

BIDIRECTIONAL ASSOCIATION BETWEEN DEPRESSION AND MARITAL  
SATISFACTION AMONG COUPLES IN RURAL AND URBAN CHINA

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## ABSTRACT

Robust evidence supports the bidirectional and prospective association between depressive symptoms and marital satisfaction in couple relationships (Davila et al., 2003; Morgan et al., 2018; Whisman & Uebelacker, 2009; Woods et al., 2019). Still, there is a need to investigate this longitudinal association for couples with distinct sociodemographic and sociocultural backgrounds (Whisman et al., 2021). Additionally, it is vital to examine how partners' marital satisfaction and depressive symptoms impact the other's marital satisfaction and depressive symptoms. Previous studies on Chinese couples found cross-sectional associations between depressive symptoms and marital distress, as well as unidirectional effects of marital distress on depression (Cao et al., 2017; Miller et al., 2013; Wang et al., 2014). However, the nature of the associations between depressive symptoms and marital satisfaction among Chinese couples remains unclear.

The present study aims to investigate the bidirectional association between depressive symptoms and marital satisfaction among Chinese couples by controlling for potential confounding variables. A dyadic data analysis strategy was employed to test both actor and partner effects of the association. This study analyzed depressive symptoms and marital satisfaction over two years among 5,552 couples in rural ( $n = 4,021$ ) and urban ( $n = 1,531$ ) China. The results indicated a bidirectional association for Chinese couples overall. Specifically, a negative, bidirectional association between depression and marital satisfaction was found for Chinese couples. Both partners' depressive symptoms were negatively associated with their own levels of marital satisfaction at the baseline, and both partners' levels of marital satisfaction were linked to their own' initial levels of depressive symptoms, indicating that the actor effect was significant. Partner effects were insignificant when examining couples in rural and urban areas

together. However, differences in the associations existed based on gender and household location. For couples in rural areas, male partners' depressive symptoms were associated with their own and their spouses' previous levels of marital satisfaction, while female partners' depressive symptoms were merely linked to their own levels of marital satisfaction at the baseline. Urban male partners' levels of depressive symptoms were not associated with either their own or their spouses' previous levels of marital satisfaction, in contrast to urban female partners' whose own levels of depressive symptoms were associated with previous levels of marital satisfaction. Other differences were also found in this study. Results revealed that the association between levels of marital satisfaction and depressive symptoms varied depending on the couples' personal characteristics. These findings strengthen the theoretical basis for applying couple therapy to treat both marital satisfaction and depression for Chinese couples. Future studies are needed to explore the factors and mechanisms causing the variations among couples in diverse sociodemographic regions.

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## CHAPTER I: INTRODUCTION

### **Statement of the Problem**

Depression is a prevalent mental disorder in which a lasting and pervasive sadness can impair an individual's ability to function physically and psychologically (American Psychiatric Association, 2013). The prevalence of major depressive disorder is estimated to be 6% in the past year and 15%-18% in one's lifetime (Bromet et al., 2011; Kessler & Bromet, 2013). Specifically, an estimated 56.36 million Chinese were depressed in 2017, accounting for 21.3% of the total cases worldwide (Ren et al., 2020). Additionally, depression is associated with a high risk of substance use, suicidal thoughts and behaviors, and all-cause mortality (Ren et al., 2020; Xia et al., 2022; Yang et al., 2013; J. Zhang et al., 2019). Depression thus presents a serious public health issue in China.

Depression is a systemic syndrome whose onset and development are closely connected to the interactions and relational qualities between those who suffer from depression and those who surround them (Beach et al., 1990; Coyne, 1976b; Wittenborn et al., 2016). Despite the fact that stressful interaction patterns from depressive symptoms could occur in many interpersonal contexts, such as with friends or relatives, consistent empirical support shows that romantic partners' interactions and depressive symptoms are significantly associated with partners' depressive symptoms and perceived relational satisfaction (Rehman et al., 2008). Therefore, there is a need for further studies concerning depression in a couple relationship to further shed light on the relationship between depression and marital satisfaction.

The interplay between depression and marital satisfaction has robust empirical support (Goldfarb & Trudel, 2019; Whisman et al., 2021). Specifically, for Chinese couples, several cross-sectional and longitudinal studies confirmed the unidirectional relationship that low

satisfaction in marriage predicts depressive symptoms in self and partners in Chinese cities (Cao et al., 2017; Miller et al., 2013; Wang et al., 2014). In contrast, little attention has been paid to the association between relationship satisfaction and depressive symptoms among couples in rural China. Furthermore, Chinese urban areas are significantly different from rural areas in terms of higher educational levels (Wu, 2013), higher income levels (Su & Heshmati, 2013), more traditional beliefs about marriage and family (Ji & Yeung, 2014; Ma et al., 2018; Zhou, 2019), and more complex family structures (Ji & Yeung, 2014; Peng, 2016). Therefore, a research gap remains concerning the bidirectional association between depression and marital satisfaction in a general population and the differences in the bidirectional association across rural and urban China.

### **Theoretical Framework**

This study was informed by the couple discord model (CDM). CDM, developed by Beach (2014), theorizes that marital distress could trigger depression in partners, and the depressive symptoms of partners may exacerbate couples' stressful interactions and foster a vicious interpersonal environment that maintains partners' depressive symptoms. CDM evolved from the original marital discord model by incorporating the stress generation model to more thoroughly describe the reciprocal process between depression and relational satisfaction (Whisman et al., 2022).

According to CDM, depression leads to a decrease in marital satisfaction over time, and low marital satisfaction may cause the onset or increase in depressive symptoms (Beach, 2014). The present study examined whether the temporal and bidirectional association between depression and marital satisfaction exists among general Chinese couples. This study also

explored the variations in the reciprocal association among Chinese couples from diverse sociocultural backgrounds.

### **The Purpose of the Study**

First, a temporal bidirectional association between marital satisfaction and depression for Chinese couples remains unaddressed. Most existing studies involving Chinese couples have focused on the unidirectional and cross-sectional association between marital satisfaction and depression (Miller et al., 2013; Wang et al., 2014). By excluding some confounding variables, one longitudinal study further demonstrated the existence of an actor effect in the unidirectional association from marital satisfaction to depression over time but without controlling the initial level of depression (Cao et al., 2017). Another longitudinal study showed that the rate of change of depressive symptoms and the rate of change of marital satisfaction affect each other (Hsiao & Hwang, 2010).

Second, the sample populations in these studies were not representative of the whole Chinese population. Four studies recruited participants from large cities in China (Cao et al., 2017; Hsiao & Hwang, 2010; Miller et al., 2013; Wang et al., 2014), and only one study used a national sample of Chinese couples (Du et al., 2021). The involvement of participants with higher socioeconomic status in the samples from large cities may compromise the generalizability of the results beyond this demographic.

Third, the gender difference in the bidirectional association between the two variables remains unclear for Chinese couples. Some research found differences in the association by gender, in which female partners and male partners differed in the paths or the magnitude of the association (Dehle & Weiss, 1998; Fincham et al., 1997; Hsiao & Hwang, 2010; Woods et al., 2019). In contrast, some empirical literature has indicated that gender differences in the

association do not exist (Davila et al., 2003; Whisman & Uebelacker, 2009). Therefore, it is necessary to test whether there are gender differences among Chinese couples.

Fourth, it is important to explore the difference in the temporal association between the two variables across couples with various socioeconomic and sociocultural characteristics.

Whisman et al. (2021) underlined the importance of examining the causal association among couples with various characteristics to identify the variation in the longitudinal association.

Couples in rural and urban China differ in many aspects, such as education levels, gender role attitudes, and income levels, so it is significant to explore differences among these couples.

Fifth, examining both the actor and partner effects on depressive symptoms and marital satisfaction is essential for understanding the interplay between depressive symptoms and marital satisfaction among partners. This is important because there are contradictory findings regarding whether depressive symptoms in one partner could be associated with the levels of marital satisfaction of the other (Morgan et al., 2018; Whisman & Uebelacker, 2009). Exploring whether sociocultural differences between couples contribute to discrepancies in evidence regarding partner effects is an understudied area of research.

## **The Present Study**

The purpose of the present study was to examine the bidirectional association between depression and marital satisfaction in Chinese couples over two years using a nationally representative sample, identifying dyadic pattern differences by gender and household location (i.e., urban or rural). I used existing data from the China Family Panel Studies (Xie & Hu, 2014). By using an Actor-Partner Interdependence Model (APIM) approach in a structural equation modeling (SEM) framework, I explored whether the depressive symptoms and marital satisfaction levels at baseline predict the own and spouses' levels of marital satisfaction and

depressive symptoms. Meanwhile, I investigated whether the female and male partners in heterosexual Chinese couples demonstrate different dyadic patterns in the bidirectional associations. Furthermore, I examined the variation in the dyadic patterns of both partners by comparing rural and urban couples while using household location as a group variable.

### **Research Questions**

The current gaps in the literature demonstrate the need for further research to clarify the bidirectional association between depression and marital satisfaction for urban and rural Chinese couples. Motivated by this need, the following research questions were examined:

1. Do baseline depressive symptoms in one partner predict their own or their spouse's marital satisfaction two years later when controlling for partners' age, education, income, family structure, and gender role attitude?
2. Do baseline levels of marital satisfaction predict their own or their spouse's depressive symptoms two years later when controlling for partners' age, education, income, family structure, and gender role attitude?
3. Does the association between depressive symptoms and levels of marital satisfaction for partners in heterosexual couples in China differ by gender when controlling for partners' age, educational background, income, family structure, and gender role attitude?
4. Does the association between depressive symptoms and levels of marital satisfaction for partners in heterosexual couples in China differ for couples in rural and urban household locations when controlling for partners' age, educational background, income, family structure, and gender role attitude?

## CHAPTER II: LITERATURE REVIEW

### **Three Prominent Theories of Depression**

Three prominent interpersonal models of depression provide frameworks to conceptualize and explain the interpersonal process of depression in the context of couple relationships. They primarily focus on the unidirectional association between depression and relational satisfaction. This section presents an overview of these models and a literature review.

#### **Interactional Theory of Depression**

Coyne (1976a, 1976b) suggested that depressive symptoms could negatively affect interpersonal dynamics and posited an interactional theory of depression. According to this theory, people with depression may initially create attenuated interpersonal dynamics that can inhibit authentic communication and thus reinforce their depressive symptoms (Coyne, 1976b). When people are depressed, their repetitive assurance and support-seeking behaviors may, over time, make interactions with significant others more challenging, allowing people with depression to concentrate more on distortions and false beliefs about themselves and their relationships. In this case, it makes those with depression feel more insecure and exhibit more depressive symptoms (Coyne, 1976b).

In one of the first studies of this theory, Coyne et al. (1987) examined the distressing experiences of 42 adults living with a depressed person by comparing their experiences with those of 23 adults living with someone who was currently out of a depressive episode. Multiple regression analyses suggested that depressive symptoms could result in a generally distressed interpersonal environment. Another study compared the psychosocial function of spouses of patients whose depression had remitted, partially remitted, or not remitted (Krantz & Moos, 1987). Spouses of the remitted group reported encountering more psychosocial problems than

other groups. Likewise, the results of another study with a sample of 79 couples also supported this model (Benazon & Coyne, 2000).

### **Marital Discord Model of Depression**

The marital discord model was developed by Beach et al. (1990), which states that relational discord leads to depressive symptoms among partners by reducing the available support from the partner and increasing relational distress. The available support includes six facets: joint time and pleasant couple activities, acceptance of emotional expression, dyadic coping with external stressors, self-esteem support (e.g., appreciation and compliment), perceived dependability, and intimacy. Furthermore, the marital discord model identified five facets of couple interactions that could increase relational distress and deteriorate depressive symptoms: blame and severe denigration, serious break of routine, physical and verbal aggression, threats of separation, and major idiosyncratic marital stressors (e.g., substance abuse) (Beach et al., 1990).

A series of longitudinal studies tested the marital discord model by investigating the temporal association between marital distress and depressive symptoms. Burns et al. (1994) used structural equation modeling to test a causal relationship between relational satisfaction and depression severity in 115 patients with depression who received Cognitive Behavioral Therapy over 12 weeks. The researchers verified a minimal causal impact from relational satisfaction to the severity of depression. Whisman and Bruce (1999) conducted a longitudinal study on a community sample with 904 married participants. They assessed participants' marital dissatisfaction and the incidence of major depressive episodes over 12 months. According to the findings, couples who reported being dissatisfied were around four times more likely to

experience a major depressive episode within a year compared to those who were in a satisfying marriage (Whisman & Bruce, 1999).

Interestingly, Fincham et al. (1997) used a similar study design to follow 150 newlyweds for 18 months, but the results indicated a clear gender difference in the causal relationship between marital satisfaction and depression. The causal path for newly married men was from depression to marital satisfaction, while for newly married women, it was the opposite. The researchers elaborated that women might feel a greater sense of obligation to address relationship issues, while men might be more prone to dismissing or avoiding conflicts and challenges (Fincham et al., 1997).

The marital discord model of depression has received support from studies of participants from different countries, different age groups, and same-sex couples (Gilmour et al., 2022; Hollist et al., 2007; Wang et al., 2014). Salinger et al. (2021) conducted a cross-sectional study to explore the cross-cultural invariance of this association in 11 European countries. They divided these countries into three groups based on whether the countries were characterized as more family-oriented or individualistic-oriented. The results partially confirmed a stronger actor effect for partners in family-oriented countries compared to partners from countries with a greater emphasis on individualism (Salinger et al., 2021).

