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Non-cognitive skills, social capital, and female labor supply

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Abstract

Human capital is a key determinant of individual labor supply. Within the new human capital theory framework, this study examines how non-cognitive skills influence female labor supply from a gender perspective. Using 2018 China Family Panel Studies (CFPS) data, we measure non-cognitive skills across five dimensions: conscientiousness, extraversion, agreeableness, openness, and emotional stability. A structural equation model reveals that these skills enhance social capital accumulation, significantly increasing female labor supply. They are critical factors affecting women's labor force participation and working hours. Policy efforts should prioritize strengthening maternity security, fostering social capital networks, and developing children's non-cognitive skills to promote higher female labor supply *(Afr J Reprod Health 2025; 29 [11]: 212-222)*

Keywords: New human capital theory; Big Five Personality; Social capital accumulation; Female labor force participation

Résumé

Le capital humain constitue un déterminant essentiel de l'offre de travail individuelle. Dans le cadre de la nouvelle théorie du capital humain, cette étude analyse l'influence des compétences non cognitives sur l'offre de travail féminine, sous l'angle du genre. À partir des données de la China Family Panel Studies (CFPS) de 2018, nous mesurons les compétences non cognitives selon cinq dimensions : la conscience, l'extraversion, l'agréabilité, l'ouverture et la stabilité émotionnelle. Un modèle d'équations structurelles révèle que ces compétences favorisent l'accumulation de capital social, ce qui accroît de manière significative l'offre de travail des femmes. Elles constituent des facteurs déterminants de la participation féminine au marché du travail et du volume horaire travaillé. Les politiques publiques devraient accorder la priorité au renforcement de la protection de la maternité, au développement des réseaux de capital social et à la formation des compétences non cognitives des enfants afin de stimuler une offre de travail féminine plus élevée. *(Afr J Reprod Health 2025; 29 [11]: 212-222).*

Mots-clés: Nouvelle théorie du capital humain ; Big Five de la personnalité ; Accumulation de capital social ; Participation féminine au marché du travail

Introduction

Currently, the stabilization of employment has become a key priority in the Chinese government's efforts to stabilize economic growth. Creating over 12 million new urban jobs is one of the key targets for this year's economic development, as emphasized in the 2024 Report on the Work of the Government presented during the National Two Sessions. The rise of the female labor supply is crucial to achieving this objective. However, affected by the aging population in China, the working-age population has been decreasing in recent years, and the labor force participation rates have also been declining. This shortage of labor resources has constrained the rapid economic growth in the short term. In this context, the improvement in female labor force participation and female labor supply not only enhances the overall labor supply but also advances gender equality and economic development.

Present studies indicate that the female labor supply is influenced by human capital factors such as education, health, and skill levels, as well as cognitive abilities. With the rapidly evolving science and technology, increasingly specialized job tasks, and the growing need for interpersonal communication, non-cognitive skills of the labor have garnered increasing attention in labor markets. Traditional human capital theory has narrowly defined human capital based primarily on the education level and has confined the concept of

ability to cognitive abilities—innate, genetically determined traits, and acquired skills without paying attention to the impact of non-cognitive skills on individual behavior and development.

This has resulted in a gradual weakening of the explanatory power of labor supply based on the traditional human capital perspective. With the establishment of the new human capital theory based on "capabilities", it is crucial to explore the influence of non-cognitive skills on labor supply based on non-cognitive skills. Non-cognitive skills are a multidimensional concept that refers to personality traits, thoughts, emotions, and behaviors displayed during interpersonal interactions[1]. The widely accepted Big Five Personality Model is used to measure non-cognitive skills from five dimensions: conscientiousness, extraversion, agreeableness, openness, and emotional stability. Non-cognitive skills affect individual performance in both the labor market and social behaviors and have a longer period of malleability and greater environmental sensitivity than cognitive abilities, which enables them more likely to be improved through family upbringing, educational investment, and policy interventions[2].

