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A Study on the Relationship Between Marital Socioeconomic Status, Marital Satisfaction, and Depression: Analysis Based on Actor–Partner Interdependence Model (APIM)

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Abstract
Preceding research investigations on the correlation amidst the socioeconomic status quo (SES) of family, marital satisfaction, and depression have only focused on the influence on an individual family member. A few researchers consider husband and wife as a community and assess the complex relationship between SES and marital satisfaction on depression. This study explored the interdependent relations among SES, marital satisfaction, and marital depression in Chinese married couples from the perspectives of both sides. The study was conducted on adult married couples in China using the China Family Panel Studies (CFPS) data in 2014. This study used the Actor-Partner-Interdependence-Model (APIM) to evaluate the impacts of SES and marital gratification on depression and the target effect on a spouse by considering husband and wife as a single unit rather than separate individuals. APIM allows the use of paired data and overcomes the limitations of traditional methods. Gender differences were noted in SES, marital satisfaction, and marital depression among married couples. The social and economic status of the couple showed a negative relationship with the degree of depression. The SES of the husband had a significant negative impact on the depression degree of his wife. Similarly, the SES of the wife had a significant negative influence on the depression degree of her husband. The husband's marital gratification was undesirably correlated with his depression and manifested an identical relation from the wife's perspective. Husband's marital gratification or fulfillment had a substantial inhibitory impact on his wife's depression and vice versa.

Keywords Socioeconomic status · Marital satisfaction · Depression · APIM

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Introduction

Conferring to the World Health Organization's report of 2019, about 350 million people were projected to be afflicted with depression, and the number of cases in the recent decade was rising at a rate of 18% (Hao, 2019). The total number of patients with depression in China is estimated to be nearly 100 million, with an incidence of about 3 to 5%, which is higher than the average global average of 3.1% (Wang et al., 2020). Depression has become the second most frequently experienced disease burden in China (Fang et al., 2019), and it is a widespread mental illness (Ferrari et al., 2013), which has a lasting undesirable impact on physical health but also enhances social losses and burdens. Therefore, being a public health problem requires strong policy-based support and clinical attention (Gortmaker et al., 1993; Scott, 2006). Studies have revealed a close relationship between the prevalence of depression with genetic factors (Hodgson et al., 2019; Ionescu et al., 2013); however, genetic factors alone are inadequate to understand it entirely because of its complexity. Other factors highlighted by different study groups include socioeconomic status (SES), marital satisfaction, and social psychology (Dohrenwend & Dohrenwend, 1969; Vento & Cobb, 2011).

According to Link and Phelan's (1995) health-root-cause-theory, SES is contemplated to be the prime factor for this kind of health issue, since education, revenue, and affluence deliver admission to resources that can lead to improved health through numerous multifaceted impacts on the behaviors and predilection of an individual (Headey et al., 2021; Roxburgh, 2009). Previous studies have substantiated that education level is one of the indicators reflecting SES (Department of Health and Social Security, 1980). In addition, higher education closely affects the income level (Pinxten & Lievens, 2014; Veenstra & Patterson, 2012). Some studies have also documented that the level of personal income can affect access to social resources, medical resources, interpersonal resources, etc. (Jansen et al., 2013; Kalmijn, 1994). Furthermore, there is an important association between professional status and SES (Jansen et al., 2013). At the same time, certain studies have pointed out a significant correlation among the relevant indicators that reflect social and economic status. This specifically implies that indicators such as education level and personal income can indicate the SES of individuals from different aspects (Grusky, 2019). Therefore, SES is the position of individuals or groups in our society, which signifies the social class and status of different groups. In addition, it is a comprehensive reflection of income level, education level, occupation status, and other indicators, which also serve as an essential approach to estimate and predict people's behavior (Adler et al., 1993).

Some researchers have confirmed that an individual's social and financial standing is the chief causative factor triggering depression, along with the genetic factors (Dohrenwend & Dohrenwend, 1969; Lorant et al., 2003; Melchior et al., 2013). The research on the correlation between SES and depression dates back to the 1960s. Dohrenwend and Dohrenwend (1969) reported that SES could increase the prevalence of depression from moderate to severe. Very poor SES aggravates the risk of depression attack, and moderately poor SES enhances the

risk of sustained depression. This connection is not limited to the lower class of society but applies to the whole social stratum (Johnson et al., 1999; Kessler et al., 1995). Turner and Martinek (1995) believed that one of the reasons for the negative impact on self-concept refers to economic hurdles such as income reduction, inducing negative alterations in personal cognition through pressure (Hudson et al., 2012). Numerous recent studies have reported the correlation between SES and depression and have stated that depression is most predominant in groups with inferior SES (Fryers et al., 2005; Lorant et al., 2003; Wang et al., 2010). More specifically, highly educated people tend to have a nominal frequency rate of depression (Johnson et al., 1999; Lorant et al., 2003), and the alleviation effect of education on depression will increase with age. Education can enhance their ability to resist depression by increasing their economic and social resources (Zhang et al., 2020). Exceedingly educated people are more prone to establish a developed social network to support, thereby diminishing the propensity of depression. Previous studies have reported that people with lower income are most probability predicted to suffer from depression (Lei et al., 2014; Veenstra, 2000). The incidence of depression alters wildly amidst contrasting socioeconomic conditions and is concentrated in meager-income assemblages or settings (Han et al., 2018). There exists a close association between income inequality and depression (Bechtel et al., 2012). The unequal distribution of personal income will affect the degree and persistence of mental disorders such as depression. Consequently, it is indispensable to minimize the inequality factors such as individual and SES of the family in the process of the intervention with depression (Wang et al., 2010).