### **Stress Generation Model of Depression**

The stress generation model of depression stemmed from a study on depressed female outpatients who experienced a higher level of interpersonal stress partially caused by their depressive symptoms when compared to control groups (Davila et al., 1997; Hammen, 1991). The stress generation model of depression posits that depressive symptoms in couple relationships lead to marital discord. Furthermore, Hammen (1991) identified that, in contrast to

independent life events beyond personal control, dependent events such as interpersonal conflicts were significantly associated with the persistence of depressive symptoms for depressed female outpatients. Likewise, compared with the interactional theory of depression, Davila et al. (1997) suggested that nonverbal and verbal communication that depressed partners express are potential stress generators, including more frustrating emotions, self-blaming, and complaints.

This theory received further support from the longitudinal research conducted by Davila et al. (1997), which analyzed 172 newlywed couples' marital stress, depressive symptoms, and social support both at the beginning and after a year. The results provided support to the stress generation model among female partners. They also found a bidirectional association between marital function and depressive symptoms among female partners. Jones et al. (2001) extended the findings from the Davila et al. study. They found that depressed mothers perceived increased stress in marital relationships as well as in parent-child relationships, which indicates that the stress generation model holds true in other close family relationships as well (Jones et al., 2001). Morgan et al. (2018) further explored the causal sequence from depression to relational dissatisfaction by using a national sample. Results indicated a significant causal effect from depression to relational dissatisfaction across four years. Additionally, this study also confirmed that the prospective effect of depression on marital satisfaction was more significant than the effect of marital satisfaction on depression. Additionally, sociocultural factors could moderate the temporal effect of depression on marital satisfaction. Jenkins et al. (2020) found that if African American female partners reported a higher score indicating their racial identities were the central component of their identities, their depressive symptoms were more likely to lead to a decline in their male partners' marital satisfaction. In contrast, if not, African American female

partners' depression was not associated with male partners' marital satisfaction (Jenkins et al., 2020).

The interactional theory and the stress generation model consider that depressive symptoms initiate the effect on interactions and marital relationships. As Rehman et al. (2008) stated, these two theories did not explain the onset of depression. Although the marital discord model posits that marital distress contributes to the onset and development of depression, the evidence was more robust for female partners.

A series of longitudinal studies tested three models' validity, with inconsistent findings because many resulted in similar findings while others did not. For instance, Burns et al. (1994) found that changes in relational satisfaction showed a weak impact on depression for both female and male participants. However, Fincham et al. (1997) identified gender differences in the bidirectional association where a decrease in female partners' marital satisfaction was significantly associated with an increase in their own depressive symptoms 18 months later. The methodological differences could partially explain the differences in the results. For example, Burns et al. (1994) assessed participants' depression and relational satisfaction over a period of three months without dividing the sample by gender, while Fincham et al. (1997) assessed the same variables among newlywed couples over a period of 18 months. Two studies evaluated two dependent variables throughout different time lags in addition to differences in the sample population and analysis plan. According to Cole and Maxwell (2003), causal effects emerge after a certain time elapses, and measurement timing is critical in longitudinal studies. It takes time to develop depressive symptoms after couples are exposed to deteriorating partner interactions. In this case, the results might be different if a study were to evaluate the effect of marital satisfaction on depression at 3-month intervals versus 18-month intervals.

Whisman (2001) conducted a meta-analysis of 26 cross-sectional studies on marital satisfaction and depression. He concluded that, approximately, marital satisfaction accounted for 14% of the male partners' depression variance and 18% of the females' depression variance. Proulx et al. (2007) reported that the average effect size of 66 cross-sectional studies on the association of the two was estimated to be .37, and the average effect size of 24 longitudinal studies on the association of the two was estimated to be .25 by conducting another meta-analysis study.

### **The Bidirectional Temporal Association Between Depression and Marital Satisfaction**

Notably, researchers began to see the association between marital discord and depression as a reciprocal process or a bidirectional effect (Whisman & Baucom, 2012). As mentioned above in the study of Davila et al. (1997), the initial depressive symptoms of female partners led to higher marital distress, which in turn, caused them to become more depressed. As Davila (2001) stated, it is important to focus on the ongoing association and its underlying mechanisms over time. Beach et al. (2014) extended the original marital discord model of depression to CDM by integrating it with the stress generation model. The CDM theory, which centers on the interplay between depressive symptoms and relationship distress, served as the guiding framework for this study.

Consistent with this theory, the bidirectional causal association received support from longitudinal studies. Whisman and Uebelacker (2009) found that, for both partners, the baseline marital discord and depressive symptoms respectively predicted subsequent depression and marital discord two years later, which was replicated in the study conducted by Gustavson et al. (2012). Likewise, Morgan et al. (2018) confirmed the bidirectional association in the study with

a sample size of 1,876 couples. Additionally, they found that the causal effects from depression to relational distress for each partner ( $b_{\text{women}} = 0.33$ ,  $b_{\text{men}} = 0.25$ ) were larger than the reverse effects from depression to relational distress ( $b_{\text{women}} = 0.01$ ,  $b_{\text{men}} = 0.01$ ).

On the other hand, the initial levels of depression and marital satisfaction at baseline could mutually impact the trajectories of change, which received support from a series of longitudinal studies using growth curve methods (Davila et al., 2003; Dehle & Weiss, 1998; Hsiao & Hwang, 2010; Kouros et al., 2008; Pruchno et al., 2009). These studies revealed some different findings. Dehle and Weiss (1998) found that the initial level of marital quality showed a larger effect on depression increases for female partners than for male partners. In contrast, the results of Hsiao and Hwang (2010) showed that the increasing slope of the wife's depression trajectory has a greater effect on the wife's marital satisfaction than that of the husband's depression trajectory. In addition, the increasing slope of the husband's marital satisfaction has a greater effect on the increasing slope of his own depression trajectory than that of the wife's marital satisfaction. For couples with chronic disease, Pruchno et al. (2009) found that the change in marital satisfaction did not affect both partners' depression across two years.

Furthermore, theoretically, if the temporal association between depression and marital satisfaction exists, a decrease in depressive symptoms should lead to an increase in relational satisfaction. These processes have been observed in clinical research. Wittenborn et al. (2019) study of emotionally focused therapy indicated that couple therapy improved marital satisfaction after improving depressive symptoms for a group of couples, while for another group, marital satisfaction preceded changes in depression, and a third group experienced a simultaneous change in both depressive symptoms and marital satisfaction.

Previous research reported mixed evidence about the gender differences in the longitudinal association between depression and marital satisfaction. Fincham et al. (1997) identified a significant path for male partners from marital satisfaction to depression, while female partners had the reverse path from marital satisfaction to depression. Still, Whisman and Uebelacker (2009) insisted that no gender difference exists in the longitudinal association between depression and marital satisfaction for couples. However, Woods et al. (2019) identified the bidirectional association between marital dissatisfaction and depression among female partners across three waves in five years, but only unidirectional associations from marital distress to depression were significant for male partners.

Based on the above studies, a bidirectional and temporal association exists between depression and marital satisfaction for couples. Over time, the effect of depression on marital satisfaction is to a larger extent than that of marital satisfaction on depression. Additionally, the bidirectional association for male partners did not receive consistent support from research, specifically on the effect of depression on marital satisfaction. As a result, the evidence regarding the impact of gender is mixed.

### **The Association Between Depression and Marital Satisfaction Among Chinese Couples**

Several cross-sectional and longitudinal studies have investigated the association between depression and marital satisfaction among Chinese couples. Most of the studies focused on urban couples (Cao et al., 2017; Hsiao & Hwang, 2010; Miller, 2014; Wang et al., 2014), and only one study included a nationally representative Chinese sample (Du et al., 2021). Hsiao and Hwang (2010) found a bidirectional association between the rate of change in depression and the rate of change in marital satisfaction among urban couples, while the remaining studies confirmed a

unidirectional or cross-sectional association, such that higher levels of marital distress were related to higher levels of depressive symptoms at the same time (Cao et al., 2017; Du et al., 2021; Miller, 2014; Wang et al., 2014).

Miller et al. (2013) conducted the first study on the association among 391 couples living in two cities with a cross-sectional study design. A total of 391 couples were recruited in two urban cities from 1995 to 2001 using SEM with APIM. The results confirmed both actor and partner effects, but the gender difference in the association was not supported, which was consistent with Du et al. (2021). However, another cross-sectional study with an older-couple sample that included couples living in Beijing with an average age of 70 found different results using similar statistical methods (Wang et al., 2014). This study did not find that marital satisfaction was related to depressive symptoms within subjects, but there was a partner effect that male partners' marital satisfaction predicted female partners' depressive symptoms. These studies extended the literature on the association between marital satisfaction and depressive symptoms among Chinese couples and supported the application of the marital discord theory in China. However, they were limited by the use of cross-sectional data.

To examine longitudinal change, Cao et al. (2017) used path analysis with an APIM model to analyze data obtained from 203 newlywed couples in Beijing. At baseline, researchers collected self-report data on all variables except for depressive symptoms; depressive symptoms were measured two years after the baseline. All couples got married within three years of when they began their participation in the study. On average, they reported a higher socioeconomic status (SES) than the average level in Beijing. The study found an actor effect indicating that marital dissatisfaction was associated with one's own subsequent depressive symptoms, but partner effects were not significant. After controlling for confounding variables such as

neuroticism, self-esteem, and stressful life events, researchers identified that both partners' instability and the male partner's commitment were associated with their own depression two years later.

Hsiao and Hwang (2010) used Hierarchical Linear Modeling to analyze the dyadic trajectories of marital satisfaction and depression among 128 newlywed urban couples across three years. The results confirmed the cross-sectional bidirectional association between the mean of depression and the mean of marital satisfaction across three years. For the longitudinal changes, researchers found that the predicting effect from the depression slope to the marital satisfaction slope was larger for female partners than male partners. In comparison, male partners showed a larger effect of marital satisfaction on depression compared to female partners. Male partners' depression trajectories affected female partners' marital satisfaction trajectories, but there was no significant effect for female partners' depression on male partners' marital satisfaction trajectories.

These two studies explored the effects between depression and marital discord across time for Chinese couples (Cao et al., 2017; Hsiao & Hwang, 2010). Both used an urban couple sample. By controlling for confounding variables that were identified from previous research, the first study supported marital discord theory, and results suggested that other facets of marital function could lead to depression for newlyweds (Cao et al., 2017). However, because the data on depressive symptoms were not collected at the first time point, it is impossible to exclude the effect of previous depressive symptoms on later depressive symptoms. In this case, it is possible that the identified relationship between marital satisfaction and depressive symptoms at time 2 may be due, at least partially, to the influence of previous depressive symptoms on later depressive symptoms rather than only the influence of marital satisfaction on subsequent

depressive symptoms. Therefore, while the study's longitudinal design provided some evidence for the unidirectionality of the association between marital satisfaction and depressive symptoms, the possibility of reverse causality cannot be entirely ruled out (Gollob & Reichardt, 1987; Little, 2013).

The research on Chinese couples to date supports the cross-sectional unidirectional association between depression and marital satisfaction for couples in urban areas. Longitudinal findings support the effect of marital satisfaction on depression among couples in urban areas. However, it is unknown whether the association between depressive symptoms and marital satisfaction is bidirectional for Chinese couples and whether the associations differ by gender.

### **Potential Covariates Influencing Marriage and Depression in Rural and Urban Couples in China**

Rural and urban China are significantly different in many aspects, meaning researchers cannot ignore the sociodemographic and sociocultural influence on outcomes. Chinese household origin, namely hukou registration origin, is an institutional arrangement defined by China's household registration system used to classify people as either from urban or rural origin. These classifications are associated with different rights and levels of access to public welfare programs (Chan, 2019; Young, 2013). It is a controversial system, but the hukou registration origins are not merely about distinguishing between agricultural and non-agricultural populations (Chan & Wei, 2019; Cheng & Selden, 1994; Young, 2013). Initially, the hukou system was intended to control labor mobility. However, the hukou system has changed and evolved since the 1980s. People with high education and high income tend to migrate from rural areas to urban cities or from small towns to larger cities, but the converting of the hukou origin from a rural hukou (agricultural hukou) to a city hukou (non-agricultural hukou) remains

challenging, especially in many big cities with top economies and good welfare (Colas & Ge, 2019; Wang, 2020; K. Zhang et al., 2019).

The divide between urban and rural areas is widening rather than narrowing in the process of China's modernization (Li & Li, 2010). Hukou registration origin plays a fundamental role in shaping individuals' roles and identities in Chinese society, as well as their access to welfare services, education resources, and healthcare (Cai, 2018; Chan, 2019; Fu & Ren, 2010; Wang et al., 2019; Zhang et al., 2017). Because people also tend to marry someone of similar background to themselves, household location is a factor that can additionally impact who one marries as well (Wei & Zhang, 2016; Zhou, 2019).

Many conditions and restrictions between life in urban and rural areas influence Chinese couples. Rural and urban Chinese couples differ in relational satisfaction and depression. The average marital quality of couples in urban areas has been found to be higher than those in rural areas (Cheng et al., 2014; Yang & Li, 2013). The finding was also supported in a study using a community sample, in which couples from the city reported a higher marital quality compared to those from the countryside (Zheng et al., 2018). The primary challenges for couples in rural areas are separation and unfamiliar settings that people are exposed to because of migrant economics (Wu, 2020), expensive betrothal gifts (Yang, 2018), and the instability of available economic resources (Peng, 2011).

