental Investment Theory to the grandparenting context. The present finding is consistent with existing literature suggesting that the likelihood of frequent intergenerational contact decreases as the number of grandchildren increases (Uhlenberg & Hammill, 1998). Similar to parental investment, grandparents' investable resources are limited. Investing in any one of their grandchildren diminishes grandparents' capability to invest in other grandchildren. In other words, grandparents need to spend their time, energy, and even money if they would like to engage in activities with grandchildren, for example, maintaining frequent contact and communication with their grandchildren, attending school activities, reviewing grandchildren's homework, or simply buying things their grandchildren want or need. The amount of time, energy, money, and other resources available to the grandparent decides whether such grandparental behaviors can be performed.

Co-resident grandparents can transfer their investment to the younger generation more efficiently. Not all grandparental investment is received by grandchildren directly. "Maintenance fees" occurs in the transference. The cause of "maintenance fees" can be explained by the

opportunity structure, described by Szydlik (2012) as the “opportunities or resources for solidarity ... (which) enable, promote, hinder or prevent social interaction”. Szydlik (2012) took close geographic proximity as an example of opportunity structure enabling the interaction between generations. On the other hand, grandparents need to make extra effort to make the grandparent-grandchild interaction happen if the geographic distance between them is long. A long distance between the two generations prevents some grandparent-grandchild interactions from happening and also consumes extra time, money, and energy to close the geographic gap and enable intergenerational interactions. In addition to geographic distance, some current social factors or movements may become opportunity structures generating the “maintenance fees” in the grandparent-grandchild interaction, such as the contemporary Chinese “Zero Covid” policy restricting interpersonal interactions (Wang, 2022). Therefore, with minimized geographical barriers, co-resident grandparents are capable of involving more in their grandchildren’s affairs and are more willing to do so.

Tested in the present study, the co-residence time of grandparents and grandchildren seems to be the most influential demographic factor regarding the wide range of effects on the intergenerational relationship with grandparents of all lineages and gender. The positive associations between the co-residence time and adolescent-report grandparent-grandchild relationship supported the Intergenerational Solidarity Framework proposing that the quality of the grandparent-grandchild relationship depends on feelings and behaviors that connect the two parties (V. L. Bengtson & Roberts, 1991; Szydlik, 2012). In addition, the finding supported our hypothesis that household composition is an opportunity structure in intergenerational solidarity, where co-residence enables the happening of some interactions between grandparents and grandchildren and removes the barrier that hinders or prevents some other interactions.

Sharing the same residence minimizes the geographical distance, an obstacle to the interactions between grandparents and grandchildren. The geographical distance affects the frequency, quality, and satisfaction of interactions (Bangerter & Waldron, 2014; Hakoyama & MaloneBeach, 2013; Taylor et al., 2005; Uhlenberg & Hammill, 1998). A long distance between grandparents and grandchildren requires the extra effort of at least one generation if the interaction is to occur. Many grandparental behaviors measured in the present study cannot happen unless the two generations are physically together, such as cooking for grandchildren and shopping together. Supposing this type of joint activity is to occur, at least one party of the intergenerational relationship must travel and physically rendezvous with the other, which often requires money and energy. The increased money and energy consumption may dampen the enthusiasm for grandparent-grandchild interactions because the visible rewards do not match the increased efforts.

The positive relations between paternal grandparents' and maternal grandfathers' education levels and perceived school involvement in adolescents revealed in our path analysis suggested that grandparental resource is not unidimensional; instead, it consists of social capital in various categories. The present finding echoes previous findings in many contexts other than mainland Chinese families, including Sweden, the United States, and Taiwan (Chiang & Park, 2015; Modin et al., 2013; Møllegaard & Jæger, 2015; Pfeffer, 2014). Well-educated grandparents possess more social and cultural capital, which enables them to engage in various school-related activities (Chiang & Park, 2015). For example, educated grandparents may better understand the schooling process and have elevated social networking skill to contact a school personnel. In addition, education is an essential indicator of an individual's social class (Hertel & Groh-Samberg, 2014). Due to their well-established social connections, educated grandparents in

higher social classes can easily acquire external support to meet their grandchildren's education and schooling needs.

In addition to possessing abundant social and cultural resources, educated grandparents may care more about and be more willing to invest in their grandchildren's education and schooling. Lareau (1989) argued that educated parents tend to involve more with their children. The present findings imply that Lareau's argument is also applicable to grandparental involvement. Educated grandparents who talk to their grandchildren or engage in their grandchildren's activities, especially schooling, are capable and more likely to convey a message of the importance of schooling and education, which creates constraints to influence children's behaviors. First, educated grandparents, as well as educated parents, understand the benefits of education for the younger generation. However, the rewards of education are not always monetary or instrumental. Besides family expenditure, children's and adolescents' education diverts the young labor force from home and workplaces to classrooms, which may damage family income. In addition, the rewards of education are usually delayed. Seeing little chance of instant reward and the risk of damaging family income, poorly educated grandparents are less likely to have high motivation to invest in their grandchildren's education.

Second, social, political, and cultural movements in recent history shaped grandparents' attitudes toward education. According to their grandchildren's report, the majority of sampled grandparents were born in the mid-1940s to early 1950s. During their childhood and adolescence, the Chinese education system was devastated by the Second Sino-Japanese War (1937-1945), the Chinese Civil War (1946-1949), the Anti-Rightist Campaign (1957-1959), and the Great Famine (1959-1961) resulted from the Great Leap Forward movement (Dikötter, 2010; Fairbank, 1987; Wang, 2020). The contempt for education in the Mao era reached its peak during

the Cultural Revolution, formally known as the Great Proletarian Cultural Revolution (1966-1976), during which the educated were persecuted, and the schooling system was paralyzed (Dikötter, 2017; Fairbank, 1987; King, 2010). In this historical context, poorly educated grandparents are more likely to be affected by the Maoist propaganda and to form an ideology of anti-intellectualism. However, the relatively few educated people less affected by the propaganda may treasure their education and knowledge and seek to pass it on to the next generation.

We noticed the positive association between grandparents' education level and school involvement only existed in paternal grandparents and maternal grandfather. There is no significant effect of maternal grandmothers' education level on school involvement. In the existing literature, whether effects of grandparent education level differ for the paternal and the maternal lineage is still a debatable question. Bol and Kalmijn (2016) found that both paternal and maternal grandparents' education level positively affect their school involvement. However, in some other studies, such positive effects were only found in the paternal lineage (e.g., Chan & Boliver, 2013; Hertel & Groh-Samberg, 2014). The present finding concerns both lineage differences and gender roles in grandparenting. For example, we noticed that, in the present sample, grandmothers had lower educational levels than grandfathers. Meanwhile, as outer grandparents in the patrilineal descent system, the connection between maternal grandparents and their grandchildren is naturally weakened. Combining the two facts may cause a general withdrawal of maternal grandparents from involvement in their grandchildren's education.

Investing in one's sons' children is economically rational for grandparents. Although the current inheritance laws in China protects the equal right of both male and female offspring, the traditional custom only allows male offspring to inherit family estate (Chao, 1983; Che, 1979; Davis & Harrell, 1993). In addition, males are more financially privileged than females in

patriarchal societies, which ensures their financial capability to support the elders. Report showed that, in contemporary rural China, the financial support received by parents from their married children is significantly affected by their children's gender (Li et al., 2004). In this case, grandparents make them useful to the family by investing their time and energy in grandchild-rearing in exchange for rightfully depending on their adult, more likely on male offspring.

The result showed gender is associated with many domains of grandparent-grandchild relationship. However, moderating effect of gender appears to be less strong. The present finding reinforced Liu and Chen's (2016) claim about the mindset of son-preference in Chinese context. The present finding revealed that the effect sizes of maternal grandparent co-resident length on their frequency of communication and contact were stronger in females than in males. The finding may imply that girls must stay in the same household with their maternal grandfather to have frequent intergenerational interaction. However, the necessity of staying in the same household for frequent interaction is weaker for boys. On the other hand, well-educated maternal grandmothers are more likely to involve in their granddaughters' schooling. In contrast, maternal grandmothers may be involved in their grandsons' schooling, no matter what education they have. A possible explanation for this finding is that maternal grandmothers, especially less educated ones, saw education as more important in males. Only well-educated maternal grandmothers tend to have a similar level of school involvement with their grandsons' and granddaughters' education. These findings imply that the traditional Chinese gender bias still influences sampled grandparents' behaviors favoring male offspring than female, which is consistent with the existing finding in Chinese 7th and 8th graders (Liu & Chen, 2016). Although, as reviewed above, China has witnessed an improvement in women's social, economic, and

family status, the present finding implies that the son preference mindset still holds its place in contemporary Chinese grandparents.

Despite modern China's social and cultural changes, several cultural aspects have been retained in contemporary Chinese families that may provide protection and support for family members. One such aspect is the emphasis on family harmony and cohesion. Chinese culture is generally considered collective because of the strong emphasis on maintaining harmonious relationships within the family and the high value of the family goal (Triandis, 2019). A Hong Kong study suggested that family harmony, happiness, and health are achieved through a set of attitudes such as communicative, respectful, and caring (Lam et al., 2012). This sense of family harmony and cohesion can be a powerful source of support and protection for grandparents and grandchildren in Chinese families.

Another cultural aspect that may be protective for contemporary Chinese families is the high value of education. Education is a major pathway to individuals' and families' upward mobility (Huang & Gove, 2015). Therefore, parents and grandparents may prioritize younger generations' education above many other things, which creates a strong sense of collective motivation and determination within families.

Limitations and Future Directions

There are a few limitations in the present study, which future research should pay attention to. The present data did not capture any information about the birth order of participating adolescents. More than 80% of the participants reported having siblings, but no information about their birth order was collected. Moreover, the birth order of their parents is unknown. Empirical evidence and theoretical frameworks suggested the influence of birth order on the parent-child relationship, as well as on children's outcomes (Adams, 1972; Price, 2008;

Salmon, 2003). For example, firstborn children tend to receive more parental attention than their younger siblings at the same age (Price, 2008). Lower-birth-order children were also found to be more likely to have higher educational attainment, greater earnings, and fewer problematic behaviors, in terms of substance use and sexual activities (Argys et al., 2006; Black et al., 2005). Scholars argued that firstborn children are more supervised by their parents, which results in the difference in behavioral outcomes between firstborns and their later-born siblings (Averett et al., 2011). From an economic perspective, firstborns were the only child of the family for the first few years of life, so they enjoyed all family resources and attention with no other competitor until the birth of their first siblings (Hanushek, 1992; Lindert, 1977). In the context of intergenerational relationships, grandparent-grandchild interactions may be affected by the birth order of both grandchildren and their parents, the gatekeepers. Future discussions on grandparental involvement should consider birth order.

Second, the present study confirmed the positive association between co-resident length and grandparent-grandchild relationship in various aspects. However, it is still unclear which period of co-residency matters the most. The form of grandparent-grandchild interactions, as well as the grandparents' role, shifts along with the children's growth, while the interactions and roles affect intergenerational relationships in different ways (Taylor et al., 2005). Future studies could inspect the grandparent-grandchild relationship from a longitudinal perspective and integrate the relationship with grandchildren's needs at various developmental stages.

Lastly, limited information on the history of grandparent-grandchild interaction in the dataset makes it hard to tell when their late grandparents exited the participants' lives. In the present study, all responses related to the late grandparents are treated as structural missing data due to data limitations. Future studies can examine the grandparent-grandchild relationship from

a longitudinal perspective and consider the impacts of life events, such as changes in residential status, family members and relations, and family socioeconomic status.

Despite these limitations, this study makes a few important contributions to understanding grandparent-grandchild relations in contemporary Chinese families. First, the present study confirmed the effects of the number of grandchildren, co-residence time, and educational levels of grandparents on the grandparent-grandchild relationship. Second, the gender of grandchildren was found to moderate some demographic effects, suggesting that the son-preference mindset remains somewhat influential among Chinese grandparents. Findings from this study provide empirical rationales for implicating the Intergenerational Solidarity Framework in the Chinese population and inform future studies of important demographic determinators of the grandparent-grandchild relationship. Future studies on the Chinese grandparent-grandchild relationship should take these demographic factors into consideration, such as treating them as control or grouping variables.

CHAPTER 3. STUDY TWO

GRANDPARENTS' ROLES IN THE RELATION OF PARENTAL PSYCHOLOGICAL CONTROL AND ADOLESCENT ANXIETY

Introduction

Parental Psychological Control and Adolescent Outcomes

Psychological control refers to parental behaviors that attempt to control children's activities through a variety of autonomy-inhibiting socialization techniques that negatively influence children's psychological world, such as love withdrawal, guilt induction, and intrusiveness (Barber, 1996; Smetana & Daddis, 2002). Self-determination theory (SDT) indicates that individuals tend to explore the environment, be curious, and pursue inherently enjoyable activities. However, not all human activities are inherently enjoyable and interesting. Intrinsically motivated and well-internalized activities are autonomously regulated. In contrast, other activities that are not so pleasant are driven by controlled motivation, with which people's behavior is guided by external pressure, obligation, and deadlines. SDT assumes that the need for autonomy - people naturally desire to choose their behavior freely and volitionally - is universal. Intrusive parental psychological control deprives children's autonomy and leads to an internal compulsion in children to engage in requested activities, which is hypothesized to activate internal pressure and contribute to maladaptive patterns of development in children (Soenens & Vansteenkiste, 2010).

Empirical studies have associated parental psychological control with adolescent maladjustment in various domains. Longitudinal evidence shows that high levels of both paternal and maternal psychological control were associated with poorer psychological well-being in Hong Kong adolescents at a later time, in terms of decreasing their life satisfaction, self-esteem,

sense of hope, and sense of control over their lives (Shek, 2007). Adolescents' educational outcomes have been found to be negatively related to strict psychological control (e.g., Rapheal & Paul, 2018; Xu et al., 2020). A Meta-analysis found negative association between psychological control imposed by either fathers or mothers and adolescent academic achievement (Pinquart, 2016). Longitudinal evidence also suggests that parental psychological control triggered an increase in adolescents' maladaptive academic functioning at a later time point (Xu et al., 2020). In another study, psychological control of parents was found to predict high educational stress among Indian adolescents (Rapheal & Paul, 2018).

The relation between parental control and adolescent outcomes are not simply unidirectional. According to developmental systems theory, parental control reflects a dynamic process balancing parental expectations and concerns on the one hand, and adolescents' interpretation and reaction to controlling behaviors on the other hand (Molenaar et al., 2013). Chang and Qin's (2017) finding of reciprocal relation between parental psychological control and academic adjustment among Chinese American and Caucasian adolescents supported the bidirectional argument based on developmental system theory. Similar reciprocal relationship was also confirmed among urban Chinese high school students. The two-wave longitudinal study found parental psychological control at an earlier time point predicts poor academic functioning later. On the other hand, earlier maladaptive academic functioning predicts higher parental psychological control at a later time point (Xu et al., 2020)

The Control-Anxiety Cycle between Parents and Children

Informed by the reviewed literature, we see a cycle of circulating anxiety between parents and their children. First, psychological control has been identified to raise child anxiety through three major pathways, by increasing children's perception of threat, by reducing children's

control over threat, and by withdrawing the occasions of environment exploring and the development of coping skills, such as emotion regulation, from children (Bruggen & Bogels, 2008; Luebbe et al., 2014). For example, failing to regulate emotions in adolescents partially explained parental psychological control and parental anxiety (Luebbe et al., 2014). A moderate relation between parental psychological control and child anxiety ($d = .58$) was suggested by a meta-analytic study (Bruggen & Bogels, 2008). The relation between parental control and child anxiety has been examined in various age ranges and in multiple contexts (both clinical and community) using multiple methodologies, including self-report and observation (Affrunti & Ginsburg, 2012; Barber et al., 1994; Hudson & Rapee, 2002; McLeod et al., 2011). For example, empirical evidence confirmed the pathway that maternal overcontrol raises child anxiety through lowering children's self-perceived competence (Affrunti & Ginsburg, 2012).

Various moderators have been identified in the association between parenting and child anxiety. First, fathers tend to perform autonomy granting by encouraging their children to be independent, while mothers emphasize emotional security and personal safety (Paquette, 2004; Popenoe, 1996). Second, gender differences in children should also be accounted for. It was suspected that the levels of parental control on boys and girls are different, but this hypothesis is not supported by meta-analysis results (Endendijk et al., 2016; Luebbe et al., 2014). Moreover, it was demonstrated that parents from low SES families are more likely to adopt a parenting strategy involving a high level of parental control than those from advantaged SES backgrounds (Cortner & Fleming, 2002). Parents from disadvantaged SES backgrounds may frequently adopt anxiety-provoking parental control to cope with potential environmental risks.