Marriage satisfaction refers to the general term of subjective evaluation or attitude toward the relationship between husband and wife (Cheung et al., 2019). It is an important parameter to assess the emotions of married people (Tan et al., 2021). Researchers opine that nuptial gratification is a vital prognosticator of depression symptoms (Ulrich-Jakubowski et al., 1988; Vento & Cobb, 2011). Certain previous studies have proposed that conjugal-dissatisfaction is the predominant attribute impacting depression (Choi & Marks, 2008; Davila et al., 2003; Kendler et al., 1999; Kouros et al., 2008; Ulrich-Jakubowski et al., 1988; Vento & Cobb, 2011; Wang et al., 2014; Whisman & Uebelacker, 2009). Few researches have demonstrated that higher marital satisfaction results in lower depression levels (Rollins & Feldman, 1970). Other studies reported that depression signs projected marital discontent (Ulrich-Jakubowski et al., 1988). More recent studies have reported that marital satisfaction negatively affected depression (Davila et al., 2003; Kouros et al., 2008). Therefore, increasing evidence indicates that marital satisfaction is an essential protective factor for depression (Chen & Chen, 2019; Choi & Marks, 2008; Davila et al., 2003; Kouros et al., 2008; Whisman & Uebelacker, 2009). Another research finding points out that matrimonial value was definitely correlated to welfare in the men as well as the women; the impact of matrimonial gratification on the welfare was mostly elevated in women contrary to men (Shek, 1995). As the indicators of depression often appear after marital frustration, it is rational to presume that the absence of marital fulfillment is a risk-feature for depression (Kendler et al., 1999).

An array of research outcomes projects the correlation between SES, conjugal satisfaction, and depression, demonstrating that the probability of depression is significantly elevated in first-degree relatives, instead of in the general population. A closer relationship in terms of the degree of relatives is associated with a higher incidence rate (Beach et al., 1990; Hooley & Teasdale, 1989; Kouros et al., 2008). The domestic household is a complex as well an open system (Rayens & Svavarsdottir, 2003). A family can be analyzed at different levels, for example, at an individual level, at the level of relationship within the family or the dyadic level (such as husband and wife), and the whole family level. The family structure is based on the concept of relations and the compositional associations within the household. It is essential to study the family's mental health from a dyadic perspective. According to the family-system concept, family members affect each other's feelings, emotions, and actions (Rayens & Svavarsdottir, 2003; Yucel, 2018). Therefore, the emotional state and cognition of a member will affect the emotion and cognition of another member who interacts with them regularly. However, in most previous researches which considered the SES of couples, marital gratification, and other factors as variables, the researchers have dealt only with the personal depression of family members. However, studies ascertaining the kind of impact exerted on a person and their counterparts' depression, in which husband and wife are considered a single unit and their interdependence, are scarce. When a similarity exists between husband and wife, the couple is not an independent individual, and the behavior of one side will affect itself and the other side; thus, the variables are interdependent. Henceforth, while applying general regression analysis, the assumption that all variables are independent might be violated, critically affecting the results (Cook & Kenny, 2005). Therefore, influencing factors of marital depression should be evaluated by assuming the interdependence between husband and wife. Previous investigations have engrossed only on the connotation between marital-SES and depression, and the pessimistic prediction of depression by SES has only been verified (Dohrenwend & Dohrenwend, 1969; Fryers et al., 2005; Wang et al., 2010). Whether the impact of SES of husband and wife on depression is identical (whether there is an object effect) or not is yet to be determined. In terms of the impact of marital satisfaction and depression, it is evident thorough studies; the association between eminence marital experience and depression in Chinese elderly couples and that marital satisfaction of the husband can predict depressive symptoms of his wife (Wang et al., 2014). However, most of these studies considered among the young to middle-aged people of the occidental society or the elderly in China (Fryers et al., 2005; Hiew et al., 2016; Lei et al., 2014; Lorant et al., 2003; Schnettler et al., 2020; Veenstra, 2000; Wang et al., 2010, 2014). Thus, insufficient information regarding the association between marital gratification and depressive signs amidst Chinese-couples, including young and middle-aged people and the elderly, is available. China is the most populous country in the globe, making it essential to explore the correlation between marital gratification and depression indicators midst married of all ages (young and middle-aged). The analysis method that ignores the internal correlation of couple data cannot explore the crucial aspects of interpersonal interaction in intimate relationships. For example, which one of the couples perceives the interaction to have a more significant impact on the outcome variable? The Structural Equation

Model (SEM) by Kenny (Kenny & Cook, 1999) simultaneously considers the influence of both partners. However, in 2005, Cook and Snyder (Cook & Kenny, 2005) presented a unique model, i.e., the actor–partner interdependence model (APIM), for evaluating various linked information rendering it feasible to solve such problems. However, no Chinese researcher has adopted this model to explore the relationship between husband and wife's socioeconomic status, marriage quality, and family mental health. The western culture that emphasizes individualism considers equality and independence as more important, whereas the Eastern culture emphasizes collectivism with more attention to hierarchy and cooperation, which is also true in the family. Therefore, whether the results obtained in Western research can be extended to the Chinese cultural background is yet to be further evaluated.