Mental health affects couples' marital satisfaction both in urban and rural areas (Zheng et al., 2018). Broadly, people in urban areas have better psychological health compared to those in China's countryside (Jiang et al., 2020; Zheng et al., 2018). Research found that people's depressive symptoms differed by hukou origins. Additional studies showed that people in the

countryside are more likely to have poor mental health conditions than people in urban areas (Guo & Lai, 2011; Yang & Li, 2013).

Therefore, given that couples in rural and urban areas differ in marital satisfaction and depression, analyzing the bidirectional association by treating couples of two distinct groups as a homogeneous population may lead to a superficial conclusion that misses underlying variations in the relationship between depression and marital satisfaction. On the other hand, as Whisman et al. (2006) suggested, ruling out potential influences that contribute to depression and marital satisfaction in the analysis may increase validity.

SES differs significantly between rural and urban Chinese couples. Higher SES is associated with a lower risk of depression and more satisfied couple relationships (Dobrowolska et al., 2020; Hoveling et al., 2022). Couples in rural China tend to have a lower education level and income compared to couples in urban areas (Gruijters & Ermisch, 2019; Knight, 2014). Specifically, a higher education level and a higher self-evaluated income level are positively associated with higher perceived happiness in rural and urban China (Xu et al., 2019). Additionally, Chinese couples tend to have happier marriages if they have higher education levels and income compared to those with lower education and income (Cheng et al., 2014). Additional demographic factors of importance include age and gender. Compared to men, women have a higher risk of depression but lower levels of marital satisfaction (Bromet et al., 2011; Dobrowolska et al., 2020). However, adults at an older age are more likely to have a lower risk of depression and a lower level of marital satisfaction (Dobrowolska et al., 2020; Kessler et al., 2010). For Chinese couples, researchers found that the development of marital quality displayed a “U” curve, which means middle-aged couples reported a lower marital quality while couples of higher and lower ages reported a higher level of marital quality (Cheng et al., 2014).

One cross-sectional study showed that Chinese women and men reported similar marital satisfaction (Luo et al., 2008).

Household size varies between couples residing in rural and urban areas. For example, adults in metropolitan cities are less likely to live in the multi-generation household (Peng, 2011, 2016; Wang, 2014). Early results from the China Family Panel Studies showed that rural origin background was associated with whether couples lived with multiple generations (Gruijters & Ermisch, 2019). There is mixed evidence regarding whether living with parents influences Chinese couples' relationships. Findings have shown that living with a father-in-law could increase couples' marital satisfaction (Chang, 2013), while couples may have less affectional communication if they live with parents (Hu et al., 2015).

Traditional gender role is also an important variable to consider, which is closely connected to marital satisfaction and depression (Kuehner, 2003; Qian & Sayer, 2016). Across rural and urban areas, Chinese traditional gender roles in marriage that emerged in the previous patriarchal society play an important role in influencing couples' relationships. In China's previous agricultural society, marriage was considered an important affair for the whole family, which was considered a unit to manage the family business (Fei, 1992). Due to the family business aspect, it was common for rural couples to be more emotionally distant than urban couples because people in rural areas tended to have more interaction with people of the same gender (Fei, 1992). Furthermore, the central axis was the male bloodline of the family, and the female partners were to assist the males in the business community that was made up of all family members, which created rigid patriarchal cultural practices. Traditional gender roles in marriage based on a patriarchal structure undergird power differences between female partners and male partners by defining female partners as submissive to male partners, which serves to

maintain and protect the patriarchal societal order (Levant & Powell, 2017). In this case, the emotional connection between couples was considered less important than the order and rules of the family system in the hierarchy.

Traditional gender role attitudes influence many facets of daily life for couples, such as work-life balance, child care, and distribution of household chores, all of which are associated with marital quality (Davis & Greenstein, 2009). The results of Cao et al. (2019) revealed that Chinese couples with similar gender role attitudes reported higher levels of marital satisfaction than couples with differing attitudes. Additionally, compared to traditional couples and couples with traditional female partners and non-traditional male partners, couples with traditional male partners and non-traditional female partners reported the lowest level of marital satisfaction (Cao et al., 2019). Even in large cities like Shanghai, women change their patriarchal norms in their marriage by using individual resources like occupation status (either a well-paid job or a respectable profession) or by adopting more modern feminist gender roles (Chien & Yi, 2014). Furthermore, X. Li et al. (2020) examined the longitudinal association between traditional gender ideology and marital quality among 240 urban newlyweds over three years. The results supported Cao et al. (2019) and also further revealed that male partners' strong support of traditional gender ideology predicted an increase in both partners' conflicts between demands at work and home as well as a poorer degree of male partners' marital quality one year later (X. Li et al., 2020).

Even though the economic and sociocultural environment has been changing rapidly, traditional gender roles in marriage from traditional patriarchal culture remain the norm in many areas in China, particularly in rural areas. Cao et al. (2019) used a latent profile analysis to study the connection between gender-related attitudes among 7,257 Chinese couples, showing that

most Chinese couples still hold a relatively traditional attitude toward gender roles in marriage, especially regarding household chores and female fertility. Even when women earn more than their male partners, the traditional gender role from the patriarchal culture forces them to perform more household duties than women who do not. This attempt to balance the uneven development of gender roles at home is called gender display. This concept shows women do not fit the traditional gender roles in that female partners should take care of household work while the male partners should be the breadwinners (Brines, 1994). Yu and Xie (2011) found that Chinese females in rural areas and Taiwan showed gender display behaviors while the females in urban cities did not, indicating the difference in traditional gender ideology across rural and urban areas.

In conclusion, China's rural and urban areas have differences that may influence marital function and depression for Chinese couples. As a result, researchers should consider household location as a variable when examining the temporal association between depression and marital satisfaction. In addition, relevant research should include age, educational background, income level, family size, and traditional gender role attitudes in their analyses to control for confounding variables.

## CHAPTER III: METHOD

### **Data**

Data were selected from China Family Panel Studies (CFPS) wave 2018 and wave 2020 datasets, specifically the adult questionnaires of both waves. CFPS is an ongoing national and longitudinal survey conducted by Peking University's Institute of Social Science Survey, carried out in 2010 and funded by the 985 Program of Peking University (Xie & Hu, 2014). CFPS used three steps of sampling techniques to define targeting households by employing administrative units and socioeconomic development measurements as the key stratification variables (Xie & Hu, 2014). In each sampling area (a province or municipality), CFPS first selected a district or county, then either a community or administrative village, and finally, a household was chosen for sampling. The interviewers would interview all the family members in each sampled household. The adult, children, family connections, and family economy data are separated into four datasets for each wave. Currently, CFPS contains six waves of data, including waves 2010, 2012, 2014, 2016, 2018, and 2020. The data were shared with researchers after all identifying information was removed. The baseline survey included 14,960 families and 42,590 participants from 25 provinces/ municipalities/autonomous regions, representing 95% of the Chinese population. While depression was assessed at waves 2012, 2016, 2018, and 2020, marital satisfaction was assessed at waves 2014, 2018, and 2020. In this study, waves 2018 and 2020 were used because they contain data on depression and marital satisfaction. The Michigan State University institutional review board (IRB) deemed the present study exempt from further review because it used de-identified, non-restricted public data. The IRB approved CFPS at Beijing University (IRB00001052-14010).

The CFPS data were suitable for the present study for three reasons. First, the CFPS survey includes couples' data with diverse demographic factors and geographical regions that are representative of the Chinese couple population. Second, the CFPS datasets use the same participant ID and spouse ID across different waves, which makes it easier for researchers to trace couples across waves. The last reason was that the CFPS survey includes all the relevant variables.

This study focused on couples who remained together across both waves. First, the 2018 and 2020 data were merged, resulting in a total of 42,530 adults (including adults in romantic relationships). Adults who did not have a partner (via spouse ID from the family connection data) were removed ( $n = 16,622$ ), and adults who were not married at either wave were removed ( $n = 11,229$ ), which resulted in 14,679 adults. Finally, I limited the sample to the same couples across both datasets, which resulted in a final sample of 11,104 adults or 5,552 couples in the same relationship across both waves.

### **Sample Characteristics**

The full descriptive information is shown in table 1 and briefly addressed here. There were 4,021 couples from rural areas (72.42%) and 1,531 couples from urban areas (27.58%). The mean age of female partners was 47.63 ( $SD = 13.22$ ), and the mean age of male partners was 49.39 ( $SD = 13.37$ ). The average household annual income for couples was ¥ 99,577.80 and the median was ¥ 70,000. Couples living in rural areas reported an average household income of ¥ 80,681.58 (median= ¥ 60,000; IQR = ¥ 31,000-100,000), and couples living in cities reported an average household income of ¥ 149,216.00 (median= ¥ 106,000; IQR = ¥ 68,000-171,500). Most female partners (90.47%) and male partners (88.49%) did not have a junior college degree or above. The majority of female partners (92.8%) and male partners (93.6%) reported their

ethnicity as Han. Female partners identified themselves as non-religious (21.9%), monotheism (22.5%), and polytheism (51.2%). Male partners identified themselves as non-believer (25.4%), monotheism (27.6%), and polytheism (42.7%). The correlations between partner's marital satisfaction and depression are shown in table 2. All depressive symptoms were negatively correlated with marital satisfaction scores. Baseline depressive symptoms of female partners and male partners are positively correlated with each other as well as their depressive symptoms at time 2. Similarly, both partners' marital satisfaction scores were positively correlated with each other and their satisfaction scores two years later.

According to the 2020 Population Census of China Report (Office of the Leading Group of the State Council for the Seventh National Population Census, 2021), the population with junior college and above education was 8.93% in 2010 and 15.47% in 2020. Therefore, couples' education in the sample is similar to the general population in China. It is also important to note the potential effect of the global COVID-19 pandemic on the data. Data collection for the 2020 wave started after the outbreak of COVID-19, which likely impacted couples' mental and relationship health. A cross-sectional study showed that 31% of Chinese couples reported a decrease in the perceived couple relationship quality, and 22% of couples reported a decrease in sexual desire (G. Li et al., 2020). However, couples with positive communication, including praise and encouragement, reported an increase in the perceived relationship emotional connection, partner's attractiveness, and partner's strengths (Jiang, 2022). As a result, the global COVID-19 pandemic may affect the data collected in 2020.

**Table 1***Full Descriptive Statistics*

|                           |              | <b>Total (n=5,552)</b> |               | <b>Rural (n =4,021, 72.4%)</b> |               | <b>Urban (n =1,531, 27.6%)</b> |               |
|---------------------------|--------------|------------------------|---------------|--------------------------------|---------------|--------------------------------|---------------|
|                           |              | Female partners        | Male partners | Female partners                | Male partners | Female partners                | Male partners |
| Ethnicity                 |              |                        |               |                                |               |                                |               |
|                           | Han (汉)      | 92.45%                 | 93.12%        | 91.59%                         | 92.14%        | 94.71%                         | 95.69%        |
|                           | Man (满)      | 1.40%                  | 1.22%         | 1.42%                          | 1.37%         | 1.37%                          | 0.85%         |
|                           | Miao (苗)     | 1.37%                  | 1.31%         | 1.72%                          | 1.69%         | 0.46%                          | 0.33%         |
|                           | Yi (彝)       | 1.22%                  | 0.92%         | 1.47%                          | 1.17%         | 0.59%                          | 0.26%         |
|                           | Hui (回)      | 0.70%                  | 0.70%         | 0.70%                          | 0.67%         | 0.72%                          | 0.78%         |
|                           | Others       | 2.45%                  | 2.25%         | 2.79%                          | 2.54%         | 1.57%                          | 1.50%         |
|                           | Missing      | 0.40%                  | 0.47%         | 0.32%                          | 0.42%         | 0.59%                          | 0.59%         |
| Religion/<br>spirituality |              |                        |               |                                |               |                                |               |
|                           | Non-believer | 21.88%                 | 25.32%        | 19.92%                         | 23.40%        | 27.04%                         | 30.76%        |
|                           | Monotheism   | 22.53%                 | 27.63%        | 22.68%                         | 27.13%        | 22.14%                         | 28.94%        |
|                           | Polytheism   | 51.15%                 | 42.65%        | 52.62%                         | 44.52%        | 47.29%                         | 37.75%        |
|                           | Missing      | 4.43%                  | 4.29%         | 4.77%                          | 4.95%         | 4.29%                          | 4.29%         |
|                           | Ancestor     | 55.60%                 | 58.39%        | 57.45%                         | 59.94%        | 50.75%                         | 54.34%        |
|                           | Fengshui     | 47.78%                 | 41.62%        | 48.25%                         | 42.80%        | 46.57%                         | 38.54%        |
|                           | Buddhism     | 36.94%                 | 26.31%        | 36.73%                         | 26.83%        | 37.49%                         | 24.95%        |
|                           | Taoism       | 22.68%                 | 14.16%        | 24.57%                         | 14.90%        | 17.70%                         | 12.21%        |
|                           | Ghost        | 9.64%                  | 7.19%         | 9.45%                          | 6.86%         | 10.12%                         | 8.03%         |
|                           | Christian    | 6.90%                  | 3.91%         | 6.86%                          | 3.95%         | 6.99%                          | 3.79%         |
|                           | Islam        | 3.67%                  | 2.52%         | 3.73%                          | 2.69%         | 3.53%                          | 2.09%         |
|                           | Catholicism  | 4.68%                  | 2.50%         | 4.90%                          | 2.74%         | 4.11%                          | 2.02%         |