Parental anxiety is conveyed to child anxiety via inappropriate parenting behaviors, including overcontrol. A meta-analysis showed that children of parents with anxiety disorders

were at significantly higher risk of suffering from anxiety disorders than their peers whose parents did not have anxiety disorders (Lawrence et al., 2019). Ginsburg and Schlossberg (2002) argued that high levels of anxiety in parents could obstruct the development of adaptive coping skills in parents, which may further lead to parenting behaviors that contribute to child anxiety, such as rejection and control. It is also suggested that anxious parents tend to execute high-level parental control to avoid threatening situations because they tend to perceive new situations for their children as threatening (Bruggen & Bogels, 2008). Woodruff-Borden and colleagues (2002) suggested anxiety transmitted from parents to children via reducing the parental effort to interact with children, which may lead to inadequate parenting behaviors, such as over-control. A meta-analytic result suggested parental affect, conceptualized as momentary mood states, is associated with parenting behaviors, whereas negative parental affect was strongly related to hostile parenting (Rueger et al., 2011). The finding supported Dix's (1991) argument that parents with high levels of negative affect, such as anger and frustration, communicate negative emotions to their children and hardly use effective problem-solving parenting strategies. Thus, parents with high anxiety levels may transmit their anxiety to their children through bad moods and adopting inappropriate parenting strategies and practices, such as rejection, reduced interaction, and increased psychological and behavioral control.

Adolescent anxiety and related problematic behavioral outcomes, such as delinquency and poor academic performance, may fuel parental anxiety and complete the bidirectional cycle. A longitudinal study on adopted children found that children's anxiety symptoms could raise their adoptive parents' anxiety symptoms and vice versa, but no significant associations were found between birth parents and child anxiety at any stage between ages 6 to 8 years (Ahmadzadeh et al., 2019). The finding implied that the transactional association between child

anxiety and their parents is more to the behavioral level than the genetic. In Chinese society, where children's educational outcomes are highly valued, parents set high expectations for their children's developmental outcomes as well as their own parenting practices (Lan, 2018; Nelson, 2010; Wu et al., 2022). Scholars proposed the term "education anxiety," referring to a state of anxiety produced in the educational context, caused by parents' high expectation, fear of failure, and uncertainty of children's education outcomes (Wu et al., 2022). In addition, changes in emotional frequency, intensity, instability, and clarity in adolescence may make communicating with their parents challenging, further elevating parental anxiety (Bailen et al., 2019).

In sum, the control-anxiety cycle comprises three stages: first, parental control and other harsh parenting behaviors increases children's stress and anxiety, which further lead to external symptoms, problematic behaviors, and poor school performance; second, these anxiety-related explicit negative outcomes trigger and fuel parental anxiety, for example, failing to stay up with parents' academic expectation may lead to parental anxiety; and third, parental anxiety leads to frequent harsh parenting behaviors and exert high level of control. For example, Wu and colleagues (2022) found that parental education anxiety predicted academic burnout (e.g., low sense of achievement, academic alienation, and physical and mental exhaustion) in adolescents through parental burnout, which refers to "a group of negative symptoms caused by long-term parenting stress, such as emotional exhaustion related to the parental role, self-comparison with previous self, being fed up with their parental role, and emotional distance from children".

Generations in the "Involuting" Chinese Society

The increasing competition for social resources in contemporary mainland China may aggravate parents' anxiety about their children's education and career. Media borrowed the term, involution, or "*nei-juan*" in Mandarin Chinese, from anthropology to describe such social trends

in contemporary Chinese society. Originally, involution is defined as “a process of inward overelaboration, where population growth did not result in growth in productivity or a more advanced economic model” in Anthropology (“*Involution*” (“*Neijuan*”) in *China and Game Theory*, n.d.). The buzzword, involution or “*nei-juan*”, is used to describe “the experience of being locked in competition that one ultimately knows is meaningless” of young and middle-aged Chinese adults (Nast, 2021). For example, suppose one employee in a firm voluntarily works overtime for little or no reward and receives appreciation from the employer. In that case, other employees concerned about being knocked out in the competition will also start to work overtime. With no effective organization representing the unified interest of the employees, like labor unions in the United States, employees must compete against their fellow co-workers in order to survive in the workplace. Eventually, working overtime becomes the new normality in the firm. Enhanced by the game theory, such competition becomes purposeless and endless, like “Sisyphus spinning the wheels of a perpetual-motion Peloton” (“*Involution*” (“*Neijuan*”) in *China and Game Theory*, n.d.; Nast, 2021), spreading fear and worry of failure in the competition as *involution* accelerates.

Right before the word *involution* drew public attention, China’s economic model saw an expansion of the party-state capitalist system under Xi’s leadership, in which “the state’s prioritization of political goals drastically limits the scope for making compromises with private capital” (Pearson et al., 2021). From the early 1990s to the early 2010s, China witnessed rapid growth in private economy in terms of the number of private enterprises and their registered capital (Kanamori & Zhao, 2004; Long et al., 2022). However, in the recent decade, the role of party-state owned capital has become much stronger while encroaching on other realms of economic activity, including the private sector (Pearson et al., 2021). During this process, private

firms must cut down on expenditures for survival, including cutting employees' salaries, welfare, or even job positions. Thus, Chinese people have to compete for limited social resources to make a living.

Parents may translate *involution*-related pressure and anxiety they experienced into inappropriate parental behaviors, such as increased psychological control and harsh parenting. The mounting stress also elevates parental education anxiety. First, parents may raise their expectations of their children's educational achievement, hoping that education can help their children outrun other competitors in the future job market. Second, education anxiety spread among parents. Seeing other children's achievements may trigger parents' fear that their children are falling behind and will eventually lose the competition. The fear is translated to higher parental expectations and educational investment, which may be seen by other parents and spread the same fear. The core that keeps *involution* spinning is the fear of being knocked out in the competition. Unable to escape or change the system, the best strategy for common families is to better prepare their children so that they can outrun others. Guided by the ideology of "*guan*" and "*jiao-xun*" (Chao, 1994), parents may impose intense and extensive control over their children by depriving children's autonomy, squeezing leisure time, and intruding children's private space, so that their children can concentrate all their efforts on school works.

In this study, we are interested in the role of grandparents in this potentially common parent-child dynamic in many contemporary Chinese families. There are three potential ways through which grandparents may break this control-anxiety cycle by shielding their grandchildren from harsh parenting and supporting both parents and children, mitigating anxiety in both generations. First, parental control elevates child anxiety by increasing the child's perception of threat and decreasing the child's perceived control over threat, while grandparental

involvement may soothe children's anxiety since they see their grandparents as shelters against threats and parental punishment (Goh, 2009, 2011). The popular image of caregivers in contemporary Chinese families is the strict parents and lenient grandparents. Grandparents are reported to protect their grandchildren from the punishment imposed by the middle generation (Goh, 2011).

The disagreement between grandparents and parents on child-rearing, such as the degree of discipline and punishment, the way of practicing discipline, and the threshold of children's misbehaviors, may prevent parents from adopting inappropriate parenting practices, including excessive psychological control. Goh (2011) reported that some grandparents considered their children's physical punishment upon their grandchildren as over-reactions to minor misbehavior. From the adolescents' perspective, grandparents may help them preserve more autonomy under parental control, as well as shield them from harsh parenting behaviors, such as physical punishment, verbal hostility, and power assertion.

Grandparents provide resources for families to cope with stressors. Chinese grandparents are involved heavily in family caregiving, releasing the stress of both parent and child generations (F. Chen et al., 2011). Mustillo and colleagues (2021) found that, in two-generation families, parent work-to-family conflict was associated with child same-day and next-day negative affect, such as the emotions of miserable, mad, afraid, and scared; however, the effect of parent work-to-family conflict was not significant in three-generation families with co-resident grandparents. Grandparents filling the parenting gap allow busy-working parents to worry less about not being able to fully invest their time in their children and have someone reliable taking care of the child when they are not around. In addition to labor resources, financial resources brought by grandparents may also relieve parents' stress and anxiety.

Buchanan and Rotkirch (2018) reported that British grandparents spend an average of 400 British pounds (approximately 480 U.S. dollars) on their grandchildren each year. The same article also reported that 44% of grandmothers and 42% of grandfathers across Europe gave regular or occasional help looking after grandchildren (Buchanan & Rotkirch, 2018).

Second, although little direct evidence of the ideology of grandparenting is seen in our reviewed literature, we cannot eliminate the possibility that grandparents may share their children's parenting strategy and aid parents by enhancing their control over their grandchildren. However, reports showed that grandchildren's education is one of the most important things concerning grandparents from various social and cultural contexts. For example, Mustillo et al., 2021 reported that highly-educated grandparents served as children's home tutors in Taiwan. School, homework, college, and career plans were some of the most commonly discussed topics between Chinese-American and Korean-American grandparents and grandchildren (Yoon, 2005). In addition, as discussed in the first study, grandparental investment in grandchildren may help ensure their peaceful old age. Education has a long history of being one of the few ways to ascend to a higher social class in China (Wu et al., 2022). Investments in children's education increase the chance of moving upward in social classes, which brings prosperity to the whole family. Recognizing the priority of children's educational attainment, grandparents and parents may lay down their minor disagreements on childrearing ideology and focus on supervising children's schoolwork.

However, grandparents' stress and anxiety may spill over to their grandchildren, especially when the grandparent is the primary caregiver or provides intensive childcare. Taking on intensive childcare responsibilities is challenging for grandparents. Goh (2009) reported that physical exhaustion was a common theme in their interview with childcare-providing

grandparents in China, and the word “tired” was repeated many times by interviewees. The same study also reported that interviewed grandparents sacrificed their social network and social activities to fulfill their responsibility as childcare providers (Goh, 2009). In a qualitative study conducted in Hong Kong, non-custodial caregiving grandparents reported feeling frustrated and stressful facing the difficulties in childcare (Leung & Fung, 2014). Similar feelings of stress and burden were also found in Chinese-American grandparents caring for their grandchildren (F. Tang et al., 2016). Tang and colleagues (2016) found that, after controlling for a series of demographic factors, such as age, education, income, number of grandchildren, and years living in the United States, the feeling of caregiving pressure and burden damages grandparents’ psychological well-being, including increasing depressive symptoms, anxiety, and perceived stress.

Another possibility is that the effect of grandparental involvement is marginal in the cycle of parental control and child anxiety. In the intergenerational context, parents are usually considered to be the gatekeeper of the grandparent-grandchild relationship (Buchanan & Rotkirch, 2018; Uhlenberg & Hammill, 1998). Without parents’ permission and facilitation, grandchildren, especially in nuclear families, cannot visit their grandparents. Therefore, the interaction between grandparents and grandchildren may be severed if parents wish to isolate their parents from childrearing.

The Present Study

Theoretical and empirical evidence reviewed above indicates that parental psychological control may be linked to anxiety in children and adolescents. We see a control-anxiety cycle in which anxiety-related symptoms and behavioral outcomes in children may elevate parental anxiety and further increase the possibility and frequency of harsh-parenting behaviors. The

contemporary “involuting” social context in China may intensify the circulation of anxiety between parents and children. However, there is still a lack of empirical evidence on how grandparental involvement may influence parental control and adolescent outcomes.

In the present study, we aim at exploring the moderating effect of grandparental involvement on the association between parental psychological control and adolescent anxiety and stress in the school context. As reviewed above, grandparents may mitigate or enhance the effect of parental psychological control on adolescent school-related stress and anxiety depending on their grandparenting strategy. It is also possible that the controlling parents keep grandparents out of child rearing, so that grandparental involvement makes inappreciable differences in the control-anxiety cycle.

Informed by the reviewed literature, we learn toward the hypothesis that grandparental involvement protects children from the negative effects of parental psychological control. Yet, we cannot eliminate the possibility of a worsening or null effect. The present study seeks to answer in what way grandparental involvement may influence the association between parental psychological control and anxiety in adolescents. Based on the existing literature, the present study first examined the association between parental psychological control and adolescent school-related anxiety and stress. Second, the interaction of grandparental involvement and parental psychological control were added to the model to see if grandparental involvement mitigated the negative impact of parental psychological control on adolescents. Third, informed by the gap between grandsons and granddaughters in the intergenerational relationship discovered in the first study, we examined whether the gender of grandchildren moderated parental and grandparental effects on adolescent anxiety and potential three-way interactions of parental control, grandparent-grandchild relationship, and gender of grandchildren.

Method

This study draws on the same sample as described in the first study. Please refer to chapter 2 for details.

Measures

The present study uses the same data to indicate the grandparent-grandchild relationship as that used in the first study. See Chapter 2 for measurement details.

Parental psychological control. Parental psychological control is measured using Chinese Paternal and Maternal Psychological Control Scales (Shek, 2006). The scale consists of 10 items. Example items include “My father always wants to change my thought” and “When I disappoint my father, he will stop talking to me”. Paternal and maternal psychological controls were rated separately on Likert scales ranging from “1 = strongly disagree” to “4 = strongly agree”. Cronbach’s alpha for paternal psychological control is .88; and that for maternal psychological control is .89.

Stress. Perceived stress in adolescents was measured using three subscales of a revised version of Adolescent Stress Questionnaire (Byrne et al., 2007): stress of school performance, stress of peer pressure, and stress of teacher interaction. The subscale of stress of school performance consists of 7 items, for example “keeping up with schoolwork”. The subscale of stress of peer pressure consists of 7 items, for example “being hassled for not fitting in”. The subscale of stress of teacher interaction consists of 7 items, for example “not being listened to by teachers”. Participants were instructed to respond on a five-point Likert scale ranging from “1= not at all stressful or irrelevant to me” to “5 = very stressful”. Cronbach’s alphas for the three

subscales are: .67 for perceived stress of school performance, .78 for perceived stress of peer pressure, and .78 for perceived stress of teacher interaction.

Academic anxiety. Domain-general academic anxiety is a subscale of Academic Anxiety Scale consisting of 12 items (Gogol et al., 2014). Example items include “in class in most school subjects, I feel uneasy” and “in class in most school subjects, it is difficult for me to concentrate”. Participants reported their domain-general academic anxiety on a five-point Likert scale ranging from “1 = never” to “5 = all the time”. The Cronbach’s alpha for this scale is .86.

Control variables. In this study, gender, the number of grandchildren of grandparents, grandparent-grandchild co-residence time, relative academic standing, and perceived parenting beliefs were controlled in the models. The same data used in the first study is used to indicate gender, the number of grandchildren of grandparents, and grandparent-grandchild co-residence time. See Chapter 2 for measurement details.

Relative Academic Standing. Since the participants came from multiple high schools and grades, there was no universal exams to evaluate their academic performance. In the present study, we employed one item to measure the participants’ perceived academic standing comparing to their classmates, “Comparing to your classmates, how is your academic performance?” The possible options included “1 = far below average”, “2 = below average”, “3 = around average”, “4 = above average”, and “5 = far above average”.

Parenting Beliefs. Parenting beliefs of both fathers and mothers are measured using five-item Paternal Parenting Beliefs Scale and Maternal Parenting Belief Scale (Shek, 2006). The scales were developed in Chinese and aimed at indicating the perceived level of endorsement of traditional Chinese parenting beliefs. The English translation of example items include “My father/mother believes that children must obey their parents under any circumstances” and “My

father/mother believes that severe punishment will mold filial children”. Participants reported their fathers’ and mothers’ parenting beliefs on separate Likert scales with possible options ranging from “1 = strongly disagree” to “4 = strongly agree”. Higher scores indicate a higher level of endorsement of traditional parenting beliefs perceived by the participants.

Analytic Strategy

The present study examined the relations of the grandparent-grandchild relationship, parental behaviors, and adolescents’ stress and anxiety in the school context. Our analytic plan consists of three major steps: first, examine the bi-variate correlations of study variables; second, path analysis models are employed to test for the effects of paternal psychological control on adolescents’ school-related stress and academic anxiety, while examining the moderating effect of grandparent-grandchild relationship; and third, we used multiple group path analyses to examine if effects on adolescents’ anxiety differed between boys and girls.

In the path models, means of grandparental school involvement, leisure activities, financial support and caretaking, and emotional closeness were used to indicate the level of grandparent-grandchild relationship in each domain. The means were multiplied by the parental psychological control to create interaction terms for the purpose of testing moderating effects. For example, academic anxiety and school-related stress were regressed on paternal psychological control, domains of paternal-grandparent-grandchild relationship, the interaction terms of the previous two predictors, as well as the control variables (see Figure 3.1 for an example path diagram). Models with interaction terms were further tested under the multiple-group SEM framework to see if associations differed between boys and girls.

Mplus 8.3 (Muthén & Muthén, 2017) was used to fit our models to the data. We followed Hu and Bentler's (1998, 1999) suggestion considering CFI and TLI above .90 and RMSEA

under .08 as the criterion for good model fit and Hayes' (2017) recommendation mean-centering independent and moderator variables. Moderation was expressed as the interaction term in our models, where significant interaction terms imply statistically meaningful moderating effects. Lastly, we graphically illustrate moderations using regression lines, where one standard deviation above or below means represents the high or low grandparental involvement cases.

Results

Preliminary Analysis

The correlation matrix revealed that both paternal and maternal psychological control were correlated with adolescent academic anxiety, stress of school performance, stress of peer pressure, and stress of teacher interaction (see Table 3.1 & 3.2). However, most domains of grandparent-grandchild relationship were not significantly correlated with adolescent outcomes, except for paternal grandfather school involvement with stress of peer pressure, paternal grandmother emotional closeness with stress of peer pressure, and maternal grandmother functional support and caretaking with stress of school performance.