The APIM is widely used to analyze the interaction between paired data (Kenny & Cook, 1999). In APIM, the actor-effect is designated as the influence of a person's autonomous attributes on its dependent variable, namely, the individual internal effect. The target effect denotes the impact of an individual's autonomous attributes on the dependent variable of their counterpart in a pairing relationship, namely, the inter-individual effect (Kenny et al., 2006). In this study, the actor-effect refers to the impact of an individual's SES and marital satisfaction on their depression situation. The target effect identifies the influence of individual SES and marital satisfaction on the depression of the spouse. We investigated the effects of actors and partners on each other's depression. The APIM (Kenny & Cook, 1999) was applied to investigate dyadic paired data, which can be examined directly at the dyadic level, as well as roles and partnerships (Fig. 1). In this study, X and X' are indicators of SES and marital satisfaction of the two members in a family, whereas Y and Y' are self-rated depression indicators of the two members in a family, respectively. The actor-effect denotes the actual influence of an individual or object prediction without affecting the target-effect (i.e., path A in Fig. 1). The target-effect is the outcome of an independent variable of an individual in a dyadic group on the dependent variable of the other one in a paired relationship (i.e., path P in Fig. 1). The existence of

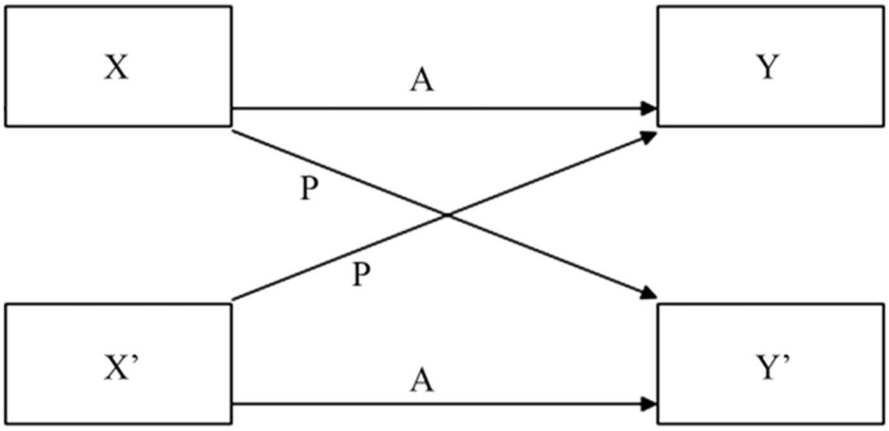

Fig. 1 Actor–partner-interdependence-model

the target-effect implies that the cohorts in the dyad are inter-reliant (Kenny et al., 2006).

Therefore, this study used the APIM to assess the interdependence among SES, marital satisfaction, and marital depression in Chinese married adults and subsequently analyzed the impacts of SES and marital fulfillment on depression through the model analysis of actor effect and target effect. Consequently, the basic results obtained from this research can be used to develop projects to improve the mental health of Chinese married adults and enrich the quality of marriage. The hypotheses and models used in this study are as follows:

Hypothesis 1(a): husband's SES is negatively related to his depression.
Hypothesis 1(b): wife's SES is negatively related to her depression.
Hypothesis 1(c): husband's SES is negatively related to his wife's depression.
Hypothesis 1(d): wife's SES is negatively related to her husband's depression.
Hypothesis 2(a): marital gratification of husband is negatively related to his depression.
Hypothesis 2(b): marital gratification of wife is negatively related to her depression.
Hypothesis 2(c): marital gratification of husband is negatively related to her wife's depression.
Hypothesis 2(d): marital gratification of wife is negatively related to her husband's depression.
Model 1: verify the actor effect and target effect of SES on the depression situation of wife and husband.
Model 2: ascertain the actor effect and target effect of marital satisfaction on the depression situation of wife and husband.

Materials and Methods

Data and Samples

This empirical research investigation included and considered the data released by the China Family Panel Studies (CFPS) for 2014, which is a national survey steered by the Institute of Social Sciences of Peking University. This study aimed to reveal transformations in the Chinese community, economy, populace, education, and individual's well-being, and deliver high-quality microdata for public policy analysis together on the academic research. The first round of CFPS was accomplished in 2008. Sampling included 57,000 individuals from 15,000 families of 25 provinces in China using the multi-stage probability proportional sampling technology. As a result, this dataset can be applied to this study as it contains a wide range of information on depression, marital satisfaction, socio-demographic characteristics, and health-related behaviors. The present study targeted married adults as the research object. We one-to-one matched the 2014 samples and eliminated the missing, extreme, and abnormal values of related variables; the couple samples with the same

ID family number were screened after a sample-merging process. Finally, 993 pairs of samples were obtained.

Variable Design

Dependent Variable

Depression was regarded as a dependent variable in this study, and the subjective depression self-evaluation index was mainly used. The CFPS 2012 survey used the simplified CES-D depression scale developed by the center for epidemiological studies to estimate the depressive symptoms of residents (Radloff, 1977). The questionnaire required the respondents to self-evaluate the frequency of depressive symptoms encountered during the last week. The questionnaire consisted of 20 questions, and the answers were divided into four levels: (1) None or almost none (such situation occurs within 1–2 days). (2) Rarely (within 1–2 days). (3) Often (3–4 days). (4) Almost always (5–7 days). The total score was acquired by summing up the scores of 20 questions. The mean value of the norm was 11.52, and the scores over 16 were defined as the presence of depressive symptoms (Zhang & He, 1998). A higher score indicated more severe depression (Table 1). In this study, the Cronbach-α values for internal consistency of male and female depression were 0.989 and 0.966, respectively.