Table 1 (cont'd)

## Education

|                |        |        |        |        |        |        |
|----------------|--------|--------|--------|--------|--------|--------|
| Elementary     | 48.70% | 34.96% | 57.95% | 42.80% | 24.43% | 14.37% |
| Middle school  | 29.03% | 36.01% | 29.15% | 39.05% | 28.74% | 28.02% |
| High school    | 12.73% | 17.53% | 8.70%  | 13.50% | 23.32% | 28.09% |
| Junior college | 5.76%  | 6.70%  | 2.79%  | 3.36%  | 13.59% | 15.48% |
| College        | 3.48%  | 4.41%  | 1.34%  | 1.24%  | 9.08%  | 12.74% |
| Graduate       | 0.29%  | 0.40%  | 0.07%  | 0.05%  | 0.85%  | 1.31%  |

|                   |         | Total ( <i>n</i> =5,552) |           |               |           | Rural ( <i>n</i> =4,021, 72.4%) |           |               |           | Urban ( <i>n</i> =1,531, 27.6%) |           |               |           |
|-------------------|---------|--------------------------|-----------|---------------|-----------|---------------------------------|-----------|---------------|-----------|---------------------------------|-----------|---------------|-----------|
|                   |         | Female Partners          |           | Male Partners |           | Female Partners                 |           | Male Partners |           | Female Partners                 |           | Male Partners |           |
|                   |         | <i>M</i>                 | <i>SD</i> | <i>M</i>      | <i>SD</i> | <i>M</i>                        | <i>SD</i> | <i>M</i>      | <i>SD</i> | <i>M</i>                        | <i>SD</i> | <i>M</i>      | <i>SD</i> |
| Age               |         | 47.63                    | 13.22     | 49.39         | 13.37     | 46.9                            | 13.04     | 48.65         | 13.20     | 49.53                           | 13.50     | 51.34         | 13.62     |
| D1                |         | 13.87                    | 3.93      | 12.81         | 3.62      | 14.14                           | 4.00      | 13.05         | 3.69      | 13.19                           | 3.65      | 12.21         | 3.37      |
|                   | missing | 3.87%                    |           | 4.00%         |           | 4.50%                           |           | 4.75%         |           | 2.22%                           |           | 2.02%         |           |
| D2                |         | 13.85                    | 4.07      | 12.91         | 3.90      | 14.15                           | 4.16      | 13.20         | 3.97      | 13.07                           | 3.71      | 12.16         | 3.60      |
|                   | missing | 1.80%                    |           | 1.22%         |           | 2.14%                           |           | 1.32%         |           | 0.91%                           |           | 1.00%         |           |
| MS1               |         | 4.42                     | 0.87      | 4.70          | 0.65      | 4.41                            | 0.91      | 4.70          | 0.67      | 4.43                            | 0.83      | 4.70          | 0.60      |
|                   | missing | 3.40%                    |           | 3.48%         |           | 4.00%                           |           | 4.10%         |           | 1.83%                           |           | 1.83%         |           |
| MS2               |         | 4.37                     | 0.90      | 4.67          | 0.68      | 4.37                            | 0.91      | 4.67          | 0.69      | 4.36                            | 0.87      | 4.66          | 0.67      |
|                   | missing | 0.05%                    |           | 0.04%         |           | 0.02%                           |           | 0.02%         |           | 0.13%                           |           | 0.07%         |           |
| Subjective income |         | 2.97                     | 1.07      | 2.96          | 1.01      | 3.00                            | 1.10      | 2.97          | 1.36      | 2.87                            | 1.00      | 2.94          | 0.93      |
|                   | missing | 5.91%                    |           | 4.29%         |           | 6.54%                           |           | 4.97%         |           | 4.25%                           |           | 2.48%         |           |

Table 1 (cont'd)

|                         |                       |      |       |      |                       |      |       |      |                       |      |       |      |
|-------------------------|-----------------------|------|-------|------|-----------------------|------|-------|------|-----------------------|------|-------|------|
| Traditional gender role | 13.18                 | 2.90 | 13.22 | 2.73 | 13.50                 | 2.80 | 13.46 | 2.65 | 12.36                 | 3.01 | 12.59 | 2.83 |
| missing                 | 1.17%                 |      | 1.28% |      | 1.29%                 |      | 1.32% |      | 0.85%                 |      | 1.18% |      |
| NFM                     | $M = 4.37, SD = 1.95$ |      |       |      | $M = 4.56, SD = 1.98$ |      |       |      | $M = 3.87, SD = 1.76$ |      |       |      |
| missing                 | 0.38%                 |      |       |      | 0.37%                 |      |       |      | 0.39%                 |      |       |      |

Note: D1= depressive symptoms score at 2018 wave. D2 =depressive symptoms score at 2020 wave. MS1= marital satisfaction at 2018 wave. MS2= marital satisfaction at 2020 wave. NFM=number of family members in the household.

**Table 2**

*Correlations Between Depressive Symptoms and Marital Satisfaction at Each Assessment*

|        | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8 |
|--------|---------|---------|---------|---------|---------|---------|---------|---|
| 1.FD1  | 1       |         |         |         |         |         |         |   |
| 2.FMS1 | -.235** | 1       |         |         |         |         |         |   |
| 3.MD1  | .285**  | -.132** | 1       |         |         |         |         |   |
| 4.MMS1 | -.105** | .207**  | -.218** | 1       |         |         |         |   |
| 5.FD2  | .349**  | -.171** | .147**  | -.055** | 1       |         |         |   |
| 6.FMS2 | -.176** | .373**  | -.097** | .137**  | -.193** | 1       |         |   |
| 7.MD2  | .133**  | -.086** | .403**  | -.121** | .202**  | -.098** | 1       |   |
| 8.MMS2 | -.077** | .111**  | -.153** | .316**  | -.057** | .199**  | -.145** | 1 |

Note: FD=Female partners' depressive symptoms. FMS=Female partners' marital satisfaction. MD= Male partners' depressive symptoms. MMS=Male partners' marital satisfaction.

\*\*. Correlation is significant at the 0.01 level (2-tailed).

## Measures

### Depressive Symptoms

Depressive symptoms were assessed using the Center for Epidemiologic Studies Depression (CES-D) questionnaire. The 20 items of CES-D were developed by Radloff (1977) to test the depressive symptoms in the past seven days and is a widely used measure of depressive symptoms. CES-D has been tested with Chinese participants, and Cronbach's  $\alpha$  was reported as ranging from 0.85 to 0.92, indicating high reliability (Han & Jia, 2012; Zhang et al., 2015).

CFPS 2018 and CFPS 2020 used CES-D 8 items (Table 3), one version of abbreviated CES-D scales that has received research support (Karim et al., 2015; Kohout et al., 1993). The Cronbach's  $\alpha$  of the CES-D 8 items was reported to be 0.84, indicating high reliability (Karim et al., 2015). The Cronbach's  $\alpha$  of the CES-D 8-item version at the 2018 wave is 0.86 for female partners and 0.88 for male partners. The Cronbach's  $\alpha$  of the CES-D 8-item version at wave 2020 is 0.92 for female partners and 0.93 for male partners.

**Table 3**

#### *CES-D 8 Items*

| In the past week, how often did you feel_____? |                                 | <1<br>day | 1-2<br>Days | 3-4<br>Days | 5-7<br>Days |
|------------------------------------------------|---------------------------------|-----------|-------------|-------------|-------------|
| CES-D 6                                        | I felt depressed                | 1         | 2           | 3           | 4           |
| CES-D 7                                        | I felt everything did as effort | 1         | 2           | 3           | 4           |
| CES-D 11                                       | My sleep was restless           | 1         | 2           | 3           | 4           |
| CES-D 12                                       | I felt happy                    | 1         | 2           | 3           | 4           |
| CES-D 14                                       | I felt lonely                   | 1         | 2           | 3           | 4           |
| CES-D 16                                       | I enjoyed life                  | 1         | 2           | 3           | 4           |
| CES-D 18                                       | I felt sad                      | 1         | 2           | 3           | 4           |
| CES-D 20                                       | I felt I could not get going    | 1         | 2           | 3           | 4           |

## **Marital Satisfaction**

Marital satisfaction was measured using a single-item question. The question assessed participants' subjective perceptions of their current relationships on a 5-point scale. The item is: "In general, are you satisfied with your current marriage/cohabitation?" Couples reported a specific number from 1 (very dissatisfied) to 5 (very satisfied). Both female partners and male partners reported their answers.

## **Other Covariates**

**Sociodemographic information.** Items also assessed age, gender, hukou register location, and education. Each sociodemographic variable was gathered by one item with each response option represented by an assigned number ranging from 0 to 10. For example, the item measuring the highest educational degree completed included the following options: Unschooled; Elementary school; Middle school; High school/ vocational high school; Junior college; Bachelor's degree; Master's degree; Doctoral degree. The hukou register locations were classified into agricultural hukou and non-agricultural hukou based on their identification documentation. The sociodemographic data from wave 2018 was used in this study.

**Attitude towards traditional gender roles in marriage.** This variable was measured using four items to investigate the subjective perspectives on conceptualizations of marriage on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating more traditional gender roles. The data were collected at wave 2020 (Table 4). Given that previous research found gender role attitudes to be a relatively stable personality trait in adults (Eagly et al., 2000; Wood et al., 1997), it is justifiable to treat it as a time-invariant variable, assuming that the score remained the same in 2018. After reverse scoring the last item, items were summed so that higher scores indicated a more traditional gender role attitude.

Cronbach's  $\alpha$  of the four items is 0.87 for the female partners in the sample and 0.90 for the male partners in the sample.

**Table 4**

*Attitude Towards Traditional Gender Roles in Marriage*

| Item                                                                                 | Strongly disagree | Disagree | Undecided | Agree | Strongly agree |
|--------------------------------------------------------------------------------------|-------------------|----------|-----------|-------|----------------|
| 1.Men should focus on career, while women should focus on taking care of the family. | 1                 | 2        | 3         | 4     | 5              |
| 2.For women, marrying a wealthy man is more practical than working hard.             | 1                 | 2        | 3         | 4     | 5              |
| 3.A woman's life is not really complete until she has children.                      | 1                 | 2        | 3         | 4     | 5              |
| 4.Men should do half the household chores.                                           | 1                 | 2        | 3         | 4     | 5              |

**Family size.** The family size was measured using one item asking how many family members were in the household. The participants responded to the question by giving out a specific number. The data were collected at wave 2018. There is no available information on the specific identities or characteristics of the additional family members beyond the number reported.

**The subjective experience of personal income level.** This variable was measured using one item asking how participants think their income compares to the local average on a 5-point Likert scale from 1 (very low) to 5 (very high). The subjective experience of financial status has been confirmed to have a stronger association with mental health outcomes than objective economic income (Ahnquist & Wamala, 2011; Wen et al., 2022). Regarding China's large population and economic inequality, the objective income in large cities is much higher than in some rural areas (Knight, 2014; Xie, 2016). Therefore, this study uses the subjective experiences

of income compared to the local average to analyze the effect of SES on depression and marital satisfaction.

## **Data Analytic Rationale and Strategy**

### **Rationale**

The systemic perspective posits that individuals' emotions should be understood in the system rather than in isolation (Beach et al., 1998), which still holds when we research the psychological processes of couples and families. Couples live together, and they maintain mental and physical intimacy. Their inner mental processes continuously influence each other through constant communication and interactions, which makes the variables involved in close relationships intrinsically linked. The observations of couples are not independent, so researchers cannot assume their data are independent (Kenny et al., 2006). Therefore, analyzing the couple in a dyad is more precise and does not violate the assumption of independence.

The APIM is a widely used dyadic data analysis approach. Researchers have applied the APIM model for a wide range of research questions in social and behavioral studies, including cross-sectional and longitudinal analyses (Kenny, 2018). Specifically, this model has been used in studies of couples' satisfaction and depression (Cao et al., 2017; Dekel et al., 2014; Du et al., 2021; Finkbeiner et al., 2013; Li & Johnson, 2018; Miller et al., 2013; Morgan et al., 2018; Regan et al., 2014; Salinger et al., 2021; Wang et al., 2014). Therefore, APIM is a suitable model for analyzing the bidirectional effects of marital satisfaction and depression in the couple dyad (Cook & Kenny, 2005).