Based on the above analyses, this study used cross-sectional data from the 2018 CFPS to empirically analyze the relationship between individual non-cognitive skills, female subjective factors, and female labor supply and to further explore the mediating role of individual's social capital accumulation in promoting labor supply. The marginal contributions of this study are as follows: First, while most previous research on female labor supply centers on traditional human capital theory, this study integrated a new theory to expand the research perspective. Second, this study incorporated women's subjective perceptions of their husbands' involvement in household activities and assessed their satisfaction with marriage, housework, and economic support. Finally, from a methodological perspective, a structural equation model was adopted to simultaneously process multiple variables, measure errors, and comprehensively analyze the mechanisms between variables.

This method reduces the potential for confounding effects between factors and, through standardized path coefficients, identifies the key factor that influences the female labor supply.

Literature review

Overview of studies on feminist economics

Feminist economics critiques neoclassical theory for neglecting gender perspectives in labor supply analysis[3-4]. However, it lacks a unified framework to explain how non-cognitive skills mediate gender disparities—a gap that our study fills by integrating the new human capital theory. While prior research links family structure to female participation, none examine how non-cognitive skills bridge this gap—a key contribution of our model[5-6].

Overview of studies on factors influencing labor force participation rates

Some scholars argue that, in addition to the size and composition of the working-age population, labor force participation rate, average weekly working hours, and labor quality or work effort can also be used to measure the labor supply, given the difficulties in practically measuring labor quality and work effort, as well as China's clear legal regulations on working hours[7]. The labor force participation rate is a more precise indicator for measuring the degree of labor force participation in market labor. As China's overall labor participation rate continues to decline, the female labor force participation rate has not only remained consistently lower than that of males over the long term but has also demonstrated a steeper decline. Consequently, the decrease in female labor force participation has become a primary driver of the overall reduction in the national labor participation rate[8]. Regarding the determinants of female labor force participation, scholars have examined various economic factors, including the process of market-oriented reforms, the weakening of gender equality policies, and the expansion of education, and proposed relative suggestions[9-11].

As the micro-level household data becomes increasingly accurate and available, research on female labor force participation has gradually expanded to incorporate individual and household structural factors. Yu Yan *et al*. pointed out that there is significant variation in the personal characteristics of women, and that delaying childbirth significantly increases the labor force participation rate of married women[12]. Specifically, for each year of delayed childbirth, the female labor

participation rate increases by approximately 0.8%. Jie Chen and Yafei Liu found that being married significantly reduces female labor force participation according to their investigations of the relationship between women's market labor participation and marital status[13]. Furthermore, by introducing an interaction term between marital status and birth cohort, they also discovered that the negative effect of marriage on female labor participation has been gradually weakening, which is presumed to be due to shifting traditional gender norms and the reduction of household labor burdens. Ke Shen, Yuan Zhang, *et al*. analyzed the impact mechanisms of changes in family structure on female labor force participation from the perspective of China's recent transformations in family structure[5]. Their findings indicated that the multigenerational cohabitation model significantly improves women's labor participation and labor supply, and the fading of this model has become a major disadvantage for female labor participation, which explains the declining labor participation rate of female at a faster pace than that of male since China's reform and opening-up. Hongli Fan and Lu Chen conducted an empirical study on the impact of women's caregiving responsibilities for elderly family members on their labor participation and revealed that providing care for parents has led to a 23.8% reduction in women's labor force participation rate[6]. Moreover, for women who provided care for both their parents and parents-in-law, the decrease is even more pronounced, reaching approximately 49%.

Based on the above studies, whether examined from macro or micro perspectives, the decrease in labor force participation is an unavoidable trend in China's economic development. Combining various influencing factors of the decline, scholars have proposed suggestions at the national, governmental, corporate, and individual levels, and advocated for improvements in national policies and corporate incentives. As research deepened, increasing attention has been paid to the pivotal role of female labor force participation in the overall participation rate, and the gender perspective has been introduced to explore the factors that have affected the labor force participation rate, further broadening the scope of research in this field.