In the present sample, no significant difference was found between adolescent-reported paternal and maternal psychological control ($M_{\text{father}} = 2.12$, $SD_{\text{father}} = .63$, $M_{\text{mother}} = 2.13$, $SD_{\text{mother}} = .62$, $t(608) = -.93$, $p = .35$). However, boys reported higher parental psychological control than girls (paternal psychological control: $M_{\text{male}} = 2.25$, $SD_{\text{male}} = .66$, $M_{\text{female}} = 2.01$, $SD_{\text{female}} = .58$, $t(576.25) = 4.81$, $p < .01$; maternal psychological control: $M_{\text{male}} = 2.24$, $SD_{\text{male}} = .64$, $M_{\text{female}} = 2.04$, $SD_{\text{female}} = .59$, $t(610) = 3.90$, $p < .01$).

The Moderating Effects of Father-Side Grandparent-Grandchild Relationship

To test for the association between paternal psychological control and adolescents' stress and anxiety in the school context, as well as the potential moderating role of the grandparent-

grandchild relationship (expressed as interaction terms of paternal psychological control and domains of the grandparent-grandchild relationship), a series of path models were fitted to the data. In both paternal grandfather and grandmother models, the main effect of paternal psychological control predicted high stress of peer pressure in adolescents (Table 3.3). However, none of the domains of the paternal-grandfather-grandchild relationship directly predicted the stress of peer pressure (Table 3.3, Model FF). In the paternal grandmother model, emotional closeness with the paternal grandmother negatively predicted stress of peer pressure (Table 3.3, Model FM).

The paternal grandfather model revealed a significant interaction effect of paternal psychological control and paternal grandfather leisure activities on adolescent stress of peer pressure. Paternal psychological control elevated peer pressure stress in adolescents who perceive high paternal grandfather leisure activities. In contrast, among participants who reported low paternal grandfather leisure activities, the effect of paternal psychological control was not significant (Figure 3.2).

Similarly, the interaction of paternal psychological control and paternal grandmother leisure activities predicted adolescent stress of peer pressure. For adolescents perceiving high paternal grandmother leisure activities, paternal psychological control positively predicted stress of peer pressure. In contrast, the effect of paternal psychological control was not significant for those who experienced low paternal grandmother leisure activities (Figure 3.3).

The Moderating Effects of Mother-Side Grandparent-Grandchild Relationship

The interaction effect of maternal psychological control and maternal grandfather school involvement on adolescent academic anxiety was statistically significant. For participants who reported high maternal grandfather school involvement, the effect of maternal psychological

control on academic anxiety was not significant. In contrast, maternal psychological control predicted high academic anxiety among adolescents with low maternal grandfather school involvement (Figure 3.4).

The interaction effect of maternal psychological control and maternal grandfather's emotional closeness on adolescent stress of school performance was also significant. The effect of maternal psychological control was not significantly associated with adolescent stress of school performance in adolescents with high maternal grandfather emotional closeness. In contrast, maternal psychological control predicted high stress of school performance in those with low maternal grandfather emotional closeness (Figure 3.5).

Another significant interaction effect was maternal psychological control and maternal grandfather leisure activities on adolescent stress of teacher interaction. For participants who reported high maternal grandfather leisure activities, the effect of maternal psychological control on adolescent stress of teacher interaction was not significant. In contrast, maternal psychological control predicted high stress of teacher interaction among adolescents with low maternal grandfather leisure activities (Figure 3.6).

Two significant interaction effects were found in the maternal grandmother model. First, the interaction of maternal psychological control and maternal grandmother leisure activities predicted adolescent stress of teacher interaction. The effect of maternal psychological control was not significant for adolescents with high maternal grandmother leisure activities, while for those with low maternal grandmother leisure activities, a positive effect was revealed (Figure 3.7).

The second significant interaction effect was maternal psychological control and maternal grandmother functional support and caretaking on adolescent stress of teacher interaction. For

adolescents reporting high maternal grandmother functional support and caretaking, maternal psychological control predicted high stress of teacher interaction. However, maternal psychological control's effect was not significant in adolescents with low maternal grandmother functional support and caretaking (Figure 3.8).

Gender Differences in the Moderating Effects of Grandparent-Grandchild Relations: A Three-Way Interaction

Multiple-group SEM approach was used to test for the effects of grandparent-grandchild relations in male and female participants. In the male models, paternal grandfathers' and grandmothers' functional support and caretaking predicted decreased academic anxiety. However, these direct effects of grandparent-grandchild relationship were not significant in the female model (Figure 3.9 & Figure 3.10). Meanwhile Wald's tests suggested that the differences in effect sizes between males and females were statistically significant (Table 3.5). Mean comparisons revealed that males reported significantly higher paternal grandfather functional support and caregiving ($M_{\text{male}} = 3.05$, $SD_{\text{male}} = 1.16$, $M_{\text{female}} = 2.77$, $SD_{\text{female}} = 1.11$, $t(365.68) = 2.39$, $p = .02$). However, the gender gap was not found in paternal grandmother functional support and caregiving ($M_{\text{male}} = 3.07$, $SD_{\text{male}} = 1.21$, $M_{\text{female}} = 2.98$, $SD_{\text{female}} = 1.12$, $t(486) = .83$, $p = .41$).

Despite the insignificant direct effects in the female group, the interaction effect of paternal psychological control and paternal grandmother emotional closeness on academic anxiety was only statistically significant in the female group, but not in the male group, with significant Wald's test indicating significant difference in the effect sizes (Table 3.5). The effect of paternal psychological control in females with low paternal grandmother emotional closeness was not statistically significant. In contrast, for females who perceives high paternal grandmother

emotional closeness, paternal psychological control predicted increased academic anxiety (Figure 3.11).

Discussion

The present study reveals significant associations between parental psychological control and increased academic anxiety, stress of peer pressure, as well as stress of teacher interaction. After controlling for a series of demographic factors and parenting belief, results from the tested path models supported our hypotheses that first, parental psychological control elevates adolescent school related anxiety and stress, and second, the relationship between grandparents and grandchildren make a difference in the association between parental psychological control and adolescent outcomes. Finally, the multiple-group path models revealed gender differences in the relationship across three generations, which implies that the status of girls in the intergenerational relationships are still inferior to those of boys.

The present findings confirm existing findings on the effect of parental psychological control elevating adolescent anxiety. In the present study, we focused on adolescents' outcomes in the school context and saw a spillover effect where parental psychological control affects school-related anxiety. One of the pathways of parental control that increases child anxiety is to withdraw children's opportunity of exploring their world and developing social skills (Bruggen & Bogels, 2008; Luebbe et al., 2014). For example, in the present study, one of the indicators of parental control is that "my father (mother) wants to control everything in my life". In Chinese culture, the ideology of "guan", proposed by Chao (1994), expects parents to regulate their children and create a controlled space ideal for child development.

The main effect of paternal psychological control echoes the literature that parental control raises adolescent peer pressure (e.g., Sun et al., 2017). According to the measurement

used in the present study, psychologically controlling parents intrude upon children's psychological world using strategies such as guilt induction (e.g., "my father/mother always blames me for the problems encountered by my family."), invalidate feelings (e.g., "when I disappoint my father/mother, he/she will stop talking to me."), and love withdrawal (e.g., "when my views are different from those of my father/mother, he/she reduces his/her friendliness to me), to force adolescents to compliance, which, in the meantime, inhibits children's autonomy (Barber, 2002). On the other hand, psychologically controlling parenting practices directly intervene and control children's relationship with peers (e.g., "my father/mother wants to control everything in my life"). From the perspective of self-determination theory, children who suffer autonomy-inhibiting parenting strategies would be accustomed to being subordinate to the demands of others, including intervention from parents and peer victimization (Soenens & Vansteenkiste, 2010; Sun et al., 2017).

Controlling parents may intervene in their children's interpersonal relations by imbuing the idea that children's peers are competitors. From parents' perspectives, this idea aims to motivate their children to focus on schoolwork and outrun their peers. However, adolescents talk with their peers to cope with stress. María and colleagues (2018) reported that talking with friends and going out with friends are two of the principal responses to stress for high school students. With the competitor idea, peer interaction may not soothe adolescents' stress but remind them of the brutal competition for social and educational resources. In addition, controlling parents may be less likely to grant their children frequent permission to hang out with peers because it may consume the time which ought to be devoted to schoolwork.

The present findings on parental psychological control challenged some existing findings and impressions. For example, fathers and mothers exerted similar levels of psychological

control and both paternal and maternal psychological control were associated with elevated stress and anxiety in adolescents. The findings are inconsistent with the traditional portrait of “strict father, kind mother” in Chinese families (Wilson, 1974) and Shek's (2007) report of weak paternal psychological control perceived by Hong Kong adolescents. Therefore, the present finding suggests that there may be a need to change the traditional notion of parental roles in contemporary Chinese society.

The “strict father, kind mother” portrait may no longer be universal in China. As reviewed in the introduction, Chinese families have witnessed significant changes in their ways of organizing their households along with the shift of society and economy in the modern era. Gender roles, at both family and social levels, change. Women are no longer confined to domestic affairs and their own houses (Attané, 2012; Davis & Harrell, 1993). The changing gender roles may have affected how fathers and mothers parent their children. In other words, the traditional portrait no longer applies to contemporary Chinese families.

The “involuting” Chinese society may also contribute to the change of the notion of a “strict father, kind mother”. In the present social context, children’s educational attainment determines whether they can outrun others in the schools, job market, and workplaces. In order to bring out their children’s best in schoolwork, parents who are influenced by the ideology of “guan” and “jiao-xun” (Chao, 1994) may exert a high level of control over their children at all times. Maintaining continuous control over their children requires both parents’ contribution. Thus, despite the traditional portrait of parents, mothers in contemporary Chinese families are motivated to exert the same level of control over their children.

Domains of the grandparent-grandchild relationship did not directly affect adolescent school-related anxiety and stress. However, after controlling for parenting beliefs, co-residence

length, grandparents' ages, and other demographics, some facets of the grandparent-grandchild relationship, such as shared leisure activities and emotional closeness with paternal grandmother in the female group were found to play moderating roles in the effect of parental psychological control on adolescent stress and anxiety in the school context. Again, however, the directions of the grandparents' moderating effects seem complicated.

On the father's side, leisure activities shared by grandparents and grandchildren strengthen the effect of paternal psychological control and adolescent stress of peer pressure. The interaction effect of paternal grandparent leisure activities and paternal psychological control supported our hypothesis that grandparental involvement facilitates their children's parenting practices and intensifies the effect of parental psychological control on their grandchildren's anxiety and stress. Grandparents share the parenting ideology of "guan" in raising their grandchildren, echoing the studies showing interrelatedness between parent-grandparent relationships and grandparent-grandchild relationships (Attar-Schwartz et al., 2009; Monserud, 2008; Mueller & Elder, 2003). Grandparents may express this ideology by facilitating parental controlling behaviors or imposing such behaviors by themselves, aiming at protecting adolescents from adverse effects from outside the family, including influences from "bad friends." On the other hand, a high frequency of interactions with grandparents withdraws adolescents from their peers. Studies on friendships in adolescence suggested that the supportive role of friends becomes more significant during adolescence (De Goede et al., 2009). Cherlin and Furstenberg (1985) pointed out that co-resident grandparents are more likely to take on parent-like roles. In the Chinese context, children are generally closer to their paternal grandparents in terms of their kinship and more likely to share the same residence than their maternal

grandparents. In this case, paternal grandparents are more likely to engage in a parent-like role which enhances the effect of parental control.

However, the interaction patterns were different on the maternal side, with one exception, maternal grandmother functional support. High maternal grandparental involvement, including maternal grandfather school involvement, maternal grandfather emotional closeness, maternal grandfather leisure activities, and maternal grandmother leisure activities, reduced the effect size of maternal psychological control on adolescent anxiety and stress. This interaction pattern supported our hypothesis that grandparental involvement mitigates the negative effect of parental control.

Compared to the moderating effect of paternal grandparents' leisure activities, a clear lineage difference emerges, where paternal grandparents facilitate the effect of parental control, while maternal grandparents mitigate it. One of the potential reasons underlying the lineage difference is the variation in the intensity of grandparental involvement. The effect of grandparental involvement may not be linear. Some certain grandparental behaviors may only occur when the grandparents are close enough with the family and grandchild, such as decision-making, behaviors associated with “guan” and “jiao-xun”, and other behaviors that are seen as intrusive by children. A low level of grandparental involvement may protect adolescents from harsh parenting because most grandparental behaviors are common leisure activities and functional supports, which are hardly anxiety-provoking. The increasing intensity of grandparental involvement may drive the protecting effect to a plateau before decreasing and turning in the other direction. In this case, the connections between grandchildren and their maternal grandparents are naturally weakened by the patrilineal descent system because, in most cases, children's family membership are assigned to their fathers' family, not their mothers'.

Family membership determines the orientation of children's families. Traditional patrilineal kinship norms dictate that the sons stay in the same household until their fathers' death (Szinov  cz, 1998). Although scholars pointed out that family division often occurs before the senior's death in modern China (Cohen, 1976), family members tend to have closer relationships with their father-side relatives. In the present sample, maternal grandfathers' involvement levels are significantly lower than paternal grandparents' in almost all studied domains. Therefore, informed by Cherlin and Furstenberg's (1985) argument, maternal grandparents are less likely to engage in parent-like roles than paternal grandparents, which in turn do not enhance the effect of parental control.

Another difference is that maternal psychological control and maternal grandfather leisure activities affected adolescent-report stress of teacher interaction. Acknowledging the relatively low school involvement of maternal grandfather, the shared leisure activities may serve as a haven for adolescents to distract themselves from the stress of teacher interaction because maternal grandparents are less likely to involve in adolescents' school affairs and play parent-like roles.

Compared to low grandparental involvement, high grandparental involvement does not simply mean the increased frequency of the same set of grandparental behaviors. Instead, some behaviors, such as discipline, decision-making, providing regular care, and playing parent-like roles, which are intrusive and anxiety-provoking to adolescents, may occur only when grandparents' relations with their grandchildren are close enough or, in other words, highly involved in child-rearing. Given this assumption and the relatively low involvement of maternal grandparents, the actual behaviors that paternal and maternal grandparents carry out are different. For example, paternal grandparents in patrilineal Chinese families are closer to their

grandchildren and more likely to play parent-like roles to fill the parenting gap and dip their toes in intrusive and anxiety-provoking behaviors. On the other hand, maternal grandparents, commonly considered relatives out of the immediate family, are not intimate enough to perform these behaviors. Instead, their involvement may be limited in domains such as care providing and leisure activities.

The exacerbating effects of grandparenting revealed in the present study may be caused by the over-involvement in the upbringing of their grandchildren. One reason why grandparents may have an exacerbating effect is that their involvement can interfere with the parenting level of the children's parents. For example, suppose grandparents are highly involved in the day-to-day activities of their grandchildren. In that case, the parents may feel less responsible for their children's upbringing, leading to a lack of consistency in parenting styles and creating confusion for the children.

Another factor that can contribute to the exacerbating effects of grandparenting is the generation gap. Grandparents may have different values, beliefs, and parenting styles than their children, which can cause conflict and tension in the family. For example, grandparents may have stricter rules or be more permissive than their children, leading to disagreements and misunderstandings. In some cases, grandparents may also overstep their boundaries and try to take control of the grandchildren's upbringing, which may lead to conflicts with the parents and cause resentment in the family.

In addition, high grandparental involvement may be the consequence of the parenting gap. For busy working parents who do not involve enough in childcare, grandparents are a reliable and inexpensive source of support for filling the parenting gap. Therefore,

grandparenting can be a valuable source of support for families, but it can also have exacerbating effects in some cases, according to the present findings.

After controlled for the co-residence length in the path models, the effect of co-residence at specific periods of children's lives may last a long time or even a lifetime for children. Co-residential grandparents can take on unique roles in the household, as well as in children's lives. For example, Taylor and colleagues (2005) found, among international students in the U.S., the influence of grandparents and relationship satisfaction maintained despite the decrease in contact frequency between grandparents and grandchildren. Thus, except for the direct effect controlled in the models, co-residence changes the dynamics of the grandparent-grandchild relationship over time and affect adolescent indirectly.

The multiple group path models found that some paternal grandparents' functional support and caretaking directly predicted low academic anxiety in males, but the effect was insignificant in the female group. The multiple group path models revealed a significant interaction effect of paternal grandmother emotional closeness and paternal psychological control on the academic anxiety in female adolescents, where high emotional closeness with paternal grandmother strengthen the effect of paternal psychological control on academic anxiety. The finding, together with findings of the first study, challenges the kin-selection theory, which predicts paternal grandfather relating to granddaughters stronger than grandsons, and the kin-keeper theory, which predicts granddaughters being closer to grandmothers than grandsons to grandmothers (Dubas, 2001). The findings are also in conflict with previous empirical evidence based on the non-Chinese population, which suggests that grandparental influences were most pronounced within the same-sex grandparent-grandchild dyad, such as the

grandmother-granddaughter dyad and the grandfather-grandson dyad (V. L. Bengtson & Robertson, 1985; Dubas, 2001; Silverstein & Long, 1998).