Researchers use the APIM model to treat dyads in pairs instead of as individuals, and the sample size is the number of pairs. A basic APIM model has two dyad members (1 and 2) and two variables (A and B), which results in four observations:  $A_1$ ,  $B_1$ ,  $A_2$ , and  $B_2$ . According to

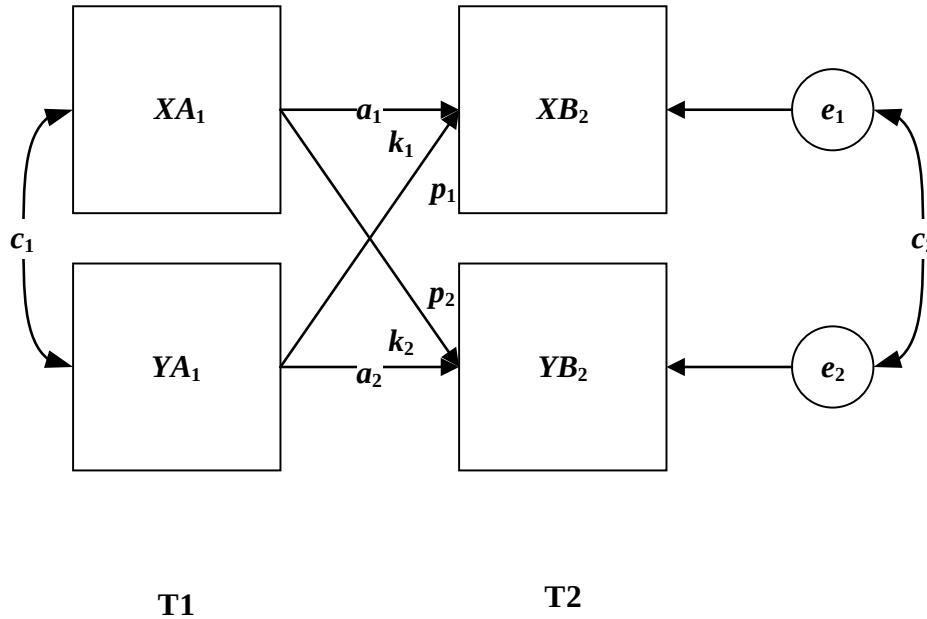
Kenny et al. (2006), an actor effect is an intrapersonal effect from  $A_1$  to  $B_1$  or from  $A_2$  to  $B_2$ , whereas the partner effect is the interpersonal effect from  $A_1$  to  $B_2$  or from  $A_2$  to  $B_1$ . For each APIM model, there are two actor effects and two partner effects when the dyad is distinguishable. If the dyad is indistinguishable, only one actor effect and one partner effect exist in the model. The actor effects are the intrapersonal effects that researchers tend to test without treating relational influences from people around them. On the other hand, if the partner effects are examined to be significant in the analysis, it indicates that interpersonal effects exist in the context.

The longitudinal APIM model (Figure 1) is similar to the standard APIM model (Kenny et al., 2006). Since the time dimension is introduced into the model, it is necessary to rule out the possibility of the variable itself influencing its own values longitudinally, also known as the autoregressive effect. For instance, in a study of two-time points, the actor effects are the intrapersonal effects from time 1 to time 2 by controlling the autoregressive effects.

Partners in the dyadic relationship may differ in the dyadic processes among baseline variables and outcome variables. Kenny and Ledermann (2010) posited that the interplay of two variables might affect two partners differently, so it is necessary to further examine the dyadic pattern differences in partners rather than treat the dyadic effects of variables the same across partners. For example, when one partner shows a significantly positive actor effect and an insignificant partner effect, the other partner may have a significant actor effect and an insignificant partner effect. In this case, partners in this relationship show different dyadic patterns in the association between variables. Also, it is possible both actor and partner effects are significant for one partner, which indicates a couple-pattern (Kenny and Ledermann, 2010).

Figure 1

*A Two-wave APIM Model*



*Note.*  $X$  and  $Y$  represent two members in a dyad;  $A$  and  $B$  are two variables;  $e_1$  and  $e_2$  denote errors (residuals);  $a_1$  and  $a_2$  are two actor effects;  $p_1$  and  $p_2$  represent two partner effects.

SEM refers to a family of related statistical data analysis procedures (Kline, 2015).

Fitting the APIM model within the SEM brings several advantages. First, missing data is a common issue in longitudinal studies, which could cause biased parameter estimates. The SEM framework can use all available data by applying the Full Information Maximum Likelihood strategy (Ledermann & Kenny, 2017). SEM can model multiple equations and outcomes simultaneously, which is useful when using the APIM model with distinguishable dyads (Ledermann & Kenny, 2017). Third, SEM provides direct model fit evaluations (Ledermann & Kenny, 2017). Fourth, when comparing parameters across different groups using SEM,

specifically multiple-group SEM, researchers have the flexibility to constrain specific parameters or to set one parameter as freely estimated (Ledermann & Kenny, 2017).

### **Data Analytic Strategy**

Based on the rationale above, an APIM Model within the SEM framework is an excellent fit to analyze the two-wave dyadic data in this study. All analyses were conducted in SPSS 25 and Mplus 8.3 (Muthén & Muthén, 1998-2017). Multiple fit indices were used to determine the model fit: the chi-square ( $\chi^2$ ), comparative fit indices (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). As Bentler (1990) suggested, it indicates an acceptable model fit if the CFI value is larger than .95. For RMSEA and SRMR, values below .06 indicate good model fit (Hu & Bentler, 1999). The chi-square difference test was used to determine whether freeing the specific parameter significantly improved the model fit (Bollen, 1989). The maximum likelihood estimator was used in this study to handle missing values (Acock, 2005). The APIM diagram for this study is shown in Figure 2.

As described in Table 5, data analysis was carried out in five steps. First, I analyzed descriptive statistics of the variables in SPSS 25. From step 2 to step 5, research questions were tested stepwise by conducting SEM via Mplus 8.3. In step 2, I developed a one-group APIM model where female partner's and male partner's depressive symptoms and marital satisfaction at one wave (2018) predicted female partner's and male partner's depressive symptoms and relationship satisfaction two years later at the next wave (2020). Meanwhile, I tested the dyad distinguishability to achieve empirical evidence of distinguishability (Kenny et al., 2006). In Step 3, age, education background, income, family size, and gender role attitude were added to the model in order to test whether there was a bidirectional relationship between marital satisfaction and depression across the full sample. Research questions 1 and 2 were answered in

step 3. The results of step 3 would provide partial information for the answer to research question 3.

In Step 4, I introduced a group variable (grouping = hukou; 1 = rural, 3 = urban) into the one-group APIM model to create a two-group model. First, I evaluated the model fit information by running an unconstrained two-group model. Then, I fixed all parameters to be the same across the two groups and gradually tested each parameter's group difference by comparing the difference in chi-square test fit indices between the fully fixed model and the model with one freed parameter. Based on this procedure, I constructed a two-group model with unconstrained parameters that were significantly different across the two groups and constrained parameters that were the same across the two groups. The results of steps 4 and 5 would fully answer research questions 3 and 4.

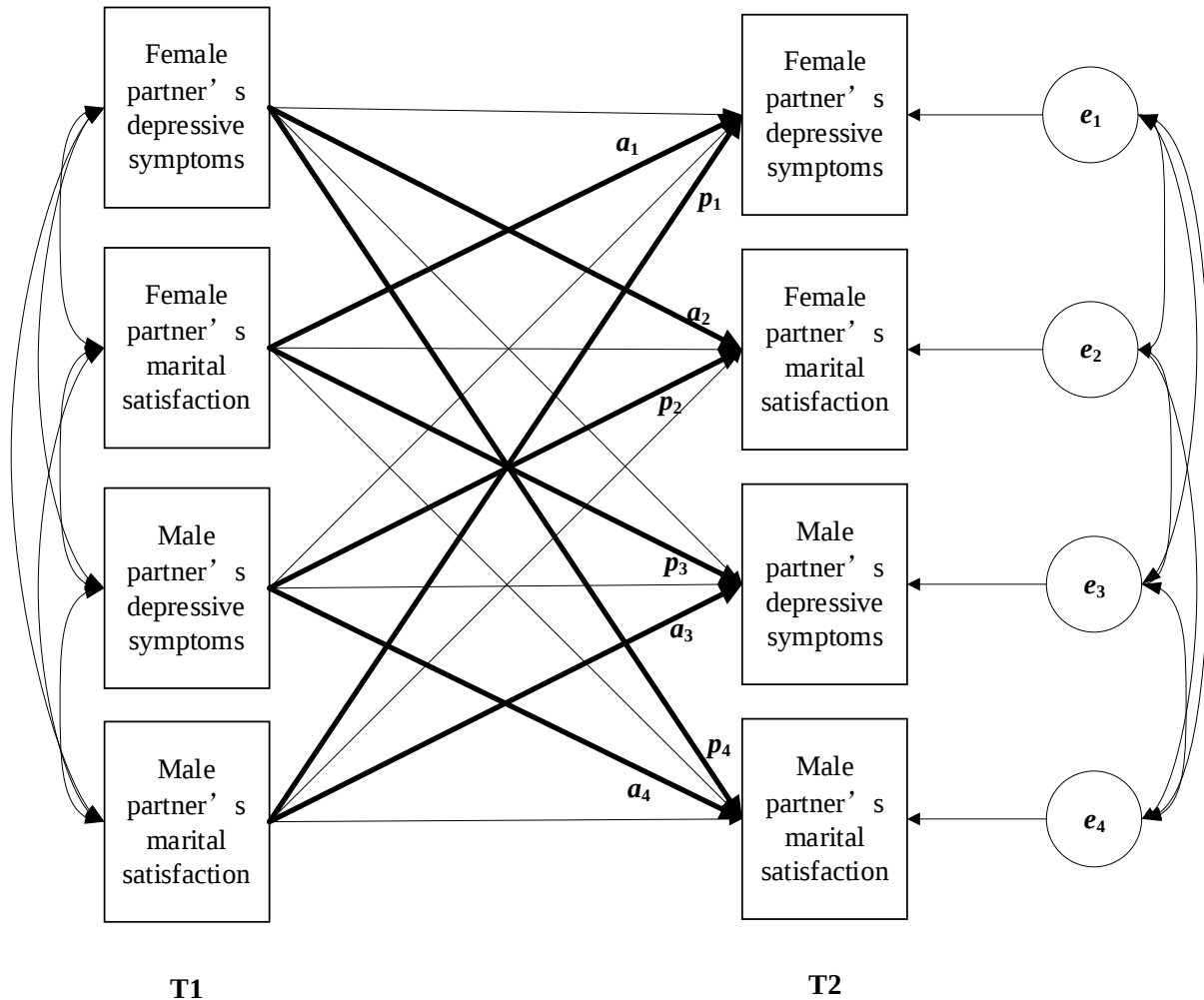
Table 5

*Data Analytic Plan*

|                        | Steps                                                                                                    | Target Research Questions    |
|------------------------|----------------------------------------------------------------------------------------------------------|------------------------------|
| Descriptive statistics | Step 1: Analyzed descriptive statistics in SPSS 25                                                       |                              |
| One-group APIM model   | Step 2: Tested basic one-group APIM model and tested distinguishability                                  |                              |
|                        | Step 3: Added the confounding variables into the one-group model                                         | Research questions 1, 2, & 3 |
| Two-group model        | Step 4: Added the grouping variable into the model and freely estimated all parameters across two groups | Research questions 3 & 4     |
|                        | Step 5: Tested parameter invariance in a stepwise manner and determined the fixed model.                 |                              |

Figure 2

*The Diagram of the APIM Model in This Study*



*Note.* A straight line with a single arrow represents a directional path, and a curve line with the double arrows indicates correlation. Eight paths represent actor effects and four paths represent partner effects, which are indicated by thicker lines.

Missing data were addressed through specific procedures in this study. Overall, missing data accounted for 2.38% of the data. Missing values ranged from 0.02% for rural couples' marital satisfaction to 4.75% for male partners' depressive symptoms at baseline, which was lower than the cut-off of 10% suggested by Bennett (2001). For the covariates, missing values

ranged from 0 for couples' education and age to 5.91% for female partners' subjective income. The results of Little's Missing Completely At Random (MCAR) indicated that the missing data in this study did not meet the MCAR assumption ( $\chi^2(283) = 414.884, p = .000$ ). Further analysis showed the missingness of female partners' subjective income was significantly associated with male partners' depressive symptoms at both time points and female partners' marital satisfaction at time point 2. The missing data were more likely in the rural group. Therefore, the missingness could be predicted by observed data and is independent of missing values. The missing pattern analyses using SPSS 25 showed that 90.12% of the data followed the pattern without missingness, and no other significant patterns emerged. There was no evidence of Missing Not At Random (MNAR) in the missing data. Missing At Random (MAR) was determined to be the missing pattern in this study. Finally, FIML was used to handle the missing data with ESTIMATOR = ML default function in Mplus 8.3 (Muthén & Muthén, 1998-2017).

## CHAPTER IV: RESULTS

### Descriptive Analysis

Multiple *t*-tests were performed to assess the differences in all variables by gender and household location. The results are shown in Table 6. Overall, *t*-test results showed significant gender differences in depressive symptoms, marital satisfaction, and age, while gender role attitude and subjective income did not reveal significant differences. Both partners' depression and age varied by household location at each wave. Additionally, female partners' subjective income and number of family members in one household varied by household location. Female partners reported higher levels of depressive symptoms at both waves than male partners ( $t_{T1} = 16.83, p = .000$ ;  $t_{T2} = 14.30, p = .000$ ). In addition, results revealed higher levels of marital satisfaction for male partners at both compared to female partners ( $t_{T1} = -21.29, p = .000$ ;  $t_{T2} = -22.02, p = .000$ ). The average age of male partners was found to be higher than that of female partners ( $t = -42.64, p = .000$ ), possibly reflecting the difference in the legal minimum age for marriage among men and women in China, where the minimum age is 22 for men and 20 for women. However, female partners and male partners did not differ in traditional gender role attitudes ( $t = -0.71, p = .476$ ) and subjective income level ( $t = 0.85, p = .397$ ).