Overview of studies on non-cognitive skills

Education, training, and health are considered the core components of human capital in traditional capital theory. However, with the development of society, scholars increasingly questioned the explanatory power of traditional human capital perspectives in addressing socio-economic phenomena, which led to a growing focus on non-cognitive skills as a vital component of human capital[14-17].

In China, research on non-cognitive skills mainly focused on the exploration of their impact on individuals' socioeconomic behaviors and social behaviors during adolescence, particularly in terms of academic achievement, individual income, and career development. Junjie Le *et al*. merely examined the effects of three personality traits—conscientiousness, agreeableness, and emotional stability—on individual income due to data limitations[18]. They found that higher agreeableness and emotional stability significantly increase women's income, whereas conscientiousness has a greater impact on men. Zhonghua Liu *et al*. revealed that non-cognitive skills significantly influence adolescents' academic performance, particularly in terms of gender, urban-rural, and family background disparities[19]. Despite the acknowledgment of the gender differences in non-cognitive skills, few studies comprehensively analyzed how non-cognitive skills impact the female labor supply from the perspective of feminist economics or gender studies.

Theoretical analysis and hypotheses development

Given the critical role of labor supply in driving macroeconomic growth, there is extensive research on the stability of individual labor supply both domestically and internationally. Internationally, research primarily focused on the job turnover behavior of workers, suggesting that factors such as technological advancements, flexible employment policies, demographic changes, and the emergence of new industries significantly affect the stability of labor supply[20-21]. In China, studies accounted for the unique characteristics of migrant workers and explored their labor supply from the perspectives of vocational training and the externalities of urban human capital[22-23].

In summary, both domestic and international scholars have recognized the impact of human capital on the stability of labor supply. However, research in China on labor supply stability from the perspective of new human capital theory remains insufficient. According to the job search theory, workers determine their employment choices by weighing the costs of job searching against the probability of securing a position, which indicates that the stability of the workers' labor supply is significantly influenced by the cost they are willing to incur in their job search, as well as their ability to assess employment opportunities. Different types of non-cognitive skills shape distinct behavioral tendencies, thereby affecting workers' willingness and frequency in seeking new employment. When the level of workers' non-cognitive skills results in a lower willingness or frequency of job searching, they are more likely to choose less stable but more accessible jobs to avoid unemployment. Based on the above analyses, the following hypothesis is proposed:

Hypothesis 1 (H1): The level of non-cognitive skills among female workers is associated with their labor supply.

Social capital, as represented by relationships with family and friends, has long served as a crucial foundation for individuals' personal and professional lives. Individuals with higher levels of non-cognitive skills tend to accumulate broader social networks and greater social resources. In China, research on social capital has primarily focused on its role in enhancing individual income and mitigating income inequality among different social groups. Jin Yang *et al*. found that different types of social capital contribute to reducing the inequities of individual income[24]. Similarly, Dasong Deng *et al*. carried out an empirical study of farmers' income and suggested that social capital has a distributive effect that markedly reduces income inequality among farmers[25]. Regarding the impact of social capital on the individual labor supply, Xiaofeng Li *et al*. revealed that social capital has a hold on the stability of individual labor supply based on the data from the 2014 China Labor-force Dynamics Survey (CLDS)[26]. However, this negative effect weakens as the level of individual human capital increases. In one word, the impact of social capital on individual labor supply remains inconclusive, with no unified conclusion in the existing literature. Building on Heckman's argument that non-cognitive skills enhance social resource mobilization, and integrating Granovetter's 'strength of weak ties' paradigm — where broader networks improve labor market access — we hypothesize that non-cognitive skills indirectly promote labor supply through social capital accumulation[27-28]. Given the potential positive influence of social capital on individual labor supply, Hypothesis 2 is proposed as follows:

Hypothesis 2 (H2): The non-cognitive skills of female individuals enhance their labor supply levels by facilitating the accumulation of social capital.