Limitations and Future Directions

The present study proposed the cycle of parental control and adolescent anxiety in the contemporary “involuting” Chinese society and examined the effect of psychological control on adolescents’ school-related stress and anxiety moderated by grandparental involvement. However, the present cross-sectional data was insufficient to support us in examining the entire cycle, including adolescent anxiety’s effect on parental psychological well-being and behaviors. Thus, we call for longitudinal studies which include and examine the potential reciprocal relation of parental control and adolescent outcomes in the same model.

In the proposed control-anxiety cycle, grandparental influence may occur in multiple stages besides the stage tested in the present study. For example, parenting behaviors are affected by parents’ childhood experiences and how parents were parented themselves (Lomanowska et al., 2017). In the multigenerational context, grandparents are determinators of parental behaviors. On the other hand, grandparents may hinder or facilitate the transmission of anxiety from children back to their parents. Future studies utilizing longitudinal designs may consider testing for the grandparents’ role in multiple stages of the control-anxiety cycle. With detailed data on the behaviors, attitudes, motivations, and expectations of the three generations, it is also interesting to see the mechanism of exactly how grandparents strengthen parental control or protect grandchildren against it.

The discussion of the nuance of family lineages in the present study is based on the most common form of descent. While such patrilineal system has historically dominated Chinese families and can still be seen in many contemporary families, it is important to recognize that

many contemporary families have different arrangements that may not follow a strict patrilineal system. In other words, the patrilineal system is only one of the many factors that affect the family relations. Some studies have identified such variations and implied a shift towards an equal distribution of caregiving responsibilities between maternal and paternal grandparents (e.g., [Chen & Lewis, 2015](#); [Xu et al., 2018](#); [Yoon, 2005](#); [Zhu, 2016](#)). Additionally, the prevalence of nuclear families in urban areas adds more uncertainties to caregiving distributions. Therefore, it is important to acknowledge the diversity within Chinese families and the context to which they are exposed and avoid making arbitrary assumptions about their caregiving arrangements based on stereotypes or generalizations.

CHAPTER 4. CONCLUSION AND IMPLICATION

In the present dissertation, the first study identified important demographic factors affecting the grandparent-grandchild relationship in the Chinese cultural context, such as the number of grandchildren, co-residence length, and the educational level of grandparents. The study also examined the moderating role of gender in the relationship between demographics and intergenerational relationships. Findings from this study provide empirical rationales for implicating the Intergenerational Solidarity Framework in the Chinese population and inform future studies of important demographic determinators of the grandparent-grandchild relationship. The first study also revealed a gap between boys and girls in the grandparent-grandchild relationship. Although grandparents' attitudes toward their grandsons and granddaughters were not directly measured, the gender differences imply that granddaughters are still not fairly treated as their male counterparts.

The second study proposed a control-anxiety cycle, where parental control triggers adolescent anxiety, which circulates back to parental anxiety and leads to inappropriate parenting behaviors. The analyses examined the grandparental effect on the relationship between parental psychological control and adolescent anxiety and found that some domains of the grandparent-grandchild relationship were moderating the effect of parental psychological control on adolescents' school-related anxiety and stress. The study also highlighted the contemporary "involuting" social context of China, which may fuel the control-anxiety cycle and endanger the psychological well-being of the adolescents, as well as other family members who care for them.

The present dissertation not only contributes to the literature by providing the listed empirical findings but also proposes future directions for the research of intergenerational relationships. More importantly, the findings revealed changes in contemporary Chinese

families, such as the change of the notion of a “strict father, kind mother”. In the existing literature, we see significant changes in Chinese families and society through the past century, starting from the Confucianism-dominated norms in the early 20th century, through the series of communist revolutions in the 1950s to mid-1970s, to the reforms and open-up in the last two decades of the 20th century. However, the perspective from which contemporary scholars look at Chinese families seems to lag behind the rapid changes in the recent decades, such as the economic prosperity, the lift of the “one-child” policy, the expansion of party-state capitalist system and the “involuting” workplaces, the uprising of nationalism ideology, the women’s movement, as well as the hit of COVID-19 and the infamous COVID-19 policies imposed by the Chinese government. The present data and analyses captured a silhouette of the contemporary Chinese family ecology with its three generations from an adolescent perspective. We expect that our findings will inspire studies on Chinese families to integrate the traditions with the social, economic, and ideological trends, addressing the family dynamics in the contemporary quick-shifting context.

To conclude the present dissertation, I would like to bring research attention on grandparents’ role in child and adolescent development and policy implication for the benefit of grandparents and grandchildren. Like any other family relation, the grandparent-grandchild relationship should also be understood in its contexts, from the immediate family context to the overarching sociocultural context, as well as the chronosystem through which the whole society, culture, families, and individuals develop. As discussed above, many traditional Chinese family norms, roles, and behaviors are no longer applicable in the contemporary quick-changing Chinese society and families. However, this does not mean that contemporary Chinese families are severed from the traditional Confucianism ideology. As discussed, some cultural aspects

have been retained in contemporary Chinese families. In addition, historical events, social movements, ideologies, as well as the economy remain vital in understanding the changing and being of Chinese families. Therefore, I encourage future studies to examine the Chinese grandparent-grandchild relationship from a chronological perspective, considering both the past and the present of Chinese families and societies.

At the present point, I am conservative to provide grandparents with practical implication like doctors' prescriptions, because the present understanding of the grandparent-grandchild relationship is still limited. However, policy implications may help promoting the wellbeing of grandparents and grandchildren and ease my two concerns about contemporary Chinese adolescents and their families.

First, the findings still imply that women have an inferior status in intergenerational interactions in Chinese families. Girls are more vulnerable to some risk factors, and we suspect that the traditional boy preference mindset and gender stereotypes still hold their places in contemporary Chinese society and families. According to a United Nations report, progress on women's rights has been achieved in China during the past decades, such as the decreasing adolescent birth rate, parliament seats held by women, and access to modern family planning methods (*Country Fact Sheet | UN Women Data Hub*, n.d.). However, more work still needs to be done. Besides the gender gap discussed in family relations, Chinese women were reported to spend more time on unpaid care and domestic work, experience sexual violence and/or harassment, and unfair treatment in workplaces, such as gender pay gap and unequal employment opportunities (*Country Fact Sheet | UN Women Data Hub*, n.d.). Though it may be impossible to directly intervene in Chinese families and force them to abandon the patriarchal system, there are ways to change people's mindset and stereotypes towards women and elevate

their status in the family context through promoting women's status at the societal level, i.e., ensuring women's economic status by mending the gender pay gap, guaranteeing equal employment opportunities, establishing women's welfare system, and implementing childcare support on the national level, such as ensuring equal maternity and paternity leave like Northern European countries and offering accessible childcare options for women to go to work.

The contemporary phenomenon of *involution* in China is the second concern regarding the well-being of Chinese adolescents and their families. We would like to call attention to the effect of contemporary social and economic trends on the well-being of adolescents and their families. Starting from a different viewpoint, we would like to join social scientists, economists, and scholars from other disciplines calling for policy changes to improve the government expenditure on public services, including education, health care, and social security, aiming at promoting people's livelihood and slowing down the spinning of the endless and purposeless competition for social resources (Xiong et al., 2022; Yu & Li, 2021). For example, the percentage of China's fiscal educational expenditure to the GDP has shown a downward trend since 2012, dropping from 4.28% to 3.6% in 2020, according to a world bank report, appallingly lower than the world average of 4.3% and the United States of 6.1% (*Government Expenditure on Education, Total (% of GDP) | Data*, n.d.; Wang et al., 2021). With enriched social resources and associated economic equality, people can easily sustain a decent livelihood and waste fewer resources on meaningless competitions.

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APPENDIX A: CHAPTER 2 TABLES

Table 2.1
Sample Demographics

	%	n
Gender		
Female	53.3%	333
Male	46.6%	291
Missing	.2%	1
Age		
15 or under	20.3%	127
16	32.3%	202
17 or above	46.6%	291
Missing	.8%	5
Home location		
Central Urban districts	40.5%	253
Outskirts	58.4%	365
Missing	1.2%	7
Number of children in the household		
1	18.2%	114
2	53.0%	331
3	20.0%	125
4 or more	8.5%	53
Missing	.3%	2
Number of grandchildren of paternal grandparents		
1 or 2	22.5%	141
3	16.3%	102
4	17.9%	112
5	10.7%	67
6 or more	30.6%	191
Missing	1.9%	12
Number of grandchildren of maternal grandparents		
1 or 2	21.3%	133
3	11.5%	72
4	16.5%	103
5	11.2%	70
6 or more	36.6%	229
Missing	2.9%	18

Table 2.2*Age, Educational Level, and Co-Residence Length Distribution of Grandparents*

	Paternal grandfather		Paternal grandmother		Maternal grandfather		Maternal grandmother	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Age								
65 years or under	96	15.4	108	17.3	63	10.1	91	14.6
66 to 70 years	134	21.4	185	29.6	165	26.4	202	32.3
71 to 75 years	97	15.5	108	17.3	98	15.7	106	17.0
76 years or above	57	9.1	85	13.6	70	11.2	73	11.7
Deceased	215	34.4	109	17.4	192	30.7	121	19.4
Missing	26	4.2	30	4.8	37	5.9	32	5.1
Educational level								
Elementary school or lower	145	23.3	300	48.0	158	25.3	254	40.6
Junior high school	96	15.4	75	12.0	82	13.1	64	10.2
High school or higher	84	13.4	40	6.4	73	11.7	55	8.8
Missing	300	48.0	210	33.6	312	49.9	252	40.3
Co-residence length								
0 period	268	42.9	236	37.8	428	68.5	387	61.9
1 period	129	20.6	129	20.6	111	17.8	127	20.3
2 periods	64	10.2	62	9.9	30	4.8	40	6.4
3 periods	69	11.0	78	12.5	23	3.7	29	4.6
4 periods	27	4.3	35	5.6	10	1.6	16	2.6
5 periods	66	10.6	84	13.4	22	3.5	25	4.0
Missing	2	.3	1	.2	1	.2	1	.2

Table 2.3*Bivariate Correlations of Demographics and the Paternal Grandparent-Grandchild Relationship*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
1. Gender	-																			
2. PGC-NO	.04	-																		
3. PGF-CR	.01	-.22**	-																	
4. PGM-CR	-.00	-.23**	.80**	-																
5. PGF-EDU	.12*	-.13*	.05	.06	-															
6. PGM-EDU	.02	-.20**	.11*	.05	.50**	-														
7. PGF-AGE	-.06	-.02	-.07	-.08	.07	.14*	-													
8. PGM-AGE	-.00	.12*	-.19**	-.08	.03	-.02	.90*	-												
9. PGF-H	-.04	-.07	.14**	.11*	.05	.01	-.07	-.14*	-											
10. PGM-H	-.04	-.04	.01	.05	.11	.04	-.09	-.06	.40**	-										
11. PGF-CC	.03	-.21**	.45**	.42**	.13*	.15*	-.03	-.09	.18**	.14*	-									
12. PGF-SI	-.18**	-.25**	.35**	.34**	.22**	.12*	.02	.01	.16**	.06	.47**	-								
13. PGF-LA	-.11*	-.16**	.32**	.30**	.13*	.15*	-.03	-.10	.22**	.15**	.46**	.52**	-							
14. PGF-FS	-.12*	-.27**	.28**	.24**	.17**	.18**	.03	.01	.23**	.15**	.48**	.54**	.56**	-						
15. PGF-EC	-.14**	-.21**	.31**	.30**	.16**	.05	.07	.03	.25**	.16**	.50**	.43**	.54**	.68**	-					
16. PGM-CC	.06	-.20**	.38**	.44**	.07	.07	-.07	-.07	.17**	.16**	.91**	.42**	.38**	.42**	.41**	-				
17. PGM-SI	-.08	-.20**	.28**	.31**	.13*	.13**	-.03	-.06	.12*	.12*	.40**	.81**	.40**	.42**	.30**	.45**	-			
18. PGM-LA	.07	-.16**	.31**	.37**	.14*	.06	-.14*	-.18**	.22**	.17**	.46**	.47**	.89**	.49**	.46**	.54**	.50**	-		
19. PGM-FS	-.04	-.27**	.26**	.28**	.16**	.17**	.03	-.05	.13*	.17**	.49**	.45**	.44**	.81**	.54**	.58**	.53**	.60**	-	
20. PGM-EC	-.11*	-.18**	.31**	.36**	.11	.02	.02	-.06	.26*	.19**	.48**	.41**	.47**	.58**	.87**	.54**	.43**	.58**	.66**	-
Cronbach's α	-	-	-	-	-	-	-	-	-	-	.81	.65	.75	.82	.91	.83	.66	.75	.82	.92

Note: *. Correlation is significant at the .05 level (2-tailed).

** . Correlation is significant at the .01 level (2-tailed).

The gender of the participants is coded as “1 = male” and “2 = female”.

PGC NO = number of paternal grandparents' grandchildren; PGF = paternal grandfather; PGM = paternal grandmother EDU = education level; CR = co-residence time; AGE = age; H = health condition; CC = contact and communication; SI = school involvement; LA = leisure activities; FS = functional support and caretaking; EC = emotional closeness.

Table 2.4*Bivariate Correlations of Demographics and the Maternal Grandparent-Grandchild Relationship*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.Gender	-																			
2.MGC-NO	.14**	-																		
3.MGF-CR	-.07	-.08*	-																	
4.MGM-CR	-.06	-.11**	.79**	-																
5.MGF-EDU	.01	-.30**	.12*	.12*	-															
6.MGM-EDU	.09	-.21**	.13*	.11*	.65**	-														
7.MGF-AGE	-.06	.10*	-.05	-.07	-.04	.03	-													
8.MGM-AGE	-.02	.10*	-.09	-.03	.02	.02	.90**	-												
9.MGF-H	.07	.03	-.02	-.01	.10	.05	-.06	.00	-											
10.MGM-H	-.05	.01	.02	.03	-.03	.00	-.03	-.05	.47**	-										
11.MGF-CC	.10*	-.10	.26**	.25**	.16**	.21**	-.06	-.05	.16**	.15**	-									
12.MGF-SI	-.11*	-.14**	.23**	.23**	.19**	.15*	-.03	-.02	.13*	.16**	.47**	-								
13.MGF-LA	-.08	-.09	.25**	.26**	.19**	.17**	-.08	-.08	.15**	.18**	.53**	.51**	-							
14.MGF-FS	-.05	-.15**	.21**	.20**	.26**	.21**	-.10	.00	.18**	.16**	.47**	.51**	.57**	-						
15.MGF-EC	-.12*	-.13*	.26**	.25**	.20**	.20**	-.07	-.04	.21**	.17**	.51**	.43**	.56**	.60**	-					
16.MGM-CC	.08	-.06	.20**	.25**	.16**	.11*	-.01	-.02	.19**	.12**	.94**	.45**	.50**	.44**	.47**	-				
17.MGM-SI	-.06	-.13**	.24**	.27**	.16**	.13*	.06	-.01	.13*	.18**	.44**	.93**	.49**	.44**	.39**	.49**	-			
18.MGM-LA	.00	-.09	.23**	.25**	.15*	.13*	-.07	-.12*	.17**	.16**	.50**	.51**	.91**	.53**	.53**	.52**	.53**	-		
19.MGM-FS	-.01	-.13**	.24**	.25**	.24**	.15**	.00	-.02	.16**	.18**	.42**	.47**	.54**	.86**	.55**	.52**	.51**	.60**	-	
20.MGM-EC	-.09*	-.09*	.25**	.27**	.17**	.04	.00	-.03	.18**	.17**	.46**	.40**	.57**	.55**	.88**	.49**	.45**	.58**	.63**	-
Cronbach's α	-	-	-	-	-	-	-	-	-	-	.77	.67	.74	.83	.90	.77	.63	.77	.83	.90

Note: *. Correlation is significant at the .05 level (2-tailed).

** . Correlation is significant at the .01 level (2-tailed).

The gender of the participants is coded as “1 = male” and “2 = female”.

MGC NO = number of maternal grandparents' grandchildren; MGF = maternal grandfather; MGM = maternal grandmother; EDU = education level; CR = co-residence time; AGE = age; H = health condition; CC = contact and communication; SI = school involvement; LA = leisure activities; FS = functional support and caretaking; EC = emotional closeness.