Table 1 Basic information of study participants

	Distribution	Husband Frequency	Percentage (%)	Wife Frequency	Percentage (%)
Age	18–29	110	11.1	78	7.9
	30–39	276	27.8	232	23.4
	40–49	379	38.2	363	36.6
	50–59	169	17.0	242	24.4
	60–69	53	5.3	62	6.2
	Over 70	6	0.6	16	1.6
Individual income	0–10,000	608	61.2	421	42.4
	10,000–25,000	220	22.2	176	17.7
	25,000–50,000	127	12.8	281	28.3
	50,000–100,000	38	3.8	115	11.6
Education level	Illiterate	57	5.7	11	1.1
	Primary school	288	29.0	209	21.0
	Middle school	353	35.5	398	40.1
	Senior high school/ technical school	174	17.5	221	22.3
	Junior college	78	7.9	102	10.3
	Undergraduate	42	4.2	50	5.0
	Master	1	0.1	2	0.2

Independent Variables

The SES was considered as an independent variable. Previous studies usually used education level and income as indicators to predict social and economic status (Galobardes et al., 2006). Therefore, we used these parameters to study the SES. All SES indicators were assessed using self-reported data. The level of education was estimated as the level of education received by an individual. The present survey used eight types of education, namely, never educated or attended literacy class, primary school, junior middle school, senior high school/technical school/vocational school, junior college, undergraduate, master's, and doctorate. The individual income was estimated based on the average annual family income (currency, RMB/¥). The survey considered seven income categories, namely, "0–10,000," "10,000–25,000," "25,000–50,000," "500,000–100,000," "100,000–250,000," "250,000–500,000," and "500,000–above."

Another independent variable was marital satisfaction. The CFPS questionnaire contains three questions concerning marital satisfaction: (1) In overall, how satisfied are you with your existing married life? (2) How satisfied are you with the monetarist benefaction of your life-partner to the household? (3) How satisfied are you with the beneficence of your companion to the family at home? In the questionnaire, the candidates were queried to score and answer on a 5-level scale with 1 to 5 points. Here, 1 point indicated that they were not satisfied, whereas 5 points indicated they were very satisfied. That is, a higher score indicated elevated levels in marital satisfaction. The Cronbach-α values for internal consistency reliability of male and female marital satisfaction were 0.886 and 0.783, respectively.

Control Variables

Gender and age were used as control variables. The male was "0" and the female was "1". Age was treated as a categorical variable and categorized into six groups: 18–29 years old, 30–39 years old, 40–49 years old, 50–59 years old, 60–69 years old, 70 years old and above.

Program and Data Processing

This study adopted SPSS 21.0 and Amos 22.0 to analyze the data. The detailed analysis process and method are as follows. First, frequency analysis was used to collect the basic demographic data and variations among married couples in China. Second, mean, standard deviation, and *t*-tests were carried out to analyze the gender variances in terms of SES, marital satisfaction, and depression of married couples in China. Third, a certain specific analysis was conducted for SES, marital satisfaction, and depression. Finally, APIM was used to study the impacts of SES and marital satisfaction on the actor and target effects of depression situations of married couples. Based on APIM proposed by Cook and Kenny (2005), the data in this study were paired to validate the mutual influence of SES and marital satisfaction on

the depression situation of couples (Cook & Kenny, 2005). The model was further modified and verified using the same basis.

Results

Basic Information of Study Participants

The frequency analysis, as demonstrated in Table 1, indicates that the majority of husbands were 40–49 years old, accounting for 38.2%, trailed by 30–39 years old, encompassing 27.8%. The most prevalent (36.6%) age group of wives was 40–49 years, followed by 24.4% belonging to the age group of 50–59 years. Therefore, the survey group essentially encompassed young and middle-aged families. The individual income level of 61.2% of the husbands participating in the study was 0–10,000, followed by 10,000–25,000, accounting for 22.2%. The individual income level of wives was primarily 0–10,000, accounting for 42.4%, followed by 25,000–50,000, accounting for 28.3%. The education level of the majority (35.5%) of the husbands was middle school, followed by 29.0% having primary schooling. Middle school education level of most of the wives accounted for 40.1%, followed by senior high school/technical school, accounting for 22.3%. These statistics showed that most of the families in the survey group were not well-educated.

Analysis of the Association Between Marital Socioeconomic Status, Marital Satisfaction, and Marital Depression

In Table 2, a significant negative correlation is highlighted between the husband's SES and depression, with a correlation coefficient value of –0.372 ($p < 0.01$). The higher SES of the husband resulted in a lower degree of depression in him. Similarly, a significant negative correlation between wife's SES and depression with a correlation coefficient of –0.287 ($p < 0.01$). Therefore, a higher SES of the wife indicated her lower degree of depression. The present study revealed a substantial undesirable correlation between a husband's marital gratification and depression with a correlation coefficient of –0.511 ($p < 0.01$). It implied that a lower depression level was associated with higher marital gratification of the husband. In terms of marital satisfaction, a significant negative correlation was documented between the wife's marital satisfaction and the depression situation, with a correlation coefficient of –0.410 ($p < 0.01$). It, therefore, indicates that the higher marital satisfaction of the wife was associated with her lower level of depression. The correlation between the variables is in accordance with the expected relationship according to the hypotheses in the theoretical deduction; that is, hypothesis 1(a), hypothesis 1(b), hypothesis 2(a), and hypothesis 2(b). The analysis results showed that because the correlation coefficient between variables did not exceed 0.7, the variables included in the model of this study can be exempted from the consideration of multi-collinearity (Kline, 2011).