Both partners' from rural areas reported depressive symptoms ( $t_{FD-T1} = 7.97, p = .000$ ;  $t_{FD-T2} = 8.85, p = .000$ ;  $t_{MD-T1} = 7.64, p = .000$ ;  $t_{MD-T2} = 8.89, p = .000$ ) at both waves that were significantly higher than their counterparts in the urban group. No differences were found in marital satisfaction across household locations. Urban couples' average age was older than rural couples' ( $t_{\text{females' age}} = -6.65, p = .000$ ;  $t_{\text{males' age}} = -6.74, p = .000$ ). Not surprisingly, couples in rural areas scored higher in traditional gender role attitudes than couples in urban areas ( $t_{\text{females}} = 13.16, p = .000$ ;  $t_{\text{males}} = 10.65, p = .000$ ). Subjective income levels were observed to have

discrepant results. Female partners in the rural areas reported higher levels of subjective income ( $t = 4.11, p = .000$ ), while no difference was found for male partners across both areas. The average number of family members in the rural group was found to be larger than in the urban group ( $t = 11.81, p = .000$ ).

Table 6

| <i>T-tests</i>                               |                              |                            |                |          |
|----------------------------------------------|------------------------------|----------------------------|----------------|----------|
| Variable                                     | Female partners<br>N = 5,552 | Male partners<br>N = 5,552 | <i>t</i> -test | <i>p</i> |
| Depressive symptoms T1                       | 13.84                        | 12.78                      | 16.83          | .000     |
| Depressive symptoms T2                       | 13.84                        | 12.91                      | 14.30          | .000     |
| Marital Satisfaction T1                      | 4.42                         | 4.71                       | -21.29         | .000     |
| Marital Satisfaction T2                      | 4.37                         | 4.67                       | -22.02         | .000     |
| Age T1                                       | 47.63                        | 49.39                      | -42.64         | .000     |
| Gender Role Attitude T2                      | 13.18                        | 13.21                      | -0.71          | .476     |
| Subjective Income T1                         | 2.97                         | 2.95                       | 0.85           | .397     |
|                                              | Rural<br>N = 4,021           | Urban<br>N = 1,531         | <i>t</i> -test | <i>p</i> |
| Female partners' Depressive symptoms (FD) T1 | 14.14                        | 13.19                      | 7.97           | .000     |
| Female partners' Depressive symptoms T2      | 14.15                        | 13.07                      | 8.85           | .000     |
| Male partners' Depressive symptoms (MD) T1   | 13.05                        | 12.21                      | 7.64           | .000     |
| Male partners' Depressive symptoms T2        | 13.20                        | 12.16                      | 8.89           | .000     |
| Female partners' Marital Satisfaction T1     | 4.41                         | 4.43                       | -0.95          | .344     |
| Female partners' Marital Satisfaction T2     | 4.37                         | 4.36                       | 0.20           | .840     |
| Male partners' Marital Satisfaction T1       | 4.70                         | 4.70                       | -0.26          | .794     |
| Male partners' Marital Satisfaction T2       | 4.67                         | 4.66                       | 0.34           | .736     |
| Female partners' Age T1                      | 46.90                        | 49.53                      | -6.65          | .000     |
| Male partners' Age T1                        | 48.65                        | 51.34                      | -6.74          | .000     |
| Female partners' Gender Role Attitude T2     | 13.50                        | 12.36                      | 13.16          | .000     |
| Male partners' Gender Role Attitude T2       | 13.46                        | 12.59                      | 10.65          | .000     |
| Female partners' Subjective Income T1        | 3.00                         | 2.87                       | 4.11           | .000     |
| Male partners' Subjective Income T1          | 2.97                         | 2.94                       | 0.98           | .327     |
| Number of Family Members T1                  | 4.56                         | 3.87                       | 11.81          | .000     |

Note: T1 = time 1. T2 = time 2.

### **One-group APIM Model**

The second step was to develop a basic longitudinal APIM model and test the distinguishability of the couple dyad in this study. Because the basic model used all direct observations, the model fit was perfect (See Table 7). Then all paths and parameters were fixed to be the same for female partners and male partners. The Chi-square difference test showed that the model with fixed paths was significantly different from the basic model (Table 7),  $\Delta\chi^2(16) = 11247.54$ ,  $p = .000$ . Other model fit indices indicated that the model with fixed paths did not fit the data well, CFI = 0.00, SRMR = 1.23, RMSEA = .356. Thus, treating couples as distinguishable dyads better represented the data.

The one-group APIM model with all covariates was to answer research questions 1 and 2 by assessing the bidirectional association between depressive symptoms and marital satisfaction while controlling for all confounding variables. The model included four actor paths involving one partner's baseline depressive symptoms and marital satisfaction leading to their own depressive symptoms and marital satisfaction two years later, four partner paths involving the spouse's depressive symptoms and marital satisfaction impacting one partner's depressive symptoms and marital satisfaction, four paths of autoregression from baseline depressive symptoms and marital satisfaction to later depressive symptoms and marital satisfaction, and four paths from the spouse's depressive symptoms and marital satisfaction to one partner's depressive symptoms and marital satisfaction. It also accounted for paths from covariates to the four outcome variables at time point 2. The fit indices of the one-group model indicated a flawless fit, as it used all direct observations (See Table 7):  $\chi^2(0) = 0$ ; CFI = 1.0, SRMR = .00, and RMSEA = .00. The proportion of the variance of the four outcome variables ranged from 11.3% to 24.4%.

Table 7

| <i>Model Fit Indices</i>    |          |    |       |      |       |                |             |      |
|-----------------------------|----------|----|-------|------|-------|----------------|-------------|------|
| Model                       | $\chi^2$ | df | CFI   | SRMR | RMSEA | $\Delta\chi^2$ | $\Delta df$ | p    |
| Basic APIM model            | 0.00     | 0  | 1.00  | .000 | .000  |                |             |      |
| Fixed APIM model            | 11247.54 | 16 | 0.00  | 1.23 | 0.356 | 11247.54       | 16          | .000 |
| One-group APIM model        | 0        | 0  | 1.00  | .000 | .000  |                |             |      |
| Fully free two-group model  | 0.00     | 0  | 1.00  | .000 | .000  |                |             |      |
| Constrained two-group model | 144.232  | 64 | 0.984 | .017 | 0.021 |                |             |      |
| Verified two-group model    | 50.836   | 47 | 0.999 | .008 | 0.005 | 93.3960        | 17          | .000 |

The findings indicated that all the actor paths were significant (see Table 8), which answered research questions 1 and 2. Specifically, female partners' and male partners' baseline levels of marital satisfaction were negatively linked to their own depressive symptoms two years later ( $b_{a1} = -.488$ ,  $SE_{a1} = .064$ ,  $p_{a1} = .000$ ;  $b_{a3} = -.220$ ,  $SE_{a3} = .083$ ,  $p_{a3} = .007$ ). Similarly, both partners' baseline depressive symptoms were negatively associated with their own levels of marital satisfaction two years later ( $b_{a2} = -.022$ ,  $SE_{a2} = .003$ ,  $p_{a2} = .000$ ;  $b_{a4} = -.015$ ,  $SE_{a4} = .003$ ,  $p_{a4} = .000$ ). However, neither partner's baseline levels of depressive symptoms nor marital satisfaction had a significant impact on their spouse's corresponding levels two years later, suggesting that the partner paths in the model were not significant.

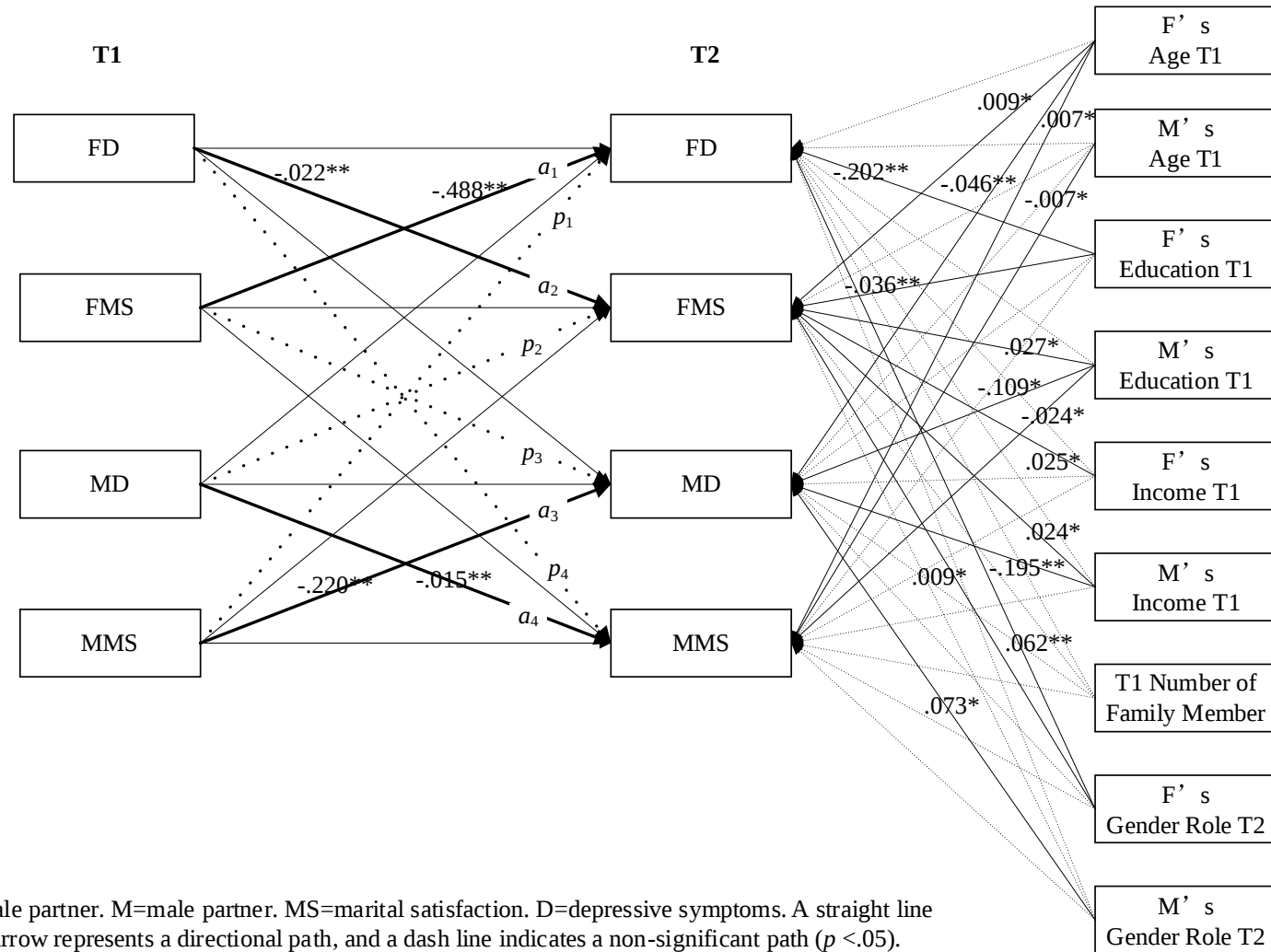
Additionally, all four autoregression paths and the four paths involving the same variables were statistically significant. The baseline depressive symptoms of both partners significantly influenced the depressive symptoms of their own and their spouses two years later. Additionally, both partners' baseline level of marital satisfaction positively correlated with their own level of marital satisfaction two years later.

The above results answered research questions 1 and 2 by ruling out the effects of confounding covariates in the one-group model. The confounding variates' effects on couples' future depressive symptoms and marital satisfaction were observed (See Figure 3). The level of education and -gender role attitudes of the female partners were found to affect their depressive symptoms levels two years later. On the other hand, the education levels of both partners, the subjective income levels of both partners, the female partners' age, and the female partners' gender role attitudes were all significant factors affecting the female partners' marital satisfaction after two years. The male partners' depressive symptoms at time 2 were affected by their subjective income level, education level, and the age of their female partners at baseline. Gender role attitude was significantly associated with their own depressive symptoms and female partners' levels of marital satisfaction. The male partners' educational level and both partners' ages at baseline were key covariates affecting the male partners' marital satisfaction at time 2. Family size was found to be irrelevant to any outcome variables at time 2.

Thus, an APIM model tested the dyadic distinguishability for the couple dyads. The one-group model analyses showed a shared actor-only dyadic pattern of the longitudinal association between depressive symptoms and marital satisfaction for both partners' depressive symptoms and marital satisfaction while controlling for covariates. Research questions 1 and 2 were answered. No gender differences were found in the one-group model.

Figure 3

One-group APIM Model ( $N = 5,552$ )



Notes: F=female partner. M=male partner. MS=marital satisfaction. D=depressive symptoms. A straight line with a single arrow represents a directional path, and a dash line indicates a non-significant path ( $p < .05$ ). There are four actor paths and four partner paths.  $*p < .05$ .  $**p < .01$ .