Table 2.5*Summary Table for Moderating Effects in Chapter 2 Path Models*

Main Effects	Moderator	Figure
Paternal grandfather's age – Paternal grandfather leisure activities	Gender of grandchildren	Figure 2.4
Maternal grandfather co-residence length – Maternal grandfather contact and communication	Gender of grandchildren	Figure 2.5
Maternal grandmother education level – maternal grandmother school involvement	Gender of grandchildren	Figure 2.6

APPENDIX B: CHAPTER 3 TABLES

Table 3.1

Bivariate Correlations of Paternal Psychological Control, the Intergenerational Relationship (Father-Side), and Outcomes

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.PPC	-												
2.PGF-SI	-.09	-											
3.PGF-LA	-.08	.52**	-										
4.PGF-FS	-.05	.54**	.56**	-									
5.PGF-EC	-.05	.43**	.54**	.68**	-								
6.PGM-SI	.00	.81**	.40**	.42**	.30**	-							
7.PGM-LA	-.10*	.47**	.89**	.49**	.46**	.50**	-						
8.PGM-FS	-.04	.45**	.44**	.81**	.54**	.53**	.60**	-					
9.PGM-EC	-.04	.41**	.47**	.58**	.87**	.43**	.58**	.66**	-				
10.SS	.09*	-.05	.04	.03	.00	-.03	.00	.00	-.04	-			
11.SP	.10*	-.10*	-.01	-.04	-.05	-.07	.00	-.04	-.09*	.30**	-		
12.ST	.17**	-.02	.03	-.02	-.07	-.04	-.02	-.02	-.08	.27**	.40**	-	
13.ANX	.14**	-.01	.01	-.05	-.05	.02	.01	-.06	-.05	.42**	.28**	.25**	-
Cronbach's α	.88	.65	.75	.82	.91	.66	.75	.82	.92	.67	.78	.78	.86

Note: *. Correlation is significant at the .05 level (2-tailed).

** . Correlation is significant at the .01 level (2-tailed).

PPC = paternal psychological control; PGF = paternal grandfather; PGM = paternal grandmother; SI = school involvement; LA = leisure activities; FS = functional support and caretaking; EC = emotional closeness; SS = stress of school performance; SP = stress of peer pressure; ST = stress of teacher interaction; ANX = academic anxiety.

Table 3.2*Bivariate Correlations of Maternal Psychological Control, the Intergenerational Relationship (Mother-Side), and Outcomes*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.MPC	-												
2.MGF-SI	-.08	-											
3.MGF-LA	-.02	.51**	-										
4.MGF-FS	-.06	.57**	.51**	-									
5.MGF-EC	-.14**	.56**	.43**	.60**	-								
6.MGM-SI	-.07	.49**	.93**	.44**	.39**	-							
7.MGM-LA	-.07	.91**	.51**	.53**	.53**	.53**	-						
8.MGM-FS	-.01	.54**	.47**	.86**	.55**	.51**	.60**	-					
9.MGM-EC	-.10*	.57**	.40**	.55**	.88**	.45**	.58**	.63**	-				
10.SS	.09*	.03	.02	.05	-.01	.07	.06	.11*	.06	-			
11.SP	.12**	-.01	-.01	-.05	-.04	-.05	-.02	-.07	-.08	.30**	-		
12.ST	.19**	.03	-.02	-.04	-.04	.00	.03	.01	-.01	.27**	.40**	-	
13.ANX	.14**	.04	-.06	-.03	-.08	-.02	.02	-.03	-.05	.42**	.28**	.25**	-
Cronbach's α	.89	.67	.74	.83	.90	.63	.77	.83	.90	.67	.78	.78	.86

Note: *. Correlation is significant at the .05 level (2-tailed).

**. Correlation is significant at the .01 level (2-tailed).

MPC = maternal psychological control; MGF = maternal grandfather; MGM = maternal grandmother; SI = school involvement; LA = leisure activities; FS = functional support and caretaking; EC = emotional closeness; SS = stress of school performance; SP = stress of peer pressure; ST = stress of teacher interaction; ANX = academic anxiety.

Table 3.3*Path-Analysis Models for the Father-Side Grandparents*

	Academic Anxiety			Stress of School Performance			Stress of Peer Pressure			Stress of Teacher Interaction		
	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Model FF. paternal psychological control and PGF-grandchild relations w/ interaction												
Constant	2.26	.18	<.01	3.08	.18	<.01	2.24	.19	<.01	2.60	.21	<.01
Paternal psychological control (X_f)	.16	.06	.01	.03	.06	.67	.17	.07	<.01	.18	.07	.01
PGF school involvement (Z_1)	.04	.05	.48	-.05	.05	.33	-.01	.06	.86	.00	.06	.99
PGF leisure activities (Z_2)	.03	.05	.49	.03	.05	.58	.01	.06	.90	.04	.05	.41
PGF functional support and caretaking (Z_3)	-.04	.04	.37	.04	.04	.34	.01	.04	.76	.01	.05	.89
PGF emotional closeness (Z_4)	-.01	.04	.85	-.01	.04	.82	-.04	.04	.35	-.06	.04	.18
Interaction $X_f * Z_1$	-.05	.07	.51	.08	.07	.27	-.05	.08	.50	-.15	.09	.08
Interaction $X_f * Z_2$	.12	.08	.13	.04	.08	.62	.18	.08	.03	.02	.09	.82
Interaction $X_f * Z_3$	-.08	.06	.19	-.08	.06	.18	-.02	.07	.77	-.05	.07	.52
Interaction $X_f * Z_4$	.04	.06	.50	-.03	.06	.63	.01	.06	.84	.11	.07	.11
Model FM. paternal psychological control and PGM-grandchild relations w/ interaction												
Constant	2.09	.18	<.01	3.09	.18	<.01	1.81	.19	<.01	2.63	.21	<.01
Paternal psychological control (X_f)	.11	.06	.08	.05	.06	.38	.13	.06	.04	.23	.07	<.01
PGM school involvement (Z_5)	.06	.05	.21	.00	.05	.96	-.02	.05	.75	-.03	.05	.56
PGM leisure activities (Z_6)	.01	.04	.80	.00	.04	.95	.01	.04	.84	.02	.05	.62
PGM functional support and caretaking (Z_7)	-.04	.03	.21	.02	.03	.54	.04	.04	.22	.04	.04	.32
PGM emotional closeness (Z_8)	-.01	.03	.72	-.03	.03	.41	-.08	.04	.02	-.09	.04	.02
Interaction $X_f * Z_5$	-.07	.06	.23	.06	.06	.29	-.10	.06	.12	-.13	.07	.06
Interaction $X_f * Z_6$	.08	.06	.21	.09	.06	.15	.15	.07	.03	.03	.07	.69
Interaction $X_f * Z_7$	-.03	.06	.59	-.02	.06	.67	-.04	.06	.45	-.05	.06	.39
Interaction $X_f * Z_8$	.04	.05	.42	-.05	.05	.30	-.03	.05	.61	.06	.06	.32

Note:

1. Participant's gender, academic standing, the number of paternal grandparents' grandchildren, father's parenting belief, and co-residence time with paternal grandfather (model FF) or co-residence time with paternal grandmother (model FM) were controlled for.
2. PGF = paternal grandfather; PGM = paternal grandmother.

Table 3.4*Path-Analysis Models for the mother-side grandparents*

	Academic Anxiety			Stress of School Performance			Stress of Peer Pressure			Stress of Teacher Interaction		
	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Model MF maternal psychological control and MGF-grandchild relations w/ interaction												
Constant	2.01	.17	<.01	3.16	.18	<.01	2.40	.19	<.01	2.61	.22	<.01
Maternal psychological control (X_m)	.06	.06	.31	.07	.06	.29	.10	.07	.13	.16	.07	.03
MGF school involvement (Z_9)	.01	.06	.93	.02	.06	.77	.07	.06	.30	-.04	.07	.61
MGF leisure activities (Z_{10})	.11	.05	.03	.01	.05	.81	.03	.05	.53	.07	.06	.23
MGF functional support and caretaking (Z_{11})	.00	.03	.95	.03	.04	.35	-.06	.04	.13	-.03	.04	.48
MGF emotional closeness (Z_{12})	-.05	.04	.12	-.03	.04	.47	-.02	.04	.70	-.03	.04	.46
Interaction $X_m * Z_9$	-.26	.08	<.01	.04	.09	.65	-.12	.09	.20	-.19	.11	.08
Interaction $X_m * Z_{10}$	.11	.08	.16	.03	.08	.74	.05	.08	.58	-.20	.10	.04
Interaction $X_m * Z_{11}$	.06	.06	.30	.00	.06	.99	-.02	.06	.72	.08	.07	.26
Interaction $X_m * Z_{12}$	.05	.05	.37	-.11	.06	.05	.02	.06	.78	.06	.07	.37
Model MM. maternal psychological control and MGM-grandchild relations w/ interaction												
Constant	2.14	.11	<.01	3.15	.16	<.01	2.22	.17	<.01	2.67	.19	<.01
Maternal psychological control (X_m)	.13	.06	.02	.10	.06	.08	.11	.06	.07	.17	.07	.01
MGM school involvement (Z_{13})	.02	.05	.73	.03	.05	.54	.01	.06	.93	-.05	.06	.44
MGM leisure activities (Z_{14})	.05	.04	.24	.01	.05	.85	.05	.05	.32	.07	.05	.16
MGM functional support and caretaking (Z_{15})	-.02	.03	.54	.05	.03	.17	-.03	.04	.36	-.01	.04	.87
MGM emotional closeness (Z_{16})	-.02	.04	.60	-.01	.04	.72	-.06	.04	.13	-.04	.04	.36
Interaction $X_m * Z_{13}$	-.09	.08	.23	.04	.08	.62	-.03	.08	.69	-.15	.09	.09
Interaction $X_m * Z_{14}$	-.12	.07	.06	-.06	.06	.33	-.04	.07	.58	-.24	.08	<.01
Interaction $X_m * Z_{15}$	.04	.06	.45	.06	.05	.24	.06	.06	.29	.15	.07	.03
Interaction $X_m * Z_{16}$	.08	.06	.20	-.05	.06	.36	.05	.06	.46	.13	.07	.06

Note:

1. Participant's gender, academic standing, the number of maternal grandparents' grandchildren, father's parenting belief, and co-residence time with maternal grandfather (model MF).
2. MGF = maternal grandfather.

Table 3.5*Multiple Group Path Analysis Models Predicting Academic Anxiety by Gender*

	Male				Female				Wald's test <i>p</i>
	β	<i>SE</i>	<i>t</i>	<i>p</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>	
Model FFG paternal psychological control and PGF-grandchild relations w/ interaction									
Constant	2.34	.22	10.70	<.01	2.22	.23	9.74	<.01	-
Paternal psychological control (<i>X_f</i>)	.10	.09	1.14	.26	.17	.09	1.90	.06	.58
PGF school involvement (<i>Z₁</i>)	.04	.08	.56	.58	.04	.08	.50	.62	.98
PGF leisure activities (<i>Z₂</i>)	.06	.07	.89	.37	.01	.06	.09	.93	.55
PGF functional support and caretaking (<i>Z₃</i>)	-.12	.06	-1.94	.05	.05	.05	1.04	.30	.03
PGF emotional closeness (<i>Z₄</i>)	.06	.06	1.07	.29	-.08	.05	-1.57	.12	.07
Interaction <i>X_f</i> * <i>Z₁</i>	-.12	.10	-1.24	.21	.06	.13	.41	.68	.29
Interaction <i>X_f</i> * <i>Z₂</i>	.15	.11	1.35	.18	-.03	.13	-.25	.80	.29
Interaction <i>X_f</i> * <i>Z₃</i>	.02	.09	.26	.80	-.11	.10	-1.14	.25	.32
Interaction <i>X_f</i> * <i>Z₄</i>	-.09	.08	-1.15	.25	.16	.10	1.63	.10	.05
Model FMG paternal psychological control and PGM-grandchild relations w/ interaction									
Constant	2.24	.25	9.12	<.01	2.35	.20	12.02	<.01	-
Paternal psychological control (<i>X_f</i>)	.06	.09	.67	.50	.12	.08	1.54	.12	.61
PGM school involvement (<i>Z₅</i>)	.14	.07	2.03	.04	-.01	.06	-.12	.90	.11
PGM leisure activities (<i>Z₆</i>)	.04	.06	.55	.58	.01	.05	.18	.86	.76
PGM functional support and caretaking (<i>Z₇</i>)	-.14	.05	-2.72	<.01	.05	.04	1.13	.26	<.01
PGM emotional closeness (<i>Z₈</i>)	.04	.05	.81	.42	-.07	.05	-1.64	.10	.09
Interaction <i>X_f</i> * <i>Z₅</i>	-.17	.08	-2.13	.03	.02	.09	.19	.85	.12
Interaction <i>X_f</i> * <i>Z₆</i>	.13	.09	1.45	.15	-.08	.10	-.82	.41	.11
Interaction <i>X_f</i> * <i>Z₇</i>	.06	.08	.81	.42	-.06	.08	-.77	.44	.27
Interaction <i>X_f</i> * <i>Z₈</i>	-.13	.07	-1.86	.06	.25	.08	3.12	<.01	<.01

Note: PGF = paternal grandfather; PGM = paternal grandmother.

Table 3.6*Summary Table for Moderating Effects in Chapter 3 Path Models*

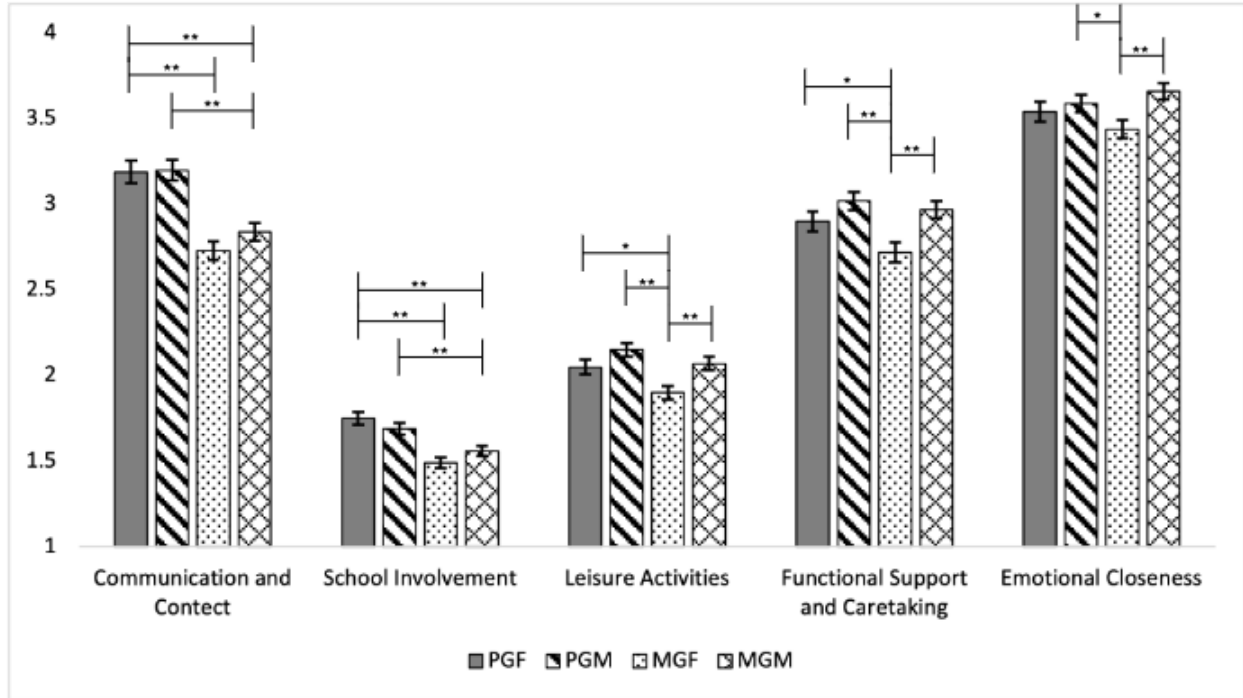
Main Effects	Moderator	Figure
Paternal psychological control – Stress of peer pressure	PGF leisure activities	Figure 3.2
Paternal psychological control – Stress of peer pressure	PGM leisure activities	Figure 3.3
Maternal psychological control – Academic anxiety	MGF school involvement	Figure 3.4
Maternal psychological control – Stress of school involvement	MGF emotional closeness	Figure 3.5
Maternal psychological control – Stress of teacher interaction	MGF leisure activities	Figure 3.6
Maternal psychological control – Stress of teacher interaction	MGM leisure activities	Figure 3.7
Maternal psychological control – Stress of teacher interaction	MGM functional support and caretaking	Figure 3.8
PGF functional support and caretaking – Academic anxiety	Gender	Figure 3.9
PGM functional support and caretaking – Academic anxiety	Gender	Figure 3.10
Paternal psychological control – academic anxiety	Gender-PGM emotional closeness (3-way interaction)	Figure 3.11

Note: PGF = paternal grandfather; PGM = paternal grandmother; MGF = maternal grandfather; MGM = maternal grandmother.