Table 2 Description of correlation among variables

Variables	Socioeconomic status of husband	Socioeconomic status of wife	Marital satisfaction of husband	Marital satisfaction of wife	Depression of husband	Depression of wife
Socioeconomic status of husband	1					
Socioeconomic status of wife	0.101**	1				
Marital satisfaction of husband	0.038	−0.019	1			
Marital satisfaction of wife	−0.034	0.006	0.442**	1		
Depression of husband	−0.372**	−0.238**	−0.511**	−0.454**	1	
Depression of wife	−0.126**	−0.287**	−0.359**	−0.410**	0.128**	1

** $p < 0.01$.

Test of the Actor–Partner Interdependence Between Marital Socioeconomic Status and Marital Depression

First, the fitness of model 1 was validated based on the ideal value of the model fitting index recommended by Hu and Bentler (1999). Table 3 depicts the X^2 value of 1237.625 ($df=895$, $p=0.000$), i.e., statistically significant at the level of 0.1%. NFI, CFI, TLI, and RMSEA were adopted to evaluate the fitting index, and the number of cases and the simplicity of the model were considered. The values of NFI, TLI, and CFI were 0.983, 0.982, and 0.983, correspondingly, which highlighted a value of about 0.90 or higher, indicating an ideal fitting standard. The RMESA score was 0.020, showing model 1 to be acceptable.

The APIM was constructed using the SES of husband and wife as the predictive variable and the depression of husband and wife as the result variable. To assess model 1, we analyzed the path model of the effect of SES of husband and wife on the actor effect and target effect of marital depression (Fig. 2). The results of the analysis of actor effect, as obtained from Table 4 and Fig. 2, indicated that the SES of the husband had a significant negative influence on his depression in model 1 ($b=-0.422$, $p<0.001$) and the husband's depression degree reduced with the increase in his SES. A wife's SES had a substantial undesirable effect on the degree of her depression ($b=-0.348$, $p<0.001$); that is, an increase in the wife's SES reduced the depression. The actor effect analysis of the SES of husband and wife on their self-depression is, therefore, in agreement with the hypothesis mentioned in theoretical deduction, that is, hypotheses 1(a) and 1(b). The analysis of the target effect reflected a significant negative effect of the SES of the husband on the depression of the wife ($b=-0.103$, $p<0.001$). An increase in the husband's SES reduced the degree of depression of his wife. Similarly, the wife's SES has a significant negative effect on her husband's depression ($b=-0.238$, $p<0.001$). An increase in the SES of the wife reduced the husband's depression. The relationship between the target effect analysis of husband's and wife's SES on depression is consistent with the hypotheses in theoretical deduction, that is, hypothesis1(c) and hypothesis 1(d).

Test of Actor–Partner Interdependence Between Marital Satisfaction and Marital Depression

First, the fitness of model 2 was verified following the ideal value of the model fitting index suggested by Hu and Bentler. Table 5 shows the X^2 value as 1367.606 ($df=982$, $p=0.000$), which was significant at a level of 0.1%. NFI, CFI, TLI, and RMSEA were used to determine the fitting index, and the number of cases and the simplicity of the model were considered. The values of NFI, TLI, and CFI were 0.982, 0.981, and 0.982,

Table 3 Fitting index of research model 1

χ^2	df	χ^2/df	p-Value	RMSEA	CFI	TLI	NFI
1237.625	895	1.383	0.000	0.020	0.983	0.982	0.983