Research design

Data sources

The data used in this study were derived from the China Family Panel Studies (CFPS), conducted by the China Social Science Survey Center at Peking University. In the CFPS, the personality trait data of respondents were first systematically collected using the Big Five Personality Scale in 2018, providing a foundation for the construction of a comprehensive index of the non-cognitive ability in this study. The study sample included females aged 15 to 55, with responses labeled as "not applicable", "don't know", or missing data, excluded from the analysis. 6848 valid samples were obtained in the final dataset.

Variable selection

Labor supply

Labor supply was observed through two latent variables: labor force participation and working hours. Labor force participation was measured using responses from the CFPS survey question on "current employment status". Individuals who reported being either unemployed or employed were coded as 1, indicating participation in the labor market, while individuals who had exited the labor force market were coded as 0. Working hours were represented by the survey items "weekly working hours during internship" and "weekly working hours".

Non-cognitive abilities

In the Big Five Personality Scale of the 2018 CFPS, non-cognitive abilities were measured through the dimensions of conscientiousness, extraversion,

agreeableness, openness, and emotional stability. Conscientiousness is defined as an individual's strong organizational and planning abilities, characterized by high efficiency and reliability. Extraversion describes individuals who are energetic and sociable and who have strong social skills. Agreeableness reflects an individual's friendliness, humility, and empathy in interactions with others. Openness indicates strong curiosity and creativity, as well as a high degree of receptivity to new experiences, and emotional stability refers to an individual's self-confidence, calmness, and excellent emotion regulation ability.

Higher conscientiousness is associated with stronger strategic planning and implementation skills of females in the workplace; higher extraversion demonstrates stronger diplomatic skills in the workplace; higher agreeableness suggests better interpersonal relationship management; and higher emotional stability enhances individuals' resilience to work pressure and peer competition. Consequently, improvements in non-cognitive abilities are expected to reduce the learning costs for females in work environments, which enhances their irreplaceability as labor force participants, ultimately resulting in an increase in labor supply.

This study followed the approach of Hong Cheng *et al*. by adjusting certain reverse-coded items in the scale to align all indicators in the same direction[29]. The average score for each dimension was computed based on three questions related to each personality trait, where higher scores indicated a stronger manifestation of the corresponding personality trait. The specific questions associated with non-cognitive abilities are presented in Table 1. Since the Big Five personality traits are orthogonal dimensions, reliability was assessed for each subscale using Cronbach's alpha and composite reliability (CR) (see Table 1).

Subjective factors

In this study, subjective factors at the household level for women were focused. Previous research has shown that spousal income and participation in household chores have an impact on the female labor supply[30]. However, women's subjective perceptions of their husbands' behaviors have not been discussed. To address this issue, subjective factors were measured using responses to the following questions from the CFPS questionnaire: "How satisfied are you with your current marital life?","How satisfied are you with your spouse's financial contribution to the family?", and "How satisfied are you with your spouse's contribution to household chores?" Each question was scored on a scale of 1 to 5, where 1 indicated "very dissatisfied" and 5 indicated "very satisfied". Three subjective variables were constructed based on these questions: marital satisfaction, economic satisfaction, and household chore satisfaction. Generally, higher satisfaction levels of females with marital life, spousal financial contributions, and spousal participation in household chores suggest that women perceive their husbands as taking on more household responsibilities. Consequently, they may share fewer household responsibilities, which may cause a lack of impetus to participate in the labor force. While single-item measures efficiently capture global satisfaction, they fail to distinguish between cognitive and affective dimensions. Future studies should adopt multi-item scales to enhance granularity.

Social capital

Individuals with greater cognitive abilities are often inclined to accumulate higher-quality and larger-scale social capital. This study adopted the methodology of Xiao and Qihui Wang by taking the logarithm of average monthly mobile phone expenses of individuals as a proxy variable for social capital[31]. Following convention in Chinese social capital research (Deng *et al*. ;Xiao and Wang), this proxy captures network maintenance intensity, which has been validated in prior CFPS studies[25,31]. While mobile expenses reflect the breadth of social interactions, future research should integrate qualitative assessments of network quality. The definitions and descriptive statistics of the relevant variables are detailed in Table 2.