APPENDIX C: CHAPTER 2 FIGURES

Figure 2.1

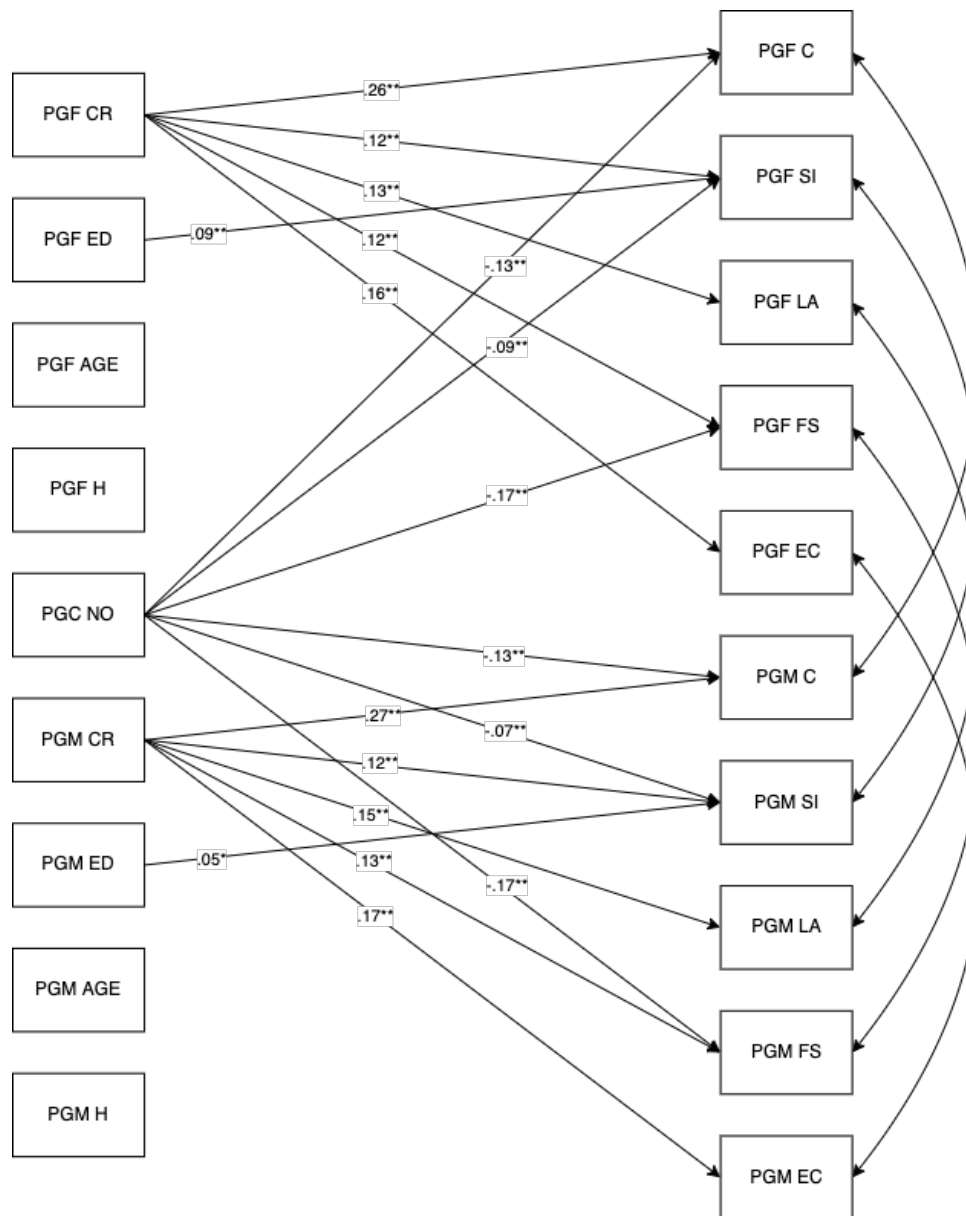
Means of Grandparent-Grandchild Relationship Domains



Note: PGF = paternal grandfather; PGM = paternal grandmother.
 MGF = maternal grandfather; MGM = maternal grandmother.
 *. The mean difference is significant at the .05 level.
 **. The mean difference is significant at the .01 level.
 Error bars represent standard errors.

Figure 2.2

Path Model Predicting the Grandparent-Grandchild Relationship (Father-Side)



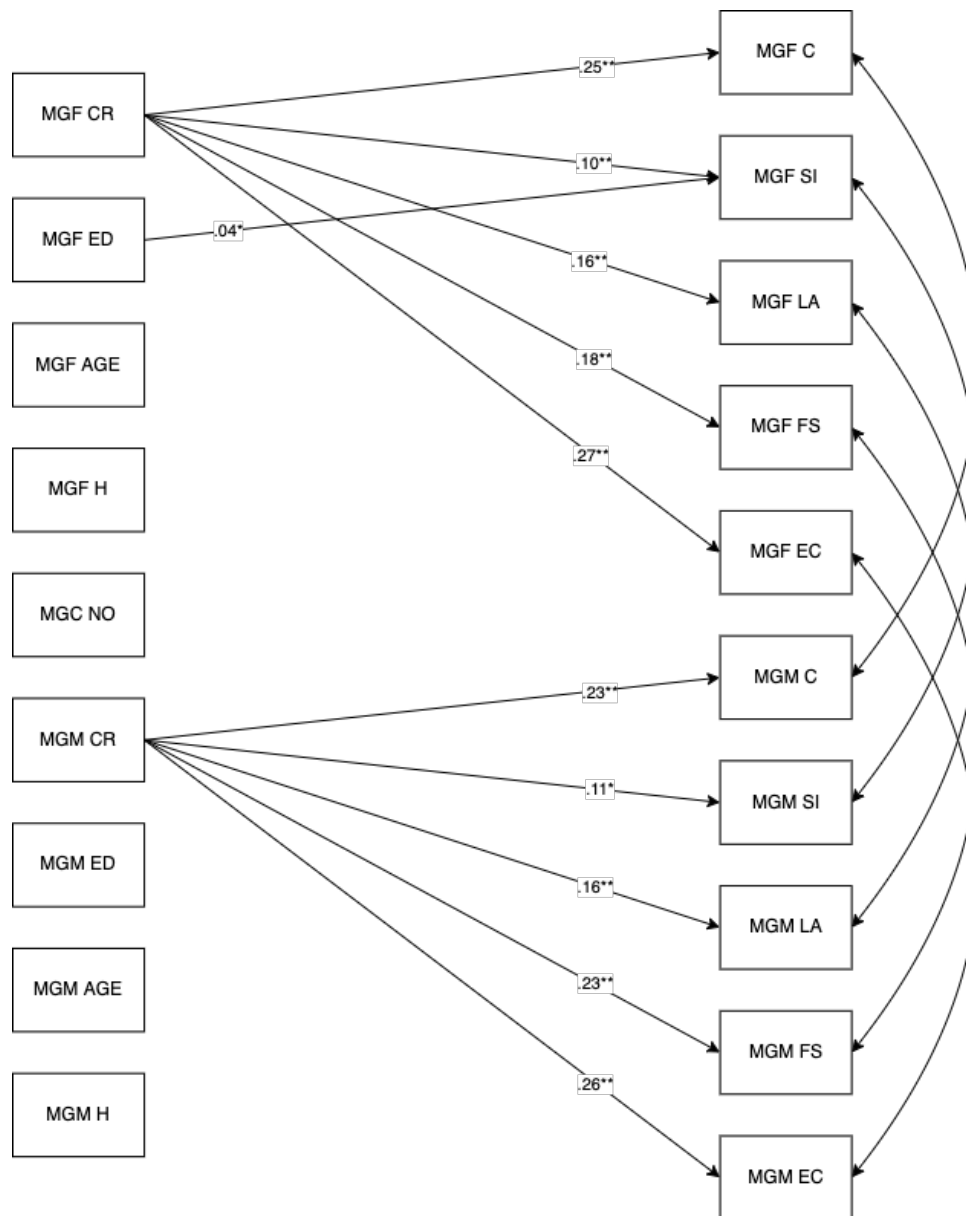
Note: *. The coefficient is significant at the .05 level (2-tailed).

**. The coefficient is significant at the .01 level (2-tailed).

PGC NO = number of paternal grandparents' grandchildren; PGF = paternal grandfather; PGM = paternal grandmother EDU = educational level; CR = co-residence time; AGE = age; H = health condition; CC = contact and communication; SI = school involvement; LA = leisure activities; FS = functional support and caretaking; EC = emotional closeness.

Figure 2.3

Path Model Predicting the Grandparent-Grandchild Relationship (Mother-Side)



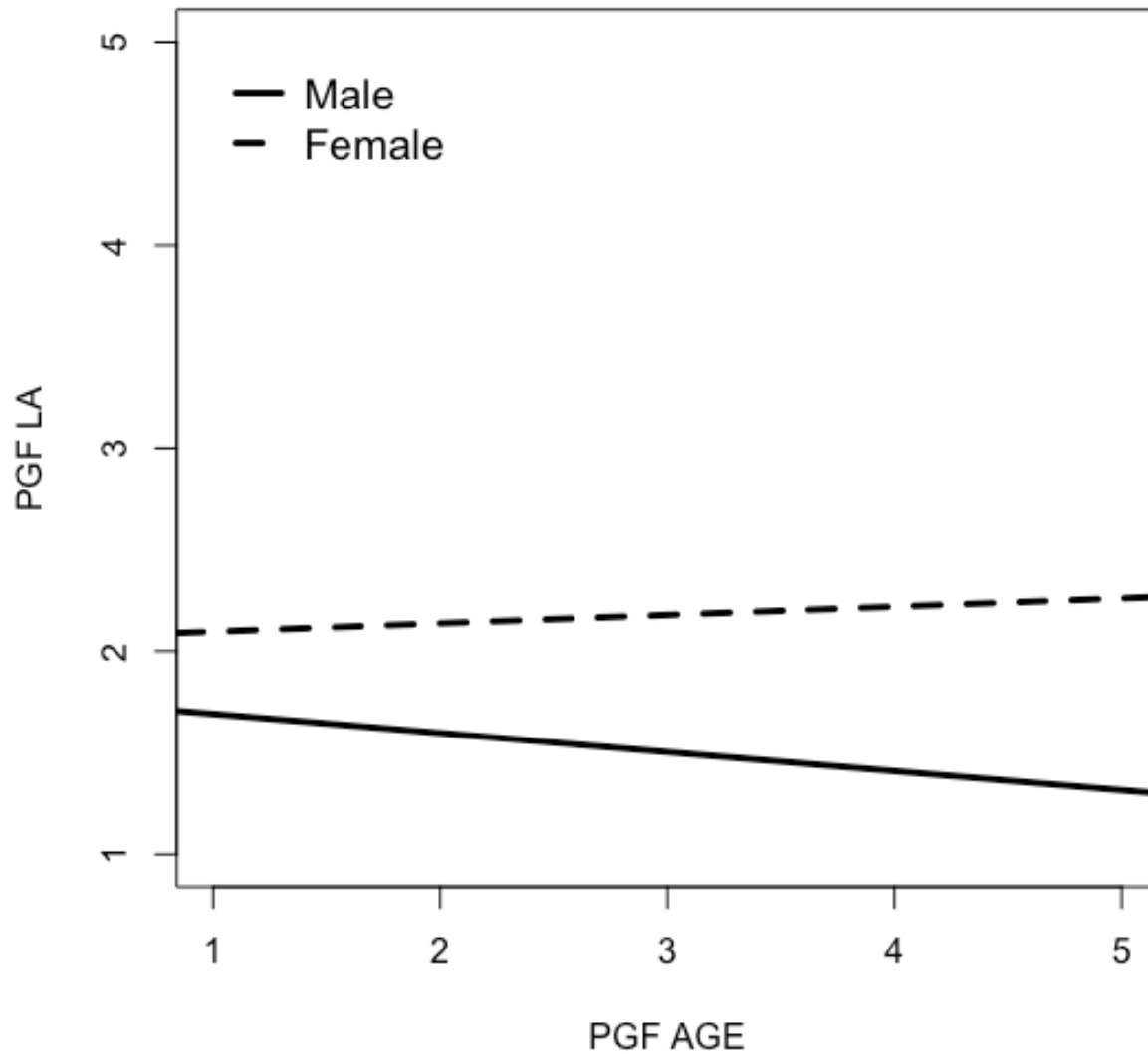
Note: *. The coefficient is significant at the .05 level (2-tailed).

** . The coefficient is significant at the .01 level (2-tailed).

MGC NO = number of maternal grandparents' grandchildren; MGF = maternal grandfather; MGM = maternal grandmother EDU = educational level; CR = co-residence time; AGE = age; H = health condition; CC = contact and communication; SI = school involvement; LA = leisure activities; FS = functional support and caretaking; EC = emotional closeness.

Figure 2.4

Relations of Paternal Grandfathers' Ages and Paternal Grandfather Leisure Activities in Male and Female Groups

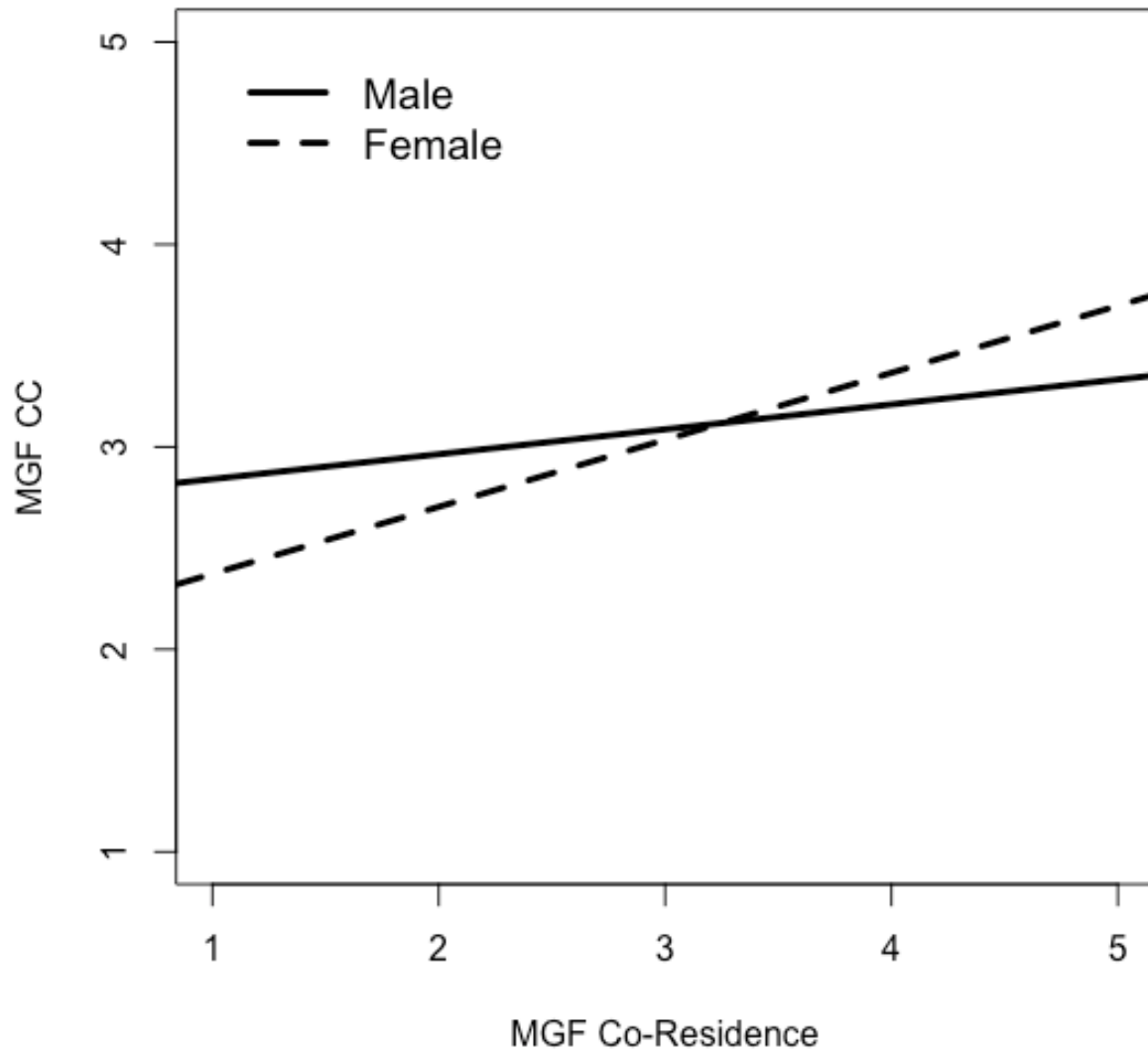


Note: PGF = paternal grandfather. LA = leisure activities.

The regression coefficient in the female group was NOT significant at .05 level.