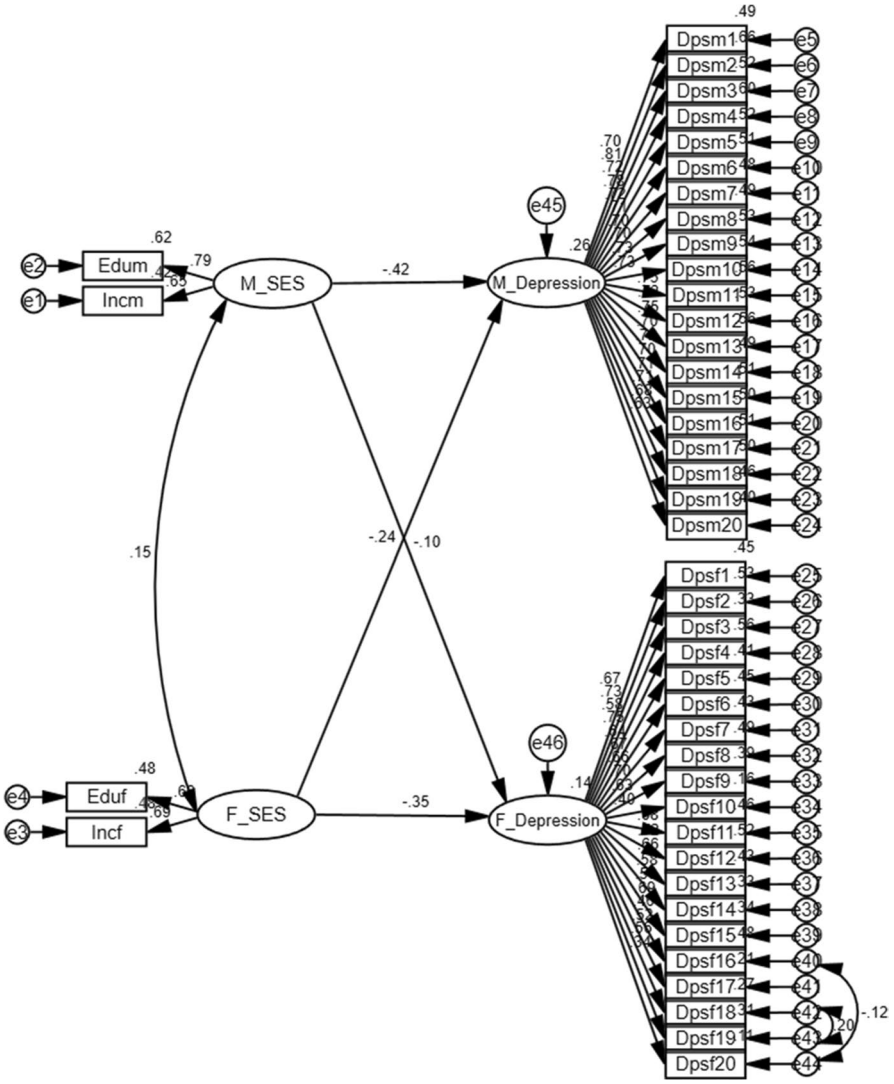

Fig. 2 Research model 1

correspondingly, which demonstrated a value of about 0.90 or higher, indicating an ideal fitting of the data. An RMESA score of 0.020 showed model 2 to be acceptable.

A significant inhibitory effect of the husband's marital satisfaction on his depression ($b = -0.406$, $p < 0.001$) can be witnessed from Fig. 3 and Table 6. Therefore, his depression decreased with the increase in his marital satisfaction. Similarly, the wife's marital satisfaction significantly inhibited the degree of her depression ($b = -0.368$, $p < 0.001$), that is, her depression degree decreased as her marital satisfaction increased. The actor effect analysis of marital satisfaction on depression confirmed the hypothesis proposed in the theoretical deduction, that is, hypotheses

Table 4 Regression coefficient of model 1

			Estimate	S.E	C.R	*p*-value	Standardized coefficients	Hypothesis
Depression of husband	<--	Socioeconomic status of husband	−0.470	0.049	−9.597	***	−0.422	Holds
Depression of wife	<--	Socioeconomic status of husband	−0.081	0.031	−2.651	0.008	−0.103	Holds
Depression of husband	<--	Socioeconomic status of wife	−0.197	0.034	−5.752	***	−0.238	Holds
Depression of wife	<--	Socioeconomic status of wife	−0.203	0.027	−7.402	***	−0.348	Holds

$^{***}p < 0.001$.

Table 5 Fitting index of research model 2

χ^2	df	χ^2/df	p-Value	RMSEA	CFI	TLI	NFI
1367.606	982	1.393	0.000	0.020	0.982	0.981	0.982

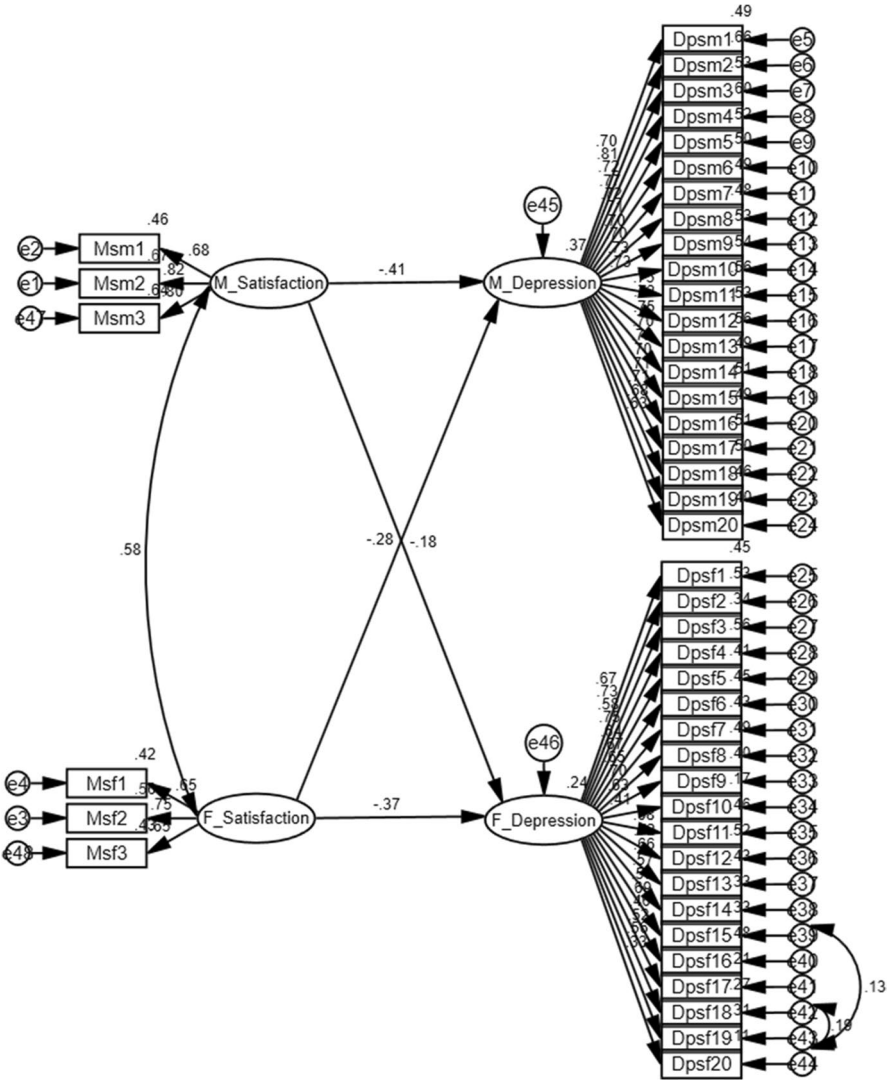

Fig. 3 Research model 2

2(a) and 2(b). In contrast, the results of the target effect verified that the husband's marital satisfaction had a significant inhibitory effect on the depression of his wife ($b = -0.176$, $p < 0.001$). High marital satisfaction of the husband reduced the degree of depression of his wife. Similarly, the wife's marital gratification had a substantial