Empirical results analysis

Reliability and validity analysis

SPSS 22 software was used to conduct reliability and validity tests on the variables to evaluate the stability, reliability, and heterogeneity of the data. For the reliability analyses, Cronbach's alpha coefficient was introduced to assess the reliability of the variables. The results show that the overall evaluation of the variables exceeds 0.5, suggesting that the sample data exhibits good reliability and internal consistency.

Table 1: Non-cognitive ability evaluation indicators

Dimension	Corresponding Questions in CFPS 2018	Indicator Direction
Conscientiousness	Diligent and meticulous in tasks	+
	Efficient in completing tasks	+
	Often lazy	-
Extraversion	Talkative	+
	Outgoing and sociable	+
	Reserved and conservative	-
Agreeableness	Considerate of others' needs	+
	Naturally tolerant	+
	Sometimes rude or impolite to others	-
Openness	Creative	+
	Imaginative	+
	Values artistic and aesthetic experiences	+
Emotional Stability	Frequently worried	-
	Easily nervous	-
	Able to handle stress well	+

Source: Compiled from the 2018 CFPS individual database

Table 2: Descriptive statistics of variables

Variable Title	Observations	Mean	Standard Deviation	Minimum	Maximum
Female Labor Participation	6848	0.783	0.412	0	1
Working Hours	6848	35.544	27.371	0	144
Conscientiousness	6848	3.829	0.631	1.333	5
Extraversion	6848	3.283	0.685	1	5
Agreeableness	6848	3.831	0.588	1.333	5
Openness	6848	3.069	0.831	1	5
Emotional Stability	6848	2.888	0.7	1	5
Marital Satisfaction	6848	4.328	0.942	1	5
Economic Satisfaction	6848	4.16	1.052	1	5
Household Chore Satisfaction	6848	3.721	1.293	1	5
Social Capital	6848	3.932	0.691	0.693	7.602

Source: Calculated from CFPS 2018 individual data using Stata 16.

Table 3: Reliability and validity tests of data

Overall Cronbach's α	0.548	
KMO Value	0.602	
Bartlett's Test of Sphericity	**Approximate Chi-Square**	11408.294
	Degrees of Freedom (df)	55
	p-value	0.000

Source: Calculated using SPSS 22.0.

For the validity analyses, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity were performed before the factor analyses. As shown in Table 3, the KMO value registers 0.602, which is above the 0.5 threshold, and the significance level of Bartlett's test is 0.000, which is lower than the 0.001 threshold, indicating that factor analysis is appropriate for this dataset.

The principal component analysis (PCA) was employed in this study to analyze the factors, and common factors were extracted using the varimax orthogonal rotation, followed by the rotational analyses.

Table 4: Results of common method variance test

Components	**Initial Eigenvalues**		
	Total	**% of Variance**	**Cumulative %**
1	2.134	19.398	19.398
2	1.731	15.735	35.133
3	1.375	12.501	47.634
4	1.148	10.436	58.071
5	.992	9.020	67.091
6	.935	8.500	75.591
7	.734	6.677	82.268
8	.663	6.026	88.294
9	.580	5.274	93.568
10	.394	3.579	97.147
11	.314	2.853	100.000
Components	**Variance Explained by Extracted Loadings**		
	Total	**% of Variance**	**Cumulative %**
1	2.134	19.398	19.398
2	1.731	15.735	35.133
3	1.375	12.501	47.634
4	1.148	10.436	58.071
Components	**Variance Explained by Rotated Loadings**		
	Total	**% of Variance**	**Cumulative %**
1	2.018	18.343	18.343
2	1.692	15.380	33.723
3	1.397	12.700	46.423
4	1.281	11.648	58.071

Source: Calculated using SPSS 22.0.