Figure 2.5

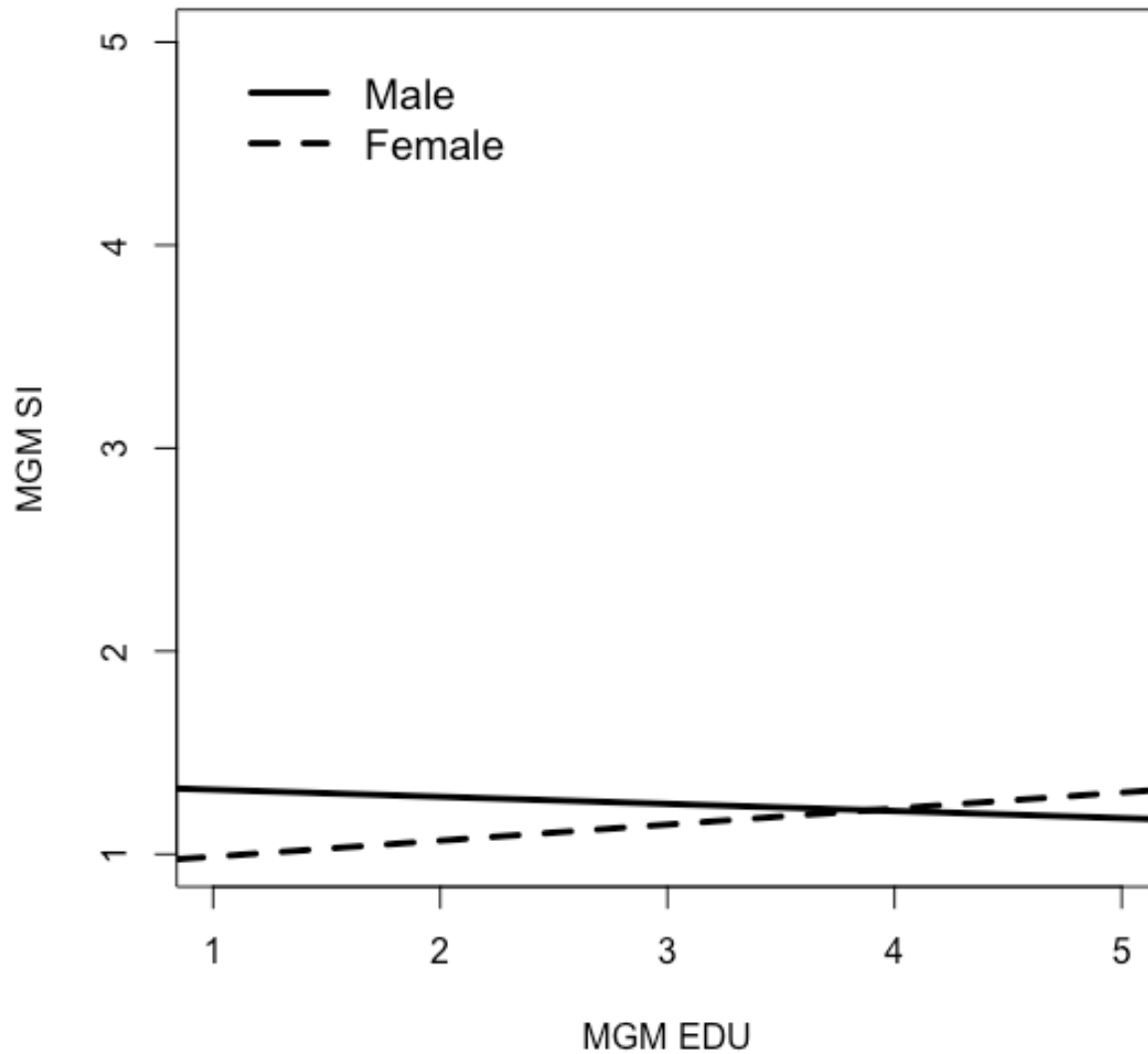
Relations of Maternal Grandfather Co-Residence Length and Maternal Grandfather Contact and Communication in Male and Female Groups



Note: MGF = maternal grandfather. CC = contact and communication.

Figure 2.6

Relations of Maternal Grandmother's Educational Level and Maternal Grandmother School Involvement in Male and Female Groups

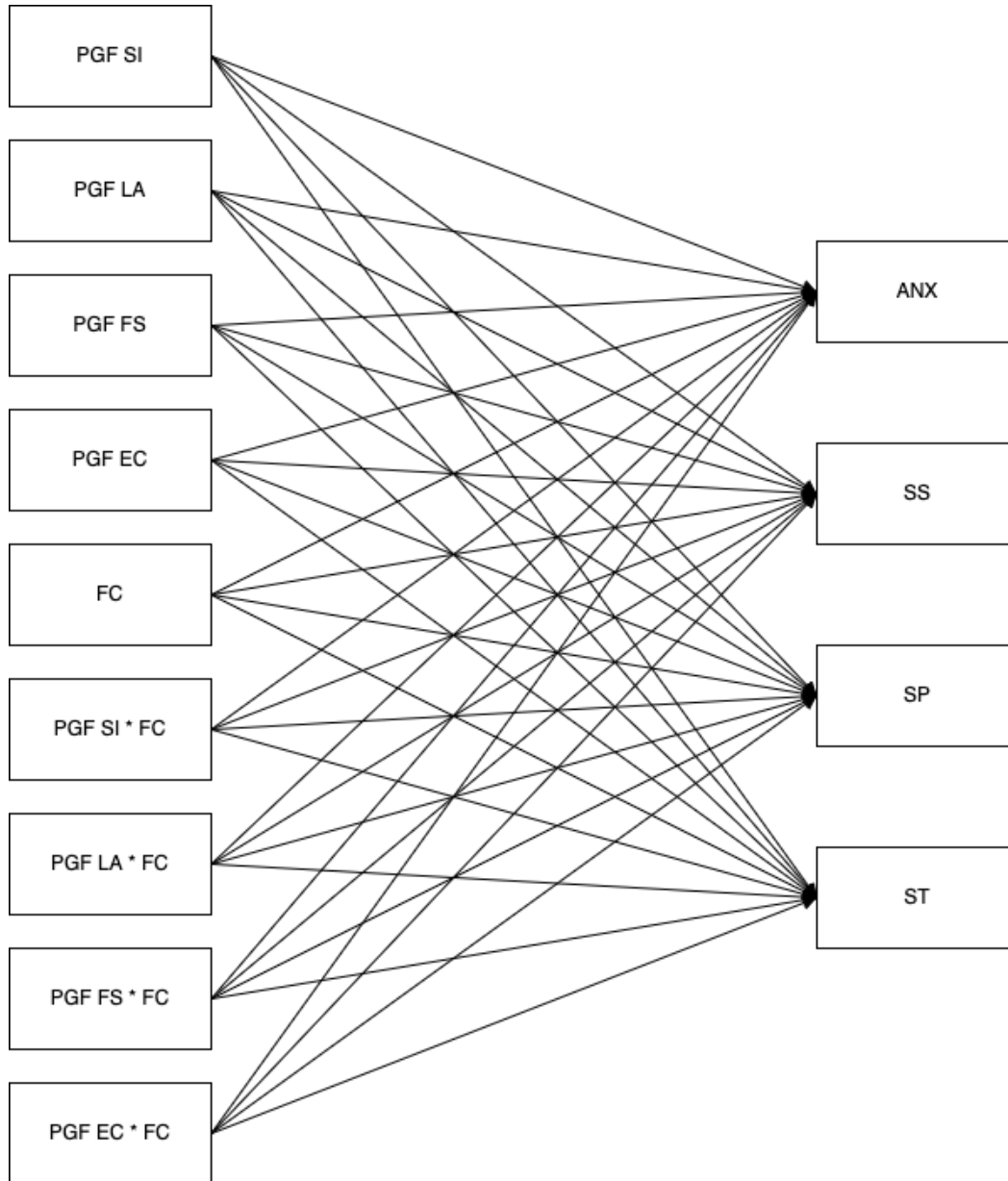


Note: MGM = maternal grandmother. EDU = educational level. SI = school involvement.
The regression coefficient in the male group was NOT significant at .05 level.

APPENDIX D: CHAPTER 3 FIGURES

Figure 3.1

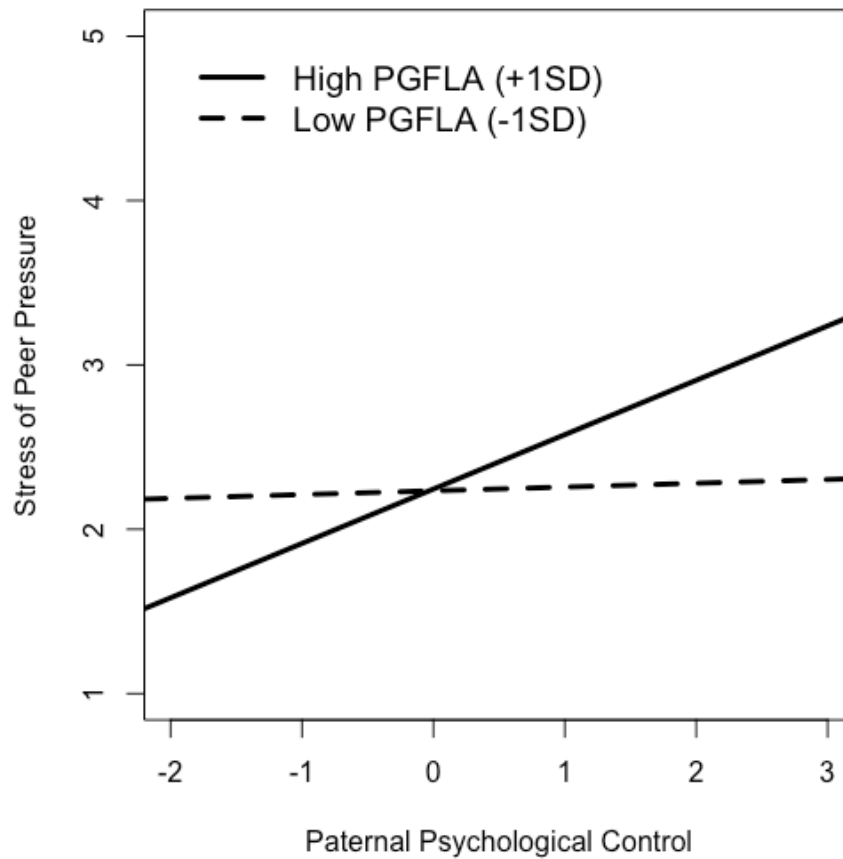
The Example Path Diagram of Paternal Psychological Control Predicting Adolescent Outcomes with Aspects of Paternal Grandfather Involvement as Moderators



Note: PGF = paternal grandfather; SI = school involvement; LA = leisure activities; FS = functional support and caretaking; EC = emotional closeness; FC = paternal psychological control; SS = stress of school performance; SP = stress of peer pressure; ST = stress of teacher interaction; ANX = academic anxiety.

Figure 3.2

The Interaction Effect of Paternal Psychological Control and Paternal Grandfather Leisure Activities on Stress of Peer Pressure

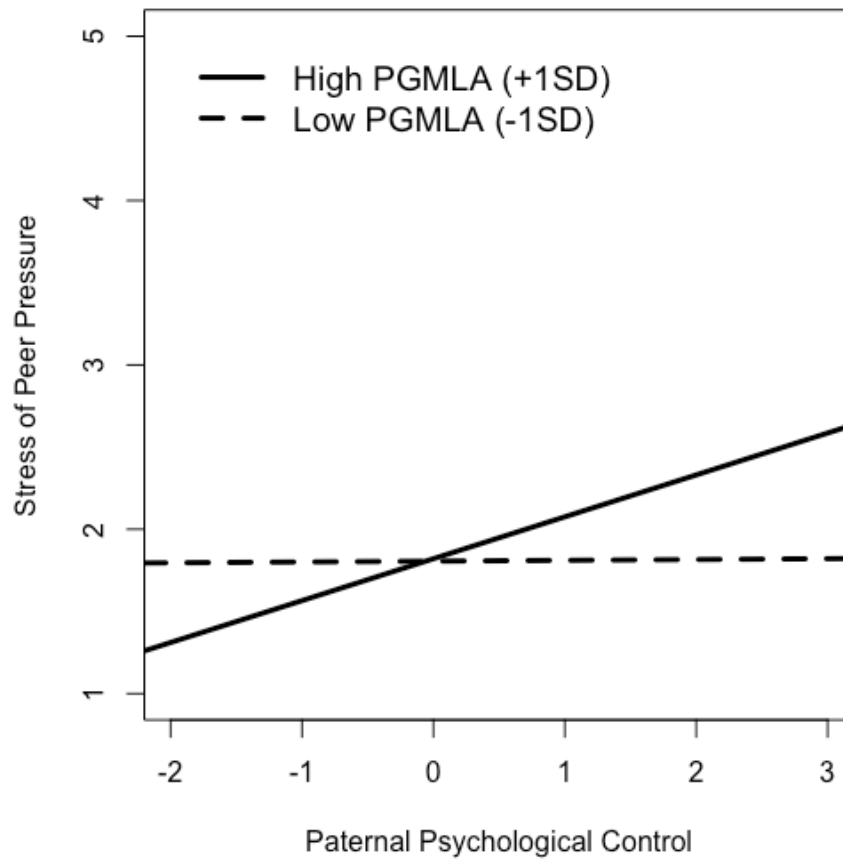


Note:

1. Parental psychological control ($M = 2.12$) and PGFLA ($M = 2.05$) are centered.
2. PGFLA = paternal grandfather leisure activities.
3. The regression coefficient for the low PGFLA group was not significant at .05 level.

Figure 3.3

The Interaction Effect of Paternal Psychological Control and Paternal Grandmother Leisure Activities on Stress of Peer Pressure

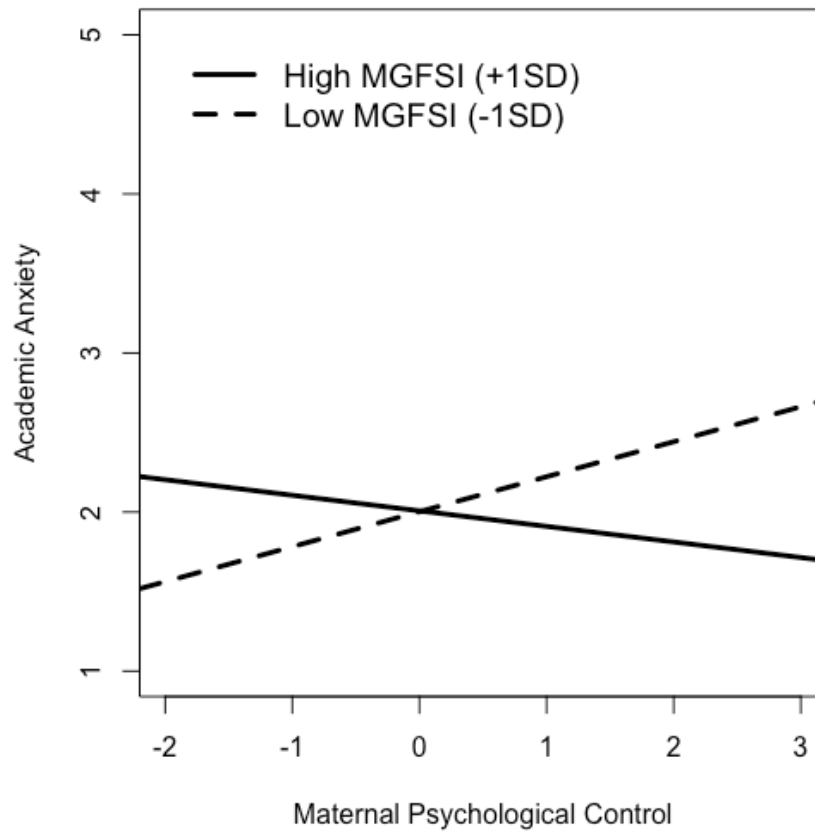


Note:

1. Parental psychological control ($M = 2.12$) and PGMLA ($M = 2.15$) are centered.
2. PGMLA = paternal grandmother leisure activities.
3. The regression coefficient for the low PGFLA group was not significant at .05 level.

Figure 3.4

The Interaction Effect of Maternal Psychological Control and Maternal Grandfather School Involvement on Academic Anxiety

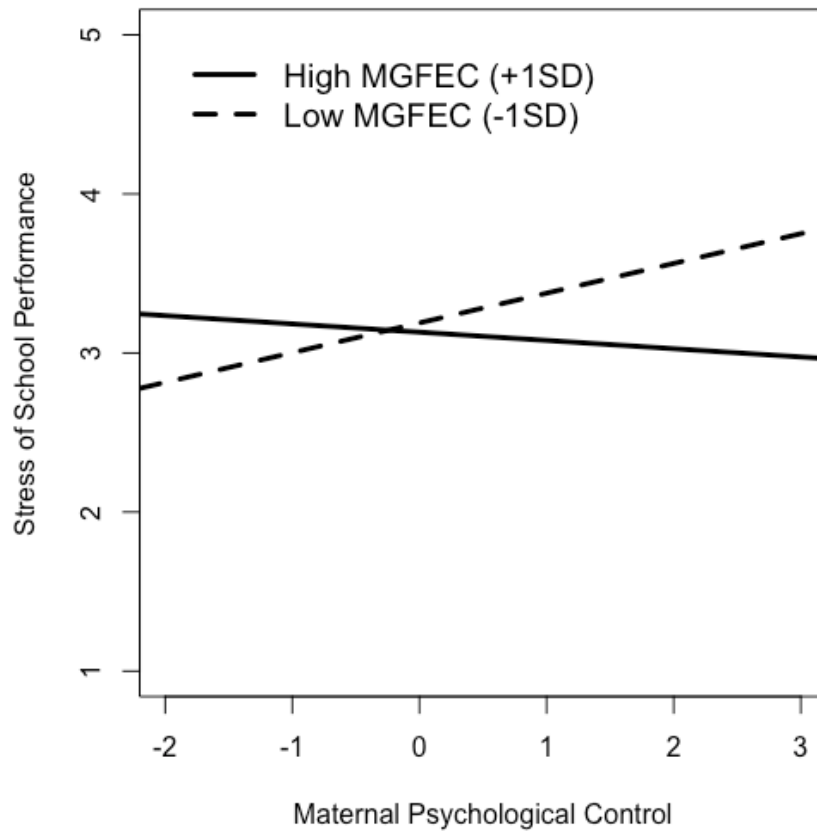


Note:

1. Maternal psychological control ($M = 2.13$) and MGFSI ($M = 1.51$) are centered.
2. MGFSI = maternal grandfather school involvement.
3. The regression coefficient for the high MGFSI group was not significant at .05 level.