Table 6 Regression coefficient of model 2

			Estimate	S.E	C.R	*p*-value	Standardized coefficients	Hypothesis
Depression of husband	<—	Marital satisfaction of husband	−0.335	0.037	−9.104	***	−0.406	Holds
Depression of wife	<—	Marital satisfaction of husband	−0.102	0.027	−3.823	***	−0.176	Holds
Depression of husband	<—	Marital satisfaction of wife	−0.283	0.045	−6.253	***	−0.280	Holds
Depression of wife	<—	Marital satisfaction of wife	−0.260	0.036	−7.185	***	−0.368	holds

***$p < 0.001$.

repressive impact on her husband's depression ($b = -0.280$, $p < 0.05$). An increase in the marital gratification of the wife reduced the depression of her husband. The target effect analysis of marital gratification on depression is, thus, consistent with the hypotheses suggested in the theoretical deduction, that is, hypothesis 2(c) and hypothesis 2(d).

Discussion

This study investigated the actor effect and target effect of SES and marital satisfaction on depression in Chinese married adults from the perspective of husband and wife. APIM was used to analyze the panel data of married couples over 18 years old in 2014, being sourced from CFPS. To prevent depression in Chinese married adults, this study analyzed the predictors of depression in the interdependent relationship between husband and wife. Apart from the interdependence relation of a couple, the APIM was used to model the self-influence of SES and marital satisfaction on depression and the target influence of spouse, which expanded the research field of mental health at the marriage level (Cook & Kenny, 2005). The results showed that the data of husband and wife were dependent, substantiating the theoretical framework of husband–wife correlation (Hoppmann & Gerstorf, 2009). In addition, this result indicated that APIM was more efficient than traditional statistical methods, assuming data independence. The use of couple data as the analysis unit can effectively avoid the error caused by the correlation of data variables, which is congruent with earlier reported research findings (Desai et al., 2012). In particular, using an analysis method that can reflect the effectiveness of measuring the pairing data of two members aids in obtaining more accurate results. In addition, it is essential to assess the actor and target effects to verify the interaction between the wife and husband of the relevant variables in this study.

The results revealed that before the APIM analysis by considering husband and wife as a unit, the correlation coefficient of the measurement variables was exploited to verify the marital interdependence in terms of SES, marriage satisfaction, and depression. The results endorsed the presence of correlation among all the measurement variables. Significant negative correlations were observed between the husband's SES and his depression, between the husband's SES and wife's depression, and between the wife's SES and her husband's depression. These observations indicated that the SES of wife and husband was associated with both their individual depression and depression as a unit. A higher SES of the husband resulted in a lower level of his depression. Similarly, a higher SES of the wife reflected a lower depression level in her, which is consistent with the previous research findings on individuals (Dohrenwend & Dohrenwend, 1969; Fryers et al., 2005; Wang et al., 2010). Moreover, significant negative correlations occurred between the marital gratification of the husband and his depression, between marital gratification of wife and her depression, between husband's marital satisfaction and wife's depression, and between wife's marital satisfaction and the depression of her husband, signifying the inter-connection between marriage satisfaction and depression within and among the two individuals. The inter-individual correlation between husband and wife is

congruent with earlier studies (Choi & Marks, 2008; Davila et al., 2003; Kendler et al., 1999; Kouros et al., 2008; Ulrich-Jakubowski et al., 1988; Vento & Cobb, 2011; Wang et al., 2014; Whisman & Uebelacker, 2009); that is, marital gratification wielded a substantial inhibitory consequence on marital depression. The correlation between the two individuals authenticated that husband and wife are the closest, and they have continuous interaction inside the family, whereby certain family environmental factors may jointly induce depression (Desai et al., 2012).

Cook and Kenny reported that if interdependence was confirmed in the collected couple data and husband and wife were considered as individual units rather than one community to be analyzed, although the "original hypothesis" actually existed, it may be wrongly refuted back to the first type of error. Therefore, it is necessary to adopt APIM to allow the individual characteristics to generate actor effect and target effect on themselves, that is, the effect of individual characteristics on the dependent variable of the other part in a dyad (Cook & Kenny, 2005). Therefore, in this study, models 1 and 2 were designed to verify the actor and target effects of marital satisfaction and SES of married couples on their depression levels.

The results of model 1 illustrated a significant predictive effect of the SES of husband and wife on the depression level of each side and a negative correlation between the SES of husband and wife with depression, substantiating the actor–partner hypothesis proposed in this and earlier studies (Cai et al., 2017; Dohrenwend & Dohrenwend, 1969; Freeman et al., 2016; Fryers et al., 2005; Wang et al., 2010). The previous studies reported that individuals with better work, higher family income, higher education, and good SES tend to suffer less from depression (Cai et al., 2017). Individuals with higher economic income and higher education backgrounds are more likely to transform their economic and social status into the ability to maintain objective and mental health (Cai et al., 2017; Miech & Shanahan, 2000). Even if some mental or psychological problems occur, those with high-income, high education background, and high professional status can acquire professional psychological advice and treatment, whereas those with low social and economic status are unable to avail such benefits (Miech & Shanahan, 2000). Moreover, although individuals with a high income and social prestige may face a high-paced life, they nevertheless suffer a less negative impact on mental health, compared to the impact exerted by survival pressure on the groups with low income and those in the lower social class (Lei et al., 2014; Veenstra, 2000). In annex, the current study analyzed the target impact of marital SES on depression level. The results revealed that the husband's SES had a negative influence on the depression level of his spouse and the wife's SES had an adverse impact on the depression level of her husband, supporting the target effect hypothesis proposed in this study. This study also observed a gender difference in the target effect of SES, that is, compared to the influence of husband's SES on the depression of his wife, more impact on the depression level of the husband was observed under the influence of the wife's SES. The reason for the gender asymmetry may be that according to the traditional concept of gender roles in China, men are regarded as the "supporting pillar" of the family. To a certain extent, male SES mirrors the social and economic status of a family. The requirements of gender norms on men and women also vary. The traditional gender role model of "women in charge of the family chores" stipulates that those men should