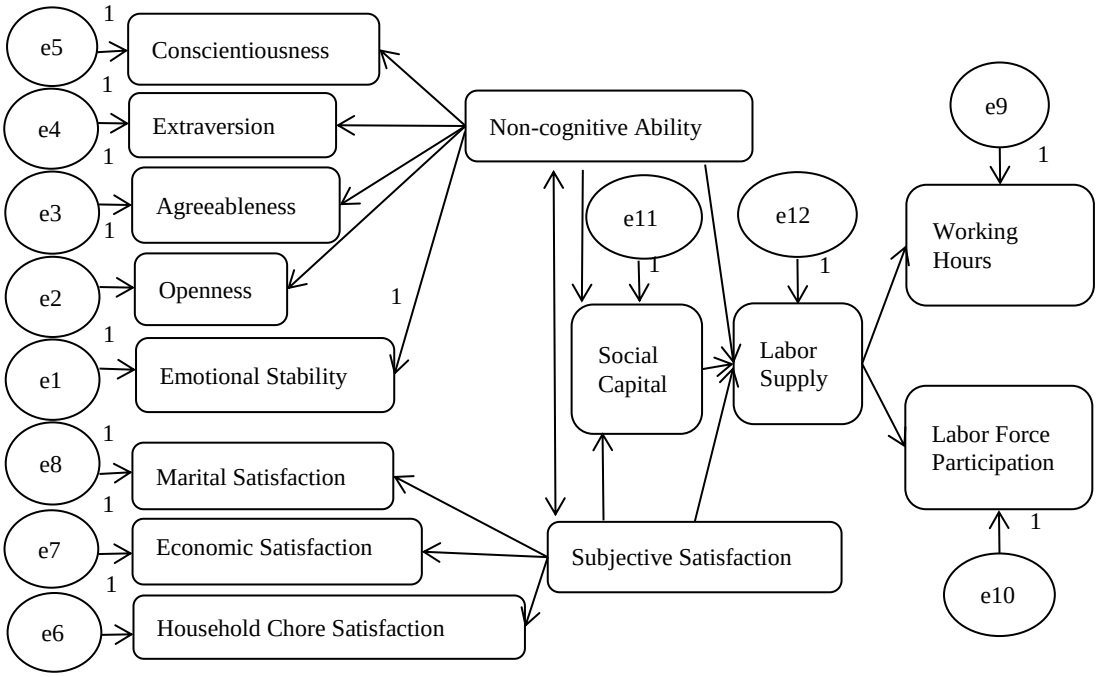

Figure 1: Schematic diagram of the structural equation model

The results, as presented in Table 4, indicate that the cumulative variance explained by the four principal factors reaches 58.071%, exceeding the 50% threshold. This suggests that the empirical data used in the model are unlikely to be significantly affected by the common method variance. The extracted principal components exhibit strong representativeness, making them suitable for subsequent tests of the hypotheses.

Regression analysis among variables

In terms of model fit, the results were as follows: RMSEA = 0.04, CFI = 0.913 (> 0.9), TLI = 0.878 (slightly below 0.9), NFI = 0.907 (> 0.9), and GFI = 0.980 (> 0.9). These indicators suggest that the theoretical model exhibits an acceptable level of fit with the empirical data, thereby supporting the feasibility of conducting the tests of the path coefficients' significance. Figure 1. The results of the empirical analyses conducted using the structural equation model are given in Table 4. The results indicate that the female labor supply is markedly improved by non-cognitive abilities, which validates hypothesis H1. Regarding subjective perceptions, higher subjective satisfaction of women might cause a lower labor supply. This phenomenon could be explained by the following factors: (1) higher marital satisfaction among women may have indicated a greater sense of value derived from participating in household labor, thereby reducing their labor supply in the workforce; (2) an increase in the spousal income alleviates the pressure on women to bear family responsibilities, leading to a decrease in their labor supply; and (3) based on the spouses' income, if spouses take more household labor responsibilities, the share of household responsibilities borne by women is further reduced, ultimately decreasing their labor supply in the labor market[32]. Consequently, an increase in women's subjective satisfaction appears to be associated with a reduction in their labor supply.