Figure 3.5

The Interaction Effect of Maternal Psychological Control and Maternal Grandfather Emotional Closeness on Stress of School Performance

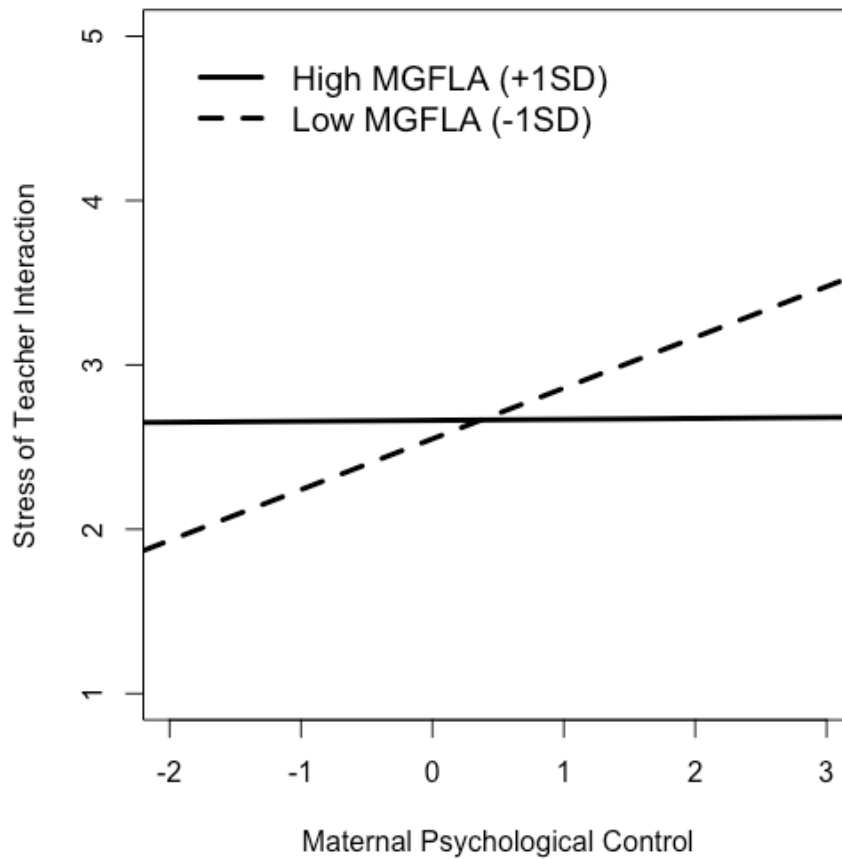


Note:

1. Maternal psychological control ($M = 2.13$) and MGFEC ($M = 3.46$) are centered.
2. MGFEC = maternal grandfather emotional closeness.
3. The regression coefficient for the high MGFEC group was not significant at .05 level.

Figure 3.6

The Interaction Effect of Maternal Psychological Control and Maternal Grandfather Leisure Activities on Stress of Teacher Interaction

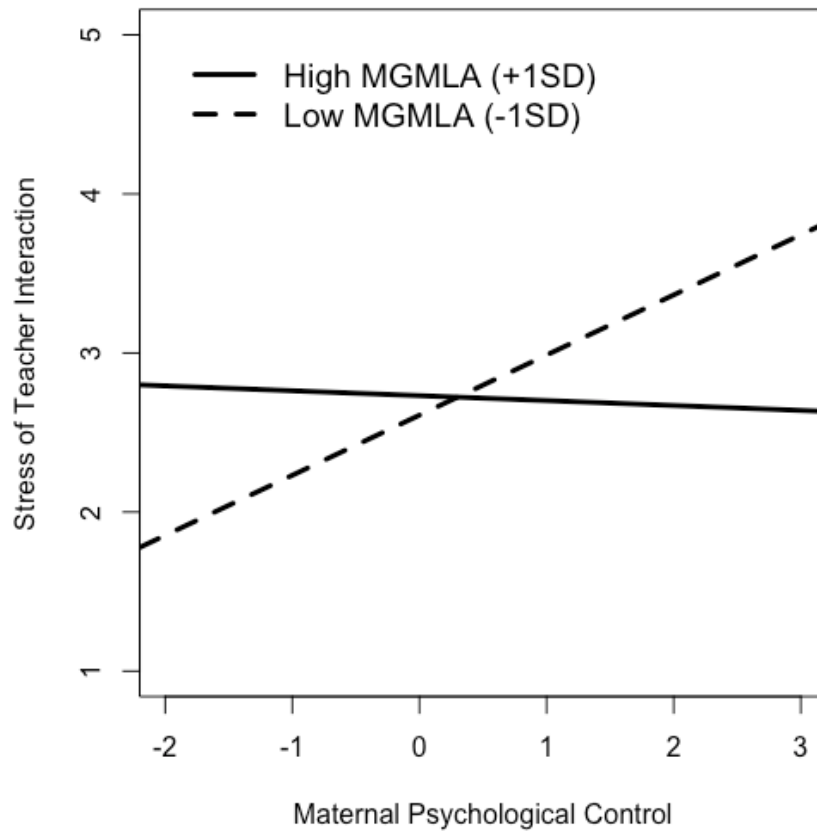


Note:

1. Maternal psychological control ($M = 2.13$) and MGFLA ($M = 1.90$) are centered.
2. MGFLA = maternal grandfather leisure activities.
3. The regression coefficient for the high MGFLA group was not significant at .05 level.

Figure 3.7

The Interaction Effect of Maternal Psychological Control and Maternal Grandmother Leisure Activities on Stress of Teacher Interaction

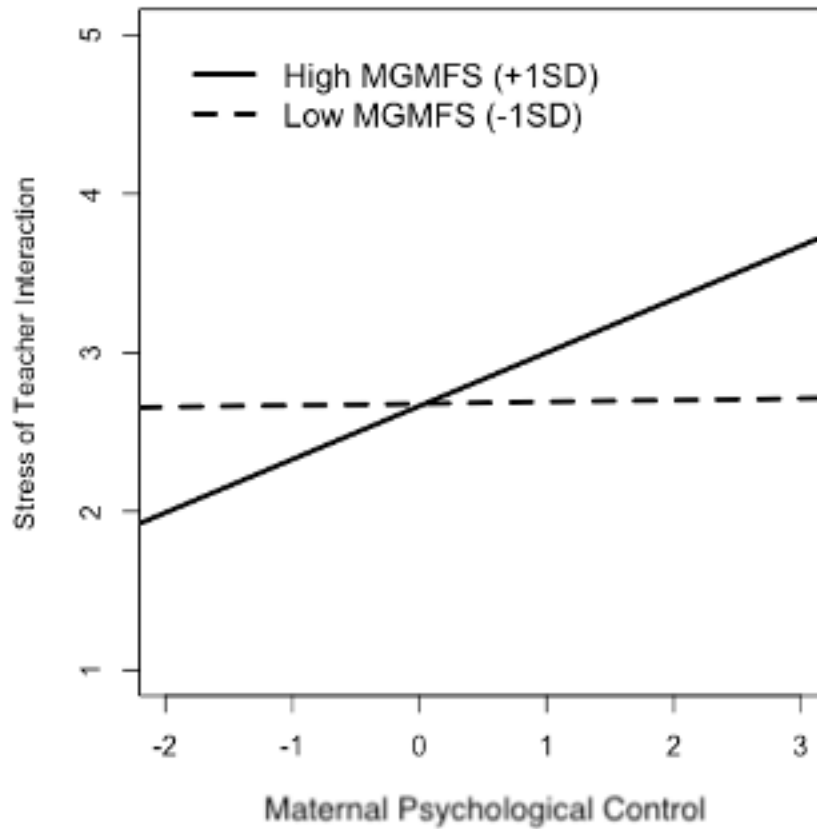


Note:

1. Maternal psychological control ($M = 2.13$) and MGMLA ($M = 2.09$) are centered.
2. MGMLA = maternal grandmother leisure activities.
3. The regression coefficient for the high MGMLA group was not significant at .05 level.

Figure 3.8

The Interaction Effect of Maternal Psychological Control and Maternal Grandmother Functional Support and Caretaking on Stress of Teacher Interaction

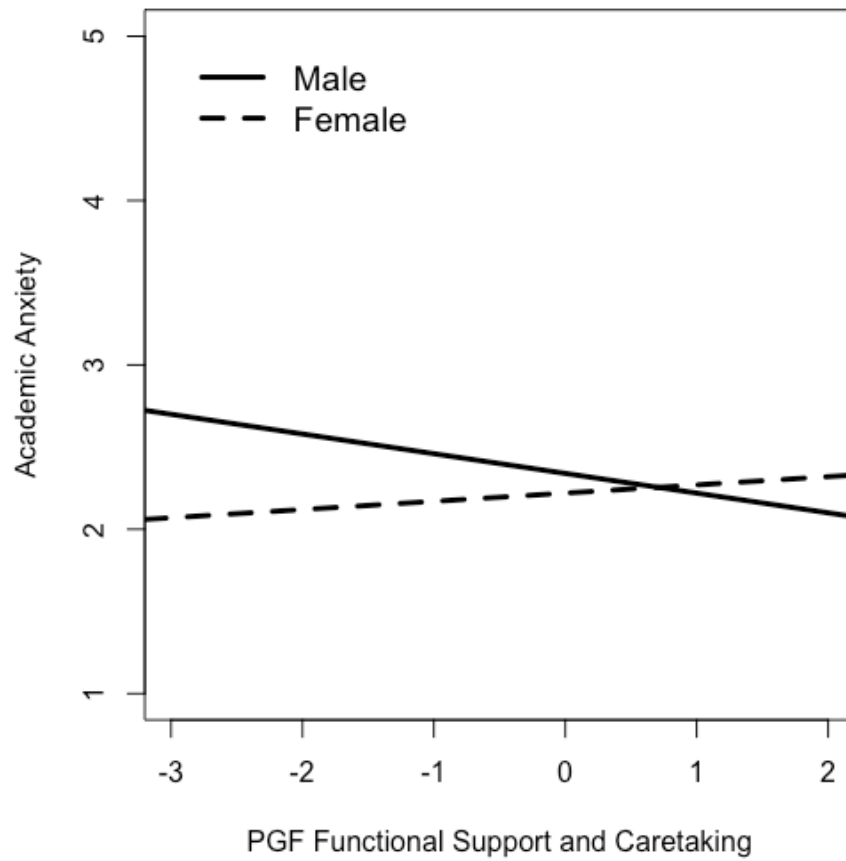


Note:

1. Maternal psychological control ($M = 2.13$) and MGMFS ($M = 3.02$) are centered.
2. MGMFS = maternal grandmother functional support and caretaking.
3. The regression coefficient for the low MGMFS group was not significant at .05 level.

Figure 3.9

The Effect of Paternal Grandmother Functional Support and Caretaking on Academic Anxiety by Gender



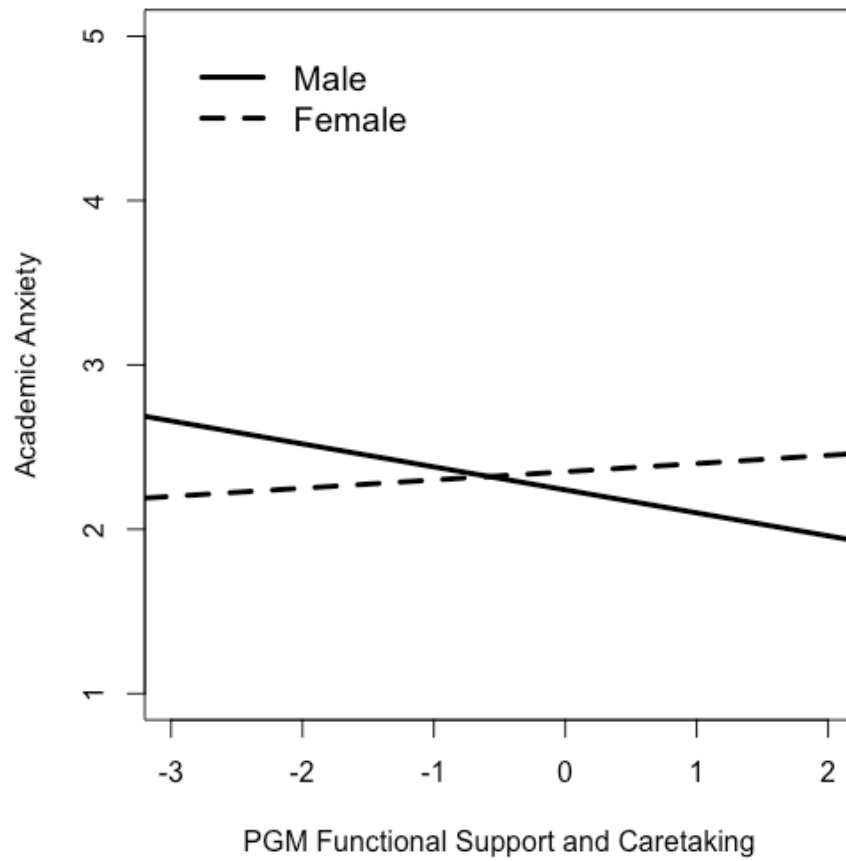
Note: PGF functional support and caretaking ($M = 2.90$) is centered.

The effect in female group is not significant ($p = .30$).

PGF = paternal grandfather.

Table 3.10

The Effect of Paternal Grandfather Functional Support and Caretaking on Academic Anxiety by Gender



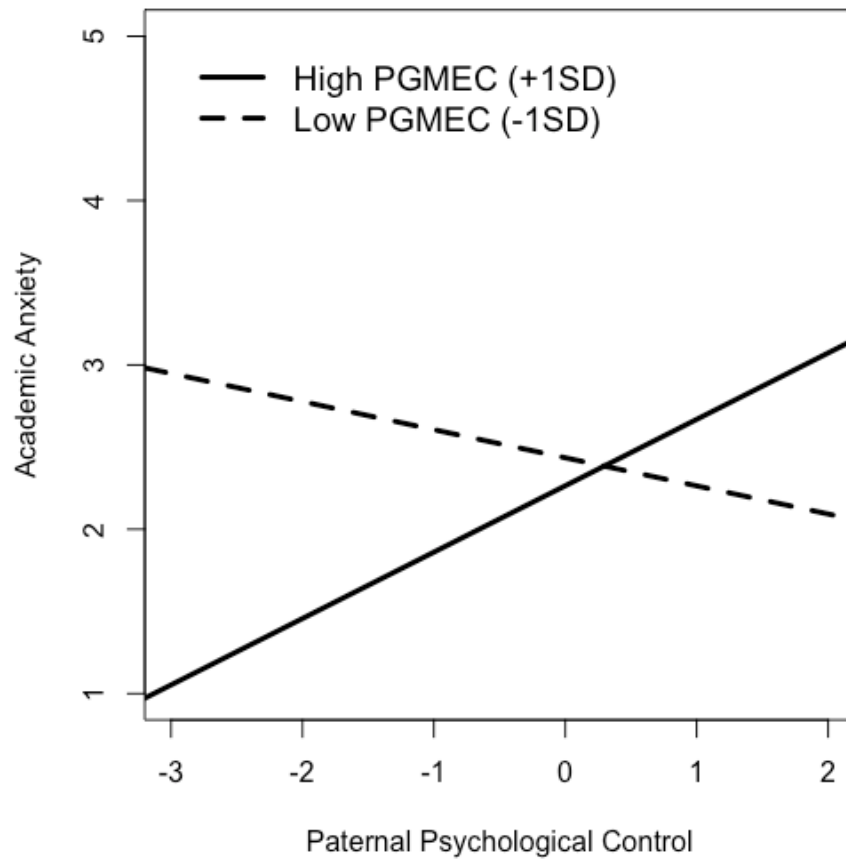
Note: PGF functional support and caretaking ($M = 3.02$) is centered.

The effect in female group is not significant ($p = .26$).

PGM = paternal grandmother.

Figure 3.11

The Interaction Effect of Paternal Psychological Control and Paternal Grandmother Emotional Closeness on Academic Anxiety in Females



Note: PGMEC in female group ($M = 3.48$) is centered.
The effect in the Low PGMEC group is not significant ($p = .17$).
PGMEC = paternal grandmother emotional closeness.