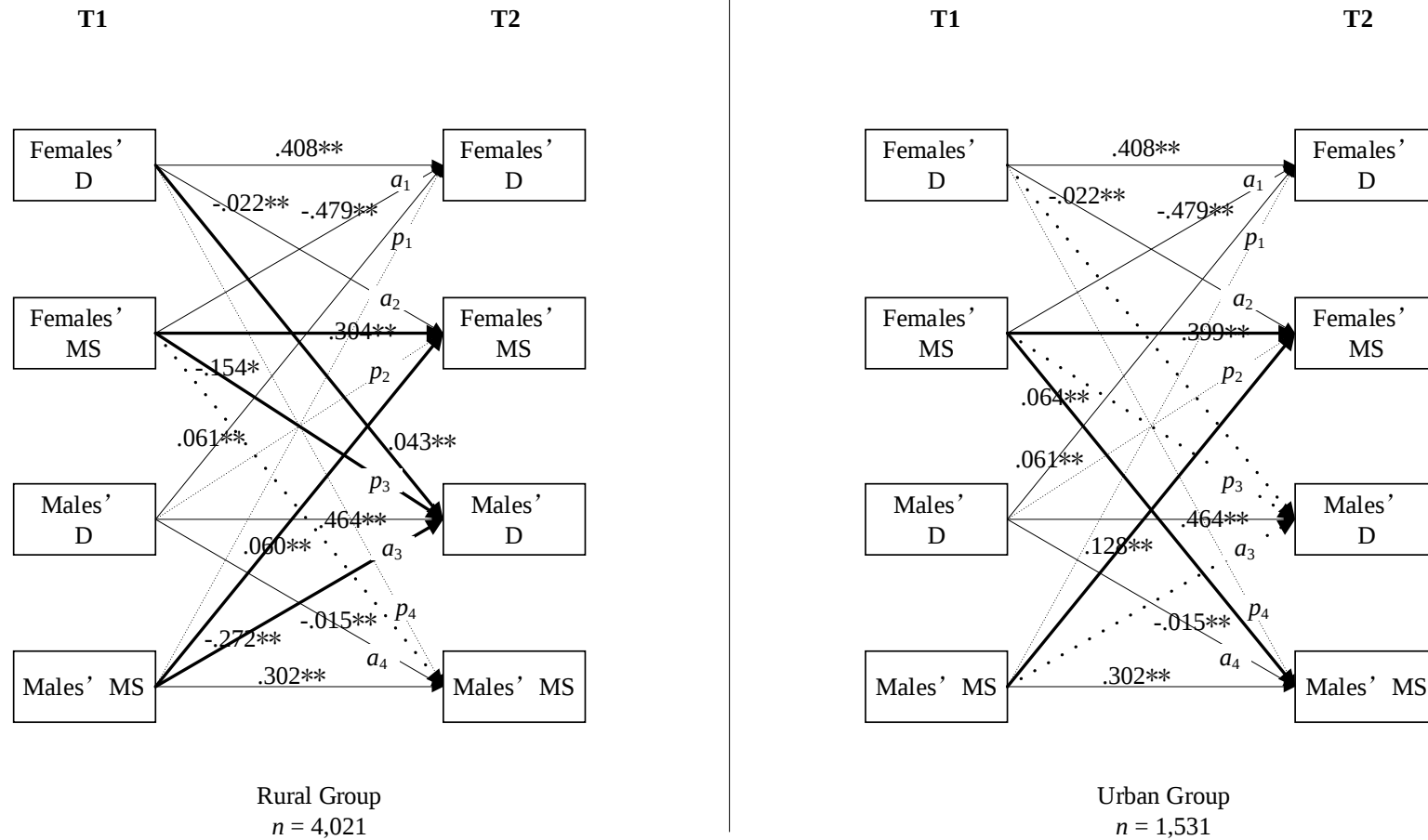
### Two-Group APIM Model

A series of two-group APIM models were developed to further investigate gender differences and examine the variations in the bidirectional association between depressive symptoms and marital satisfaction by household location. First, the two-group APIM model included household location as the grouping variable and freed all the parameters for the two groups within multiple-group SEM (Wang & Wang, 2019). The model fit indices indicated a flawless model fit to the data because all direct observations were used:  $\chi^2(0) = 0.00$ , CFI = 1.000, SRMR = .000, RMSEA = .000. Subsequently, the multiple-group invariance tests were carried out.

The basic two-group had all parameters constrained as the same across rural and urban groups. The model fit indices indicated a good fit to the data:  $\chi^2(64) = 144.232$ , CFI = .984, SRMR = .017, RMSEA = .021. The chi-square difference test assessed the improvement in the overall model fit by freeing the constrained parameters across two groups, one by one, to determine if the specific parameter varied across the two groups. This procedure found that multiple paths varied in two groups, such as the effect of baseline male partners' marital satisfaction on male partners' depressive symptoms at time 2. The results of this procedure allowed for a two-group model by constraining parameters that were consistent between the rural and urban groups and freeing those that were different. The verified two-group model indices showed an excellent model fit:  $\chi^2(47) = 50.836$ , CFI = .999, SRMR = .008, RMSEA = .005 (see Table 7).

Figure 4

Two-group APIM Model by Controlling for Covariates



Note: D=depressive symptoms. MS= marital satisfaction. A straight line with a single arrow represents a directional path, and a dash line indicates a non-significant path ( $p < .05$ ). There are four actor paths and four partner paths. Thicker lines are utilized in the diagram to highlight path differences between the two groups.

\* $p < .05$ . \*\* $p < .01$ .

Table 8

*Association Between Couples' Depressive Symptoms and Marital Satisfaction: Pathway Estimates and Significance*

|                               | Total    |           | Rural    |           | Urban    |           |
|-------------------------------|----------|-----------|----------|-----------|----------|-----------|
|                               | <i>b</i> | <i>SE</i> | <i>b</i> | <i>SE</i> | <i>b</i> | <i>SE</i> |
| <b><u>FD T2 on</u></b>        |          |           |          |           |          |           |
| FD T1                         | 0.411**  | 0.014     | 0.408**  | 0.014     | 0.408**  | 0.014     |
| MD T1                         | 0.063**  | 0.016     | 0.061**  | 0.015     | 0.061**  | 0.015     |
| FMS T1(a1)                    | -0.488** | 0.064     | -0.479** | 0.059     | -0.479** | 0.059     |
| MMS T1(p1)                    | 0.007    | 0.083     | -0.017   | 0.080     | -0.017   | 0.080     |
| Female partners' education    | -0.202** | 0.051     | -0.171** | 0.051     | -0.171** | 0.051     |
| Male partners' education      | -0.017   | 0.048     | -0.010   | 0.062     | 0.043    | 0.073     |
| Female partners' age          | -0.019   | 0.016     | -0.024   | 0.019     | -0.002   | 0.027     |
| Male partners' age            | 0.009    | 0.016     | 0.020    | 0.019     | -0.013   | 0.027     |
| Females' gender role attitude | 0.062**  | 0.018     | 0.060**  | 0.019     | 0.060**  | 0.019     |
| Males' gender role attitude   | 0.034    | 0.018     | 0.068**  | 0.023     | -0.054   | 0.030     |
| Number of family members      | 0.035    | 0.025     | 0.031    | 0.026     | 0.031    | 0.026     |
| Females' subjective income    | -0.054   | 0.055     | -0.070   | 0.048     | -0.070   | 0.048     |
| Males' subjective income      | -0.088   | 0.052     | -0.090   | 0.051     | -0.090   | 0.051     |
| <b><u>FMS T2 on</u></b>       |          |           |          |           |          |           |
| FMS T1                        | 0.327**  | 0.017     | 0.304**  | 0.015     | 0.399**  | 0.024     |
| MMS T1                        | 0.076**  | 0.019     | 0.060**  | 0.021     | 0.128**  | 0.033     |
| FD T1 (a2)                    | -0.022** | 0.003     | -0.022** | 0.003     | -0.022** | 0.003     |
| MD T1 (p2)                    | -0.002   | 0.004     | -0.002   | 0.003     | -0.002   | 0.003     |
| Female partners' education    | -0.036** | 0.011     | -0.037** | 0.012     | -0.037** | 0.012     |
| Male partners' education      | 0.027*   | 0.011     | 0.014    | 0.014     | 0.049**  | 0.016     |
| Female partners' age          | 0.009*   | 0.004     | 0.009*   | 0.004     | 0.009*   | 0.004     |
| Male partners' age            | -0.007   | 0.004     | -0.007   | 0.004     | -0.007   | 0.004     |
| Females' gender role attitude | 0.027**  | 0.005     | 0.027**  | 0.004     | 0.027**  | 0.004     |
| Males' gender role attitude   | 0.000    | 0.005     | 0.001    | 0.004     | 0.001    | 0.004     |
| Number of family members      | -0.005   | 0.006     | -0.005   | 0.006     | -0.005   | 0.006     |
| Females' subjective income    | 0.025*   | 0.012     | 0.024*   | 0.011     | 0.024*   | 0.011     |
| Males' subjective income      | 0.024*   | 0.012     | 0.025*   | 0.012     | 0.025*   | 0.012     |
| <b><u>MD T2 on</u></b>        |          |           |          |           |          |           |
| MD T1                         | 0.467**  | 0.014     | 0.464**  | 0.014     | 0.464**  | 0.014     |
| FD T1                         | 0.035**  | 0.013     | 0.043**  | 0.015     | -0.002   | 0.024     |
| MMS T1 (a3)                   | -0.220** | 0.083     | -0.272** | 0.087     | -0.088   | 0.139     |
| HMS T1 (p3)                   | -0.107   | 0.058     | -0.154*  | 0.065     | 0.035    | 0.104     |
| Female partners' education    | -0.048   | 0.047     | -0.093   | 0.061     | 0.103    | 0.071     |
| Male partners' education      | -0.109*  | 0.042     | -0.098   | 0.061     | -0.047   | 0.074     |
| Female partners' age          | -0.046** | 0.014     | -0.044** | 0.015     | -0.044** | 0.015     |
| Male partners' age            | 0.025    | 0.015     | 0.026    | 0.015     | 0.026    | 0.015     |

Table 8 (cont'd)

|                               |          |       |          |       |          |       |
|-------------------------------|----------|-------|----------|-------|----------|-------|
| Females' gender role attitude | 0.024    | 0.018 | 0.023    | 0.018 | 0.023    | 0.018 |
| Males' gender role attitude   | 0.073**  | 0.019 | 0.070**  | 0.018 | 0.070**  | 0.018 |
| Number of family members      | 0.049    | 0.025 | 0.045    | 0.025 | 0.045    | 0.025 |
| Females' subjective income    | 0.041    | 0.049 | -0.007   | 0.054 | 0.152    | 0.083 |
| Males' subjective income      | -0.195** | 0.050 | -0.199** | 0.048 | -0.199** | 0.048 |
| <b><u>MMS T2 on</u></b>       |          |       |          |       |          |       |
| MMS T1                        | 0.303**  | 0.023 | 0.302**  | 0.014 | 0.302**  | 0.014 |
| FMS T1                        | 0.025*   | 0.012 | 0.013    | 0.012 | 0.064**  | 0.020 |
| MD T1 (a4)                    | -0.015** | 0.003 | -0.015** | 0.003 | -0.015** | 0.003 |
| FD T1 (p4)                    | -0.003   | 0.003 | -0.003   | 0.002 | -0.003   | 0.002 |
| Female partners education     | -0.006   | 0.009 | -0.007   | 0.009 | -0.007   | 0.009 |
| Male partners education       | -0.024*  | 0.009 | -0.027** | 0.009 | -0.027** | 0.009 |
| Female partners age           | 0.007*   | 0.003 | 0.007*   | 0.003 | 0.007*   | 0.003 |
| Male partners age             | -0.007*  | 0.003 | -0.007*  | 0.003 | -0.007*  | 0.003 |
| Females' gender role attitude | -0.002   | 0.004 | -0.002   | 0.003 | -0.002   | 0.003 |
| Males' gender role attitude   | 0.001    | 0.004 | 0.007    | 0.004 | -0.012*  | 0.006 |
| Number of family members      | -0.001   | 0.004 | 0.000    | 0.005 | 0.000    | 0.005 |
| Females' subjective income    | 0.008    | 0.010 | 0.008    | 0.009 | 0.008    | 0.009 |
| Males' subjective income      | 0.013    | 0.008 | 0.013    | 0.009 | 0.013    | 0.009 |

Note: FD = female partners' depressive symptoms. MD = male partner s' depressive symptoms. FMS = female partner s' marital satisfaction. MMS = male partners' marital satisfaction. T = time. Actor path and partner path are abbreviated as a and p, respectively (e.g., a1 refers to actor path 1, and p1 refers to partner path 1).

\*  $p < .05$ ; \*\*  $p < .01$ .

The gender differences and variations in the association between depressive symptoms and levels of marital satisfaction across rural and urban areas were observed in the results of two-group model analyses. The outcome of the established two-group model indicated that the actor paths and partner paths for female partners were consistent across both rural and urban groups. However, the paths for male partners differed between the two groups (See Figure 4). For both rural group and urban groups, female partners' baseline levels of marital satisfaction were associated with their own depressive symptoms two years later ( $b_{a1} = -.479$ ,  $SE_{a1} = .059$ ,  $p_{a1} = .000$ ). Additionally, female partners' baseline depressive symptoms were related to their own levels of marital satisfaction subsequently ( $b_{a2} = -.022$ ,  $SE_{a2} = .003$ ,  $p_{a2} = .000$ ). Male partners in

the rural group showed their depressive symptoms at time 2 were affected by their own ( $b_{a3} = -.272, SE_{a3} = .087, p_{a3} = .002$ ) and their spouse's ( $b_{p3} = -.154, SE_{p3} = .065, p_{p3} = .018$ ) levels of marital satisfaction two years ago, indicating both actor path and partner path were significant. When examining whether 0 was equal to the difference of  $a_3$  and  $p_3$ , the Wald chi-square test showed insignificance,  $\chi^2(1) = 1.000, p = .317$ . The results of the Wald test indicated that the actor effect and partner effect for male partners' depressive symptoms at time 2 were not significantly different. In contrast, neither the actor path nor the partner path was significant for the male partners' depressive symptoms in the urban group. The baseline depressive symptoms of male partners in both groups were significantly associated with their own marital satisfaction two years later but not with their spouse's ( $b_{a4} = -.015, SE_{a4} = .003, p_{a4} = .000$ ).