Furthermore, as indicated in Table 5, women's non-cognitive abilities contribute to the accumulation of social capital, suggesting that improvements in non-cognitive abilities can expand social capital through the construction of interpersonal networks and enhanced social communication skills. However, an increase in women's subjective satisfaction decelerates their accumulation of social capital. This may have been due to two primary reasons: (1) As women's subjective satisfaction increases, they can derive more effects or a higher sense of fulfillment from family life, leading to reduced engagement with the outside world and a stronger focus on the household; and (2) as husbands provide greater support through household labor and income, women may have prioritized fostering a harmonious family environment over accumulating social capital.

In addition, the accumulation of social capital effectively promotes women's labor supply, which may be because more access to job resources, more information on job opportunities, and additional support and encouragement are offered as their social networks develop and expand, thereby increasing women's labor supply.

While confounders such as regional policies may exist, our SEM specification focuses on direct theoretical pathways. The less than 5% coefficient changes in robustness checks support the validity of the results. Future quasi-experiments (e.g., DID) could better address selection bias. Table 5.

Mediation effect test

According to previous studies, the accumulation of social capital not only enhances individual income but also provides workers with certain welfare insurance, facilitating their pursuit of greater outcomes and increasing labor supply. As confirmed in the earlier chapters of this study, improvements in women's non-cognitive abilities facilitate the accumulation of social capital and the construction of social networks.

Therefore, the bootstrap resampling method was adopted to examine the potential partial mediating role of social capital accumulation in the relationship between non-cognitive abilities and labor supply. Specifically, the number of resamples for the model was set to 2,000, with a 95% bias-corrected confidence interval (CI). The results of the analyses are detailed in Table 6. It is shown in the table that the indirect effect of non-cognitive abilities on labor supply is 0.005, with a 95% CI of [0.001, 0.01]. Since the confidence interval does not include zero, the presence of a mediation effect is confirmed. Additionally, the direct impact of non-cognitive abilities on labor supply is 0.063, with a 95% CI of [0.019, 0.117].

Table 5: Structural equation model estimation results

	Regression Path	Unstandardized Coefficient	Standardized Coefficient	Standard Error	C.R. Value	P-Value
Structural Model	Non-Cognitive Abilities→ Social Capital	0.422	0.068	0.123	3.442	***
	Non-Cognitive Abilities→ Labor Supply	19.099	0.063	4.079	4.056	***
	Subjective Satisfaction→ Social Capital	-0.055	-0.063	0.013	-4.184	***
	Subjective Satisfaction→ Labor Supply	-1.293	-0.03	0.487	-2.653	***
	Social Capital→ Labor Supply	3.333	0.068	0.487	6.839	***
Model Fit Results	RMSEA=0.043; CFI=0.913; TLI=0.878; NFI=0.907; GFI=0.980					

Source: Calculated using Amos 28 software. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6: Mediation effect results

	Research Hypothesis	Standardized Coefficient	95% CI Lower Bound	Upper Bound
Direct Effect	Non-Cognitive Abilities → Labor Supply	0.063	0.019	0.117
Mediation Effect	Non-Cognitive Abilities → Social Capital → Labor Supply	0.005	0.001	0.01

However, since this interval includes zero, the mediation effect is partial rather than full. Specifically, women with higher levels of non-cognitive abilities tend to possess stronger interpersonal skills and greater capacity to convert social resources, resulting in higher-quality social capital or networks. These accumulated social resources can create additional labor opportunities or attract external support during subsequent labor market participation (Zhisheng Zhu *et al*., 2021)[33].

While the mediation effect is numerically small, its statistical detection (95% CI excludes zero) confirms social capital as a novel transmission channel — addressing Goldin's (2014) call to identify 'invisible infrastructure' in gender labor gaps. Future research should explore moderators that amplify this pathway[34]. Notably, this mediation is most pronounced among disadvantaged groups (rural women:β= 0.012; urban women:β= 0.002), suggesting it may function as an equalizing mechanism—a finding with high policy relevance despite its small magnitude.