bear more economic responsibilities, whereas women should help their husbands at home and rear children. In conclusion, men are more authoritative, and they are the primary source of family income, with more influence on family members (Hiew et al., 2016). However, with the modernization of the social norms in China, female social and economic status has constantly been improving. More women are receiving higher education and engaged in stable jobs, thereby increasing their income. Therefore, the wife shares a part of the economic pressure in the family. The improvement in the wife's social and economic status may alleviate male pressure and mental health problems, including depression.

Model 2 validated the actor and target impacts of marital satisfaction on depression. The results demonstrated that a higher marital gratification between husband and wife was associated with lower depression levels, confirming the previous research findings (Hiew et al., 2016; Wang et al., 2014). Moreover, the target-impact test of marital gratification on depression uncovers the effect of marital gratification of wife on the depression of husband. In other words, higher satisfaction of wife with marriage results in lower depression of her husband; this finding complies and in concurrence with that of a previous study (Wang et al., 2014). Similarly, this study established that the marital satisfaction of the husband exerted an inhibitory effect on the wife's depression. The depression level of the wife reduced with increasing marital satisfaction of her husband. Therefore, these results indicated that in the process of interaction, strengthening marital satisfaction and improving marital quality may reduce the incidence of depression.

The present study contributes to elucidating the association amid marital SES, marital gratification, and depression. Researches pertaining to this association inclines to emphasis on entities notwithstanding the dyadic nature of marital SES and marital gratification. The present study addressed these limitations by evaluating Chinese wedded couples from a dyadic viewpoint. To sum up, this study adopted the APIM to analyze paired data, which compensated for the shortcomings of traditional methods. This model systematically and comprehensively clarified the complex relationship between the social and economic status of couples as a unit. In addition, it highlighted the effect of marital satisfaction on depression level. The alteration between this and preceding researches is that earlier studies analyzed individuals as a research unit (Fryers et al., 2005; Lei et al., 2014; Veenstra, 2000; Wang et al., 2010), whereas this study considered husband and wife as a unit, which is significant as it widens the scope of mental health research at the marriage level to restrict the rapid increase in marital depression in Chinese families. Furthermore, the current research investigated the influence of SES and marital gratification on depression. It is prominent from the results that higher education and family income levels usually reflect relatively high social and economic status, which is conducive to reduce the level of depression among couples (Gecas & Seff, 1989; Lei et al., 2014; Veenstra, 2000). The result of this study was that not only wives but also husbands have the same undesirable impact on their marital gratification and depression. Marital satisfaction can affect the depression of couples, which is the primary factor in maintaining or terminating the marriage (Choi & Marks, 2008). The SES and marriage satisfaction in the relationship between husband and wife have a significant impact on the depression of the wife and husband. The stable economic

situation and affection between the spouses reflect the quality of their married life. In other words, the marital satisfaction of both husband and wife can be transformed into personal depression through the cognitive–emotional process triggered by the marital relationship. The actor effect and the target effect, that is, the influence of one's psychological characteristics or behavior on the other, should be decomposed and verified.

Our study had certain limitations. First, this study inferred causality based on previous studies, that is, the influence of SES and matrimonial satisfaction on marital depression; however, there may exist an opposite causal association amidst the variables, which needs to be considered in further studies. Nevertheless, despite the limitations, the existing research concentrates only on the individual aspects of husband and wife by analyzing the impact that affects the couple's depression. The significance of this presented research outcome is to elucidate the influence of actor-effect and target-effect on depression and determine the extent of the impact. Second, this study suggested that in addition to considering the situation of the couple to verify the self-effect and target effect of marital SES and marital satisfaction on depression, we also need to account for the influence of variables related to offspring on the couple's depression situation (Fok & Shek, 2017; Shek, 2000).

Conclusions

Using the APIM and the data of China family panel studies (CFPS) from 2014, we explored the interdependence among SES, marital satisfaction, and marital depression of adult married couples in China. The following conclusions can be drawn: (1) Gender differences are prominent in SES, marital satisfaction, and depression among married couples. (2) The social and economic status of husband and wife has a significant actor effect on depression. That is, the SES of the husband is undesirably correlated to his depression, and that of his wife is also negatively associated with her depression. (3) The social and economic status of husband and wife has a crucial target impact on depression. The wife's SES has a substantial impact on the quantum of depression of her husband. Similarly, the husband's social and economic status has a notable adverse impact on the degree of depression of his wife. (4) Marital satisfaction has an actor effect on depression. The husband's marital gratification is undesirably correlated to his depression, and the wife's marital satisfaction also affects her depression negatively.

Author Contribution WD, ML, and ZZ conceived and designed the experiments. WD analyzed the data. WD wrote the paper.

ML and ZZ contributed to the revised manuscript. All authors read and approved the final manuscript.

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Declarations

Conflict of Interest The authors declare no competing interests.

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