Gender differences and variations by household location were observed in the effects of depressive symptoms and marital satisfaction on their respective outcomes two years later. Specifically, the effects of depressive symptoms on future depressive symptoms and the effects of marital satisfaction on future marital satisfaction were different for female partners and male partners. Similarly, both groups showed a significant relationship between female partners' depressive symptoms and marital satisfaction with their own and their partners' baseline depressive symptoms and marital satisfaction, while male partners had inconsistent paths across the two groups (See Figure 4). The difference for female partners regarding the effects of baseline marital satisfaction was that female partners' marital satisfaction of the urban group showed a stronger effect from their own ( $b = .399, SE = .024, p = .000$ ) and the spouse's baseline satisfaction ( $b = .128, SE = .033, p = .000$ ) compared to the same effects of rural female partners' marital satisfaction from their own ( $b = .304, SE = .015, p = .000$ ) and their spouses' ( $b = .060, SE = .021, p = .004$ ). The results indicated that in the rural group, male partners' depressive

symptoms were impacted by their own and their spouses' baseline depressive symptoms. However, male partners' depressive symptoms at time 2 in the urban group were only connected to their own depressive symptoms rather than their spouse's. Additionally, male partners' levels of marital satisfaction in the rural group were not connected to their spouses' baseline levels of marital satisfaction, which is also different from male partners in the urban group.

Female partners and male partners in rural and urban areas were observed to demonstrate differences regarding the covariates' effects (See Figure 4). For example, in the rural group, male partners' gender role attitudes were positively correlated with female partners' depressive symptoms at time 2, but this path was not significant for the female partners in the urban group. On the contrary, urban female partners' marital satisfaction was positively associated with male partners' education level, which is different from female partners in rural areas. The only difference in covariates' effects for male partners was the male partners' gender role attitude. The results indicated a negative association between male partners' gender role attitude and urban male partners' marital satisfaction, but this path was not significant for male partners in rural areas. These results answered research questions 3 and 4.

## CHAPTER V: DISCUSSION

The current study extended existing literature by investigating the bidirectional and longitudinal association between depressive symptoms and marital satisfaction for Chinese couples, as well as examining the gender differences and variations of this association across rural and urban areas. The results indicated that, for the general Chinese population, higher levels of depressive symptoms were associated with lower levels of marital satisfaction, as indicated by significant actor effects but not partner effects. No gender differences were noted for the general heterosexual couples in China. When assessing the household location, the bidirectional association remained significant for both partners in rural areas and female partners in urban areas. However, differences in patterns between female partners and male partners were observed when rural and urban couples were separated into two groups, regarding the relationship between the two variables. Rural couples differed from urban couples in the patterns of the association and the extent of the influence and the covariates' effects on the outcome variables.

### **The Longitudinal Effect of Marital Satisfaction on Depressive Symptoms**

Both partners' baseline marital satisfaction was negatively associated with their own subsequent depressive symptoms. However, the association differed between male partners and female partners, and among rural and urban male partners. For the couples in rural areas, only when female partners personally experienced higher levels of marital satisfaction did their own depressive symptoms decrease longitudinally. In comparison, male partners in rural areas could experience more depressive symptoms when either they or their spouses had lower levels of marital satisfaction, and both actor and partner effects were equal. Similarly, the influence of perceived marital satisfaction on subsequent depressive symptoms was significant for female

partners in urban areas. In contrast, the previous levels of marital satisfaction, whether from the male partner or the female partner, did not affect the male partners' depressive symptoms.

CDM suggests that relational distress leads to couples' depressive symptoms (Beach et al., 2014). For Chinese couples in general, when couples perceived low levels of relational satisfaction, they often later reported depressive symptoms. Furthermore, the findings of this study suggest that the longitudinal effect of marital satisfaction on depression may differ by different sociodemographic and sociocultural characteristics. Some researchers have suggested that there are gender differences in the association between marital satisfaction and depression (Fincham et al., 1997; Woods et al., 2019), while some suggest there are no differences by gender (Beach et al., 2003; Cao et al., 2017). This study supports the presence of gender differences; the patterns of the gender differences also varied among couples with different levels of depressive symptoms, SES, gender role attitudes, and household locations. Increasing interpersonal conflict and decreasing spousal support have been suggested to mediate the path from marital satisfaction to depressive symptoms (Beach et al., 2014). Future research is needed to investigate how sociodemographic and sociocultural factors impact these mediators and shape gender differences in the path from marital satisfaction to depressive symptoms for rural and urban couples.

Salinger et al. (2021) found that, among female partners from European countries that value family relationships and intergenerational support, there were greater actor effects of perceived marital conflicts on depressive symptoms in the cross-sectional analysis. However, this study found no significant differences in the magnitude of the actor effect between female partners in rural and urban areas, though, female partners in rural areas were more likely to develop higher levels of depressive symptoms when their spouses were more traditional in

gender roles. In general, regarding their depressive symptoms at time 2, female partners in rural and urban areas demonstrated similar associations between depressive symptoms and levels of marital satisfaction, suggesting that the interplay of depressive symptoms and marital satisfaction may function similarly among female partners across rural and urban areas. Yan et al. (2021) explained that the similarities in depression trajectories between women in rural and urban areas might be due to the fact that they work in a similar social division of labor. Specifically for the path from marital satisfaction to depression, I argued that the social stigma that divorce carries for Chinese women could reinforce the pattern identified in this study. Women in both urban and rural regions continue to face stigma related to divorce (Lin, 2022). In this case, female partners in both regions may feel trapped in unhappy marriages in a similar manner, potentially accounting for the comparable pattern in the path from marital satisfaction to depression over time. However, regarding the differences in average levels of depressive symptoms, SES, gender role attitude, income level, and variation in the available resources among female partners, there may be other contributing factors and underlying mechanisms that need to be explored in future studies.

The findings suggest that Chinese male partners with different levels of education and gender role attitudes in rural and urban areas demonstrated various patterns regarding the path from marital satisfaction to depression. The depressive symptoms of male partners in urban areas showed one significant actor path, while depressive symptoms of male partners in rural areas were observed to have four significant paths from baseline to two years later. These findings suggest that male partners in rural areas experienced more interpersonal effects of depressive symptoms and perceived marital satisfaction than their urban counterparts. These differences highlight the importance of considering contextual factors when examining the relationship

between depression and marital satisfaction in couples. Possible contributing factors to this difference may be lower accessibility to mental health care, lower help-seeking behaviors caused by higher masculinity (Seidler et al., 2016), and lower educational backgrounds. On the other hand, a more traditional gender role attitude is connected to less spousal emotional support in couple relationships (Mickelson et al., 2006). Therefore, it appears plausible to observe variations in the path from marital satisfaction to depression among male partners in rural and urban areas.

### **The Longitudinal Effect of Depressive Symptoms on Marital Satisfaction**

The path from baseline depressive symptoms to couples' marital satisfaction over time endorses an actor-only effect, which remained the same across gender and household locations. The results suggest that when Chinese couples experience higher levels of depressive symptoms, they perceive lower levels of relational satisfaction over time, which is the same regardless of couples' differences in education, gender role attitude, income, age, and household locations. Although urban couples were more likely to be impacted by their previous levels of marital satisfaction compared to rural couples, couples across rural and urban areas exhibited the same pattern and the same magnitude of the effect regarding the influence of depression on marital satisfaction. The cross-spouse effect was not identified in this study.

CDM proposes partners experiencing depression may contribute to a greater number of stressors within the context of their couple relationship (Beach et al., 2014). The findings support the path from depressive symptoms to marital satisfaction and further suggest that this path has a higher level of stability than the reverse path for couples with different characteristics. Additionally, the effect of depressive symptoms on marital satisfaction over time happened within individuals rather than between partners.

### **The Bidirectional Association between Depression and Marital Satisfaction**

The bidirectional association between depression and marital satisfaction was found for the overall sample. Both female partners' and male partners' marital satisfaction was significantly associated with their own baseline depressive symptoms, and both partners' baseline levels of marital satisfaction were linked to their own depressive symptoms two years later. The one-group APIM model findings revealed that a partner's initial levels of depressive symptoms did not impact the other partner's subsequent marital satisfaction, and vice versa, a partner's initial level of marital satisfaction did not impact their spouse's later depressive symptoms. The results indicated an actor-only pattern in the bidirectional relationship (Kenny & Ledermann, 2010), which is consistent with Davila et al. (2003). However, in contrast to previous studies that have found partner effects in the bidirectional association (Morgan et al., 2018; Whisman & Uebelacker, 2009), this study found no evidence of partner effects among general Chinese couples. Specifically, one partner's baseline depressive symptoms were not associated with the spouse's levels of marital satisfaction over time, or one partner's depressive symptoms were not connected to the spouse's previous levels of marital satisfaction.

The results of this study provide further insight into the complex interplay between depressive symptoms and marital satisfaction among Chinese couples in rural and urban areas. The findings suggest that the bidirectional association between depression and marital satisfaction varies significantly depending on the gender and household location of the couple. Specifically, the results indicate a bidirectional association between depressive symptoms and marital satisfaction for rural couples and female partners in urban areas, while only a unidirectional association from depression to marital satisfaction was observed for male partners in urban areas. Furthermore, the results indicate that baseline marital satisfaction has a stronger

influence on subsequent levels of marital satisfaction for urban couples than for rural couples. Male partners in rural areas were found to be more affected by their spouses' previous depressive symptoms on their depressive symptoms, while their marital satisfaction was found to be independent of their spouses' baseline marital satisfaction. Taken together, rural couples' depressive symptoms were associated with more interpersonal effects on their depressive symptoms and marital satisfaction over time compared to urban couples. Conversely, marital satisfaction significantly influenced more urban couples' subsequent marital satisfaction interpersonally rather than depressive symptoms, especially for male partners. These findings highlight the importance of considering sociocultural and contextual factors in understanding the interplay between depression and marital satisfaction among Chinese couples.

### **Implications**

The present study's results provide support for the bidirectional association between depressive symptoms and marital satisfaction in Chinese couples, including gender differences and variations of the association across rural and urban areas. The findings indicated that higher levels of marital satisfaction were linked to lower levels of one's own depressive symptoms, shining light on the psychosocial risk of depression in intimate relationships for Chinese couples. Moreover, it is likely that couples who are residing in different household locations with distinct sociocultural characteristics may undergo diverse processes in the reciprocal relationships between marital distress and depressive symptoms. These distinct processes may be attributed to crucial factors such as variations in education and attitudes toward gender roles. These findings imply that sociocultural differences among couples could potentially contribute to variability in the prospective association between depression and marital satisfaction.

It highlights the potential benefits of couple therapy work for treating couples with depression by reducing their marital distress and depressive symptoms simultaneously (Wittenborn et al., 2019). Notably, couples in rural areas tend to be more vulnerable to depression, but couples in urban areas are more affected by their perceived marital satisfaction. Therefore, it is important for mental health professionals to improve their therapeutic outcomes by tailoring interventions for couples in two areas. Rural couples have less access to mental health information and resources, and interventions that address their specific needs are needed, such as providing community-based couple therapy with low cost and more psychoeducation on depression as well as other mental health problems.

### **Limitations and Future Research**

Limitations of the current study should be noted. Using secondary data limited the ability to use well-structured scales to explore the bidirectional association and its variations further. For example, the study may have been improved by using a more robust measure of marital satisfaction. Using secondary data limited access to certain information that is helpful in further exploring these processes in couples. For example, information about the duration of marriage was absent from the datasets, but it is an important factor in studies on the reciprocal process between depression and relational distress (Kouros et al., 2008). A previous study suggested testing the effect of marital distress on depression using a one-year lag time (Fincham et al., 1997). The time between assessments in the CFPS data is two-year, which may cause lower magnitudes in the effect of marital satisfaction on depression because the effect of marital satisfaction on depressive symptoms might decrease during the year 2019. It is important to acknowledge that couples with severe depression were less likely to continue in this longitudinal study and only couples who remained partnered during time 1 and 2 were included in the

analysis, which could have had an impact on the findings. In addition, the COVID-19 pandemic may have impacted data collected during 2020, so the results should be considered within that context. Future research should use scales to measure more dimensions of marital satisfaction and use one year as the lag time in order to obtain more accurate results. Additionally, this study only focused on heterosexual couples, so it is necessary to include couples of diverse sexual orientations in the future.

### **Conclusion**

The present study explored the bidirectional association between depression and marital satisfaction among Chinese couples in rural and urban areas by using national and longitudinal dyadic data. The findings provided evidence of this bidirectional association between two variables and further identified gender differences and the variation of the association across rural and urban areas after controlling for key covariates. The intrapersonal processes were significant for Chinese couples in that changes in depressive symptoms were linked to the changes in levels of one's own marital satisfaction, but their reciprocal influences and covariate effects differed between female partners and male partners, as well as between rural and urban areas. Future research needs to examine more closely what contributes to gender differences and variations across rural and urban areas by considering more sociocultural factors and recruiting a more diverse couple population.

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