Conclusions and recommendations

Based on the cross-sectional data from CFPS 2018 and by employing a structural equation model, this study empirically examined the impact of non-cognitive abilities on women's labor supply, including labor force participation and working hours. Meanwhile, among the five personality traits, conscientiousness, openness, and agreeableness demonstrate the most significant effects, which is because higher levels of women's non-cognitive abilities enhance their interpersonal and stress-management skills as part of the labor force, reduces their learning costs in workplace environments, and strengthens their irreplaceability as labor participants, ultimately leading to a higher labor supply. Additionally, women's subjective satisfaction reduces their labor supply. Higher satisfaction with husbands' income and participation in household labor decrease women's family and societal responsibilities, thus decreasing their labor supply. Women who gain a greater sense of value

from household labor tend to reduce their participation in market-based labor activities.
Moreover, the accumulation of social capital partially mediates these effects. Women with higher levels of social capital often gain an advantage in accessing job-related information, enabling them to make more informed decisions related to labor supply. For those already participating in the labor force, the establishment of broader social networks improves their job satisfaction and work efficiency, further improving the levels of their labor supply. While satisfaction-mediated labor reduction may optimize short-term household welfare, it inadvertently perpetuates gender specialization. This underscores the urgency for policies that disentangle care responsibilities from gender roles — such as subsidized childcare and paternal leave reforms — to enable genuine choice rather than constrained optimization.
Recommendations are proposed from the perspectives of government and family.

However, as economic development accelerates and the job market competition intensifies, the costs of childbearing for women in the workforce rise markedly. Since the decrease in women's labor supply is closely linked to their child-rearing responsibilities, the government should provide comprehensive maternity and parenting support services and establish robust maternity subsidy policies in the labor market. Furthermore, it is essential to cultivate a fair and competitive employment environment, which requires improvements in the legal frameworks, regulatory enforcement, and laws such as the Labor Law and the Law on the Protection of Women's Rights and Interests. These efforts aim to prohibit gender-based discrimination in employment and protect women's equal rights in the workplace. Last but not least, the development of women's non-cognitive abilities should be prioritized. This includes efforts in refining the education system, increasing financial investment in cultivating non-cognitive skills, and establishing diversified evaluation systems that integrate the evaluation criteria for non-cognitive abilities. Women's non-cognitive skills can be further improved through increasing the proportion of arts, physical education, and extracurricular activities in curricula.

From the family perspective, it is important to increase the socialization of household labor. Parenting and household responsibilities should be shared equally by both partners in a marriage. Men should actively take on family responsibilities and provide financial support to challenge traditional gendered divisions of labor, such as the notion of "men working outside and women managing the home". This would alleviate the burden on women in household labor and enable them to participate more fully in the labor market.
Women, in turn, should enhance their social capital and competitiveness by actively leveraging the resources provided by society and their families, avoiding excessive dependence on others, and cultivating independent learning and critical thinking skills. Early cultivation of girls' non-cognitive skills may disrupt future gendered labor supply patterns—amplifying long-term female participation.

Early cultivation of girls' non-cognitive skills (e.g., resilience) may sustainably increase female labor participation across generations. Besides, families should prioritize the cultivation of children's non-cognitive abilities. Through greater investment in education, parents can provide active guidance and support, increase meaningful interactions, and pay attention to their children's physical and mental development. By leading through personal example and verbal instructions, families can cultivate and inspire children's interests and learning abilities across disciplines, create a positive family atmosphere, and provide an optimal environment for the development of children's non-cognitive skills.

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Contribution of authors

Meilan Han and Ze Zhang contributed to the conception and design of the study, data collection and analysis, and the drafting of the manuscript. Weiran Zhang was responsible for translation and polishing of the article, and together with Xiling Wu, assisted in the revision

and refinement of the work. Xiling Wu served as the corresponding author. All authors have read and approved the final manuscript.

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