Household income mobility and adolescent subjective well-being in China: Analyzing the mechanisms of influence

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ABSTRACT

Background: The relationship between adult happiness and income has been a topic of extensive discussion. However, among children and adolescents, who are not directly engaged in economic activities, the relationship between household income over time and happiness is more complex and remains less explored.
Methods: We used nationally representative data from the China Family Panel Study (CFPS) from 2012 to 2018. The analytic sample consisted of 3,607 Chinese adolescents aged 10 to 19 years in 2018. Using an ordinary least squares model, we investigated the associations of 2-year (2016–2018), 4-year (2014–2018), and 6-year (2012–2018) household income mobility (i.e., upward mobility and downward mobility) with adolescents' subjective well-being (i.e., happiness and depression) in 2018. We further explored the potential mediating effects of parental care on these associations and whether they were moderated by adolescent age, adolescent sex, and initial household economic status.
Results: We found that upward mobility in household income was associated with decreased subjective well-being and parental care mediated this association. Furthermore, we found that the effects of upward mobility on adolescent subjective well-being varied by age, sex, and initial household economic status. Additionally, downward income mobility did not significantly impact adolescents' subjective well-being.
Conclusion: Our findings emphasized that economic progress and upward mobility should not come at the expense of parental care, as this would decrease adolescents' subjective well-being. Collaboration between the government and families is crucial to address the conflicts between work and family responsibilities, ensuring that parents are available and supportive to their children.

1. Introduction

Happiness has long been a fundamental pursuit of humanity, and the relationship between wealth and happiness has been a topic of extensive discussion (Killingsworth et al., 2023; Oishi et al., 2022). Family economic status is widely regarded as an important determinant of the well-being of children and adolescents (Yoo & Choi, 2016). Despite the ongoing debate, most studies suggest that children and adolescents from higher-income families typically experience better subjective well-being, characterized by greater happiness (Holder & Coleman, 2008) and lower levels of depression (Zhou et al., 2018), compared to those from lower-income families. However, the impact of changes in household income over time on children's happiness is more complex and remains less explored. Therefore, the current study aimed to investigate how household income mobility impacts the subjective well-being of adolescents from a dynamic perspective.

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1.1. Subjective well-being of children and adolescents

The United Nations aims to "ensure healthy lives and promote well-being for all at all ages" by 2030 as part of the sustainable development goals (United Nations, 2015, p.14). To achieve this goal, it is essential to scrutinize adolescence, a period characterized by significant physical, psychological, cognitive, and emotional development (Viner et al., 2012). Subjective well-being in adolescence is crucial not only to life satisfaction in adulthood (Coffey et al., 2015) but also to one's development throughout the lifespan (Hoyt et al., 2012). As an important dimension of well-being, subjective well-being refers to individuals' overall evaluation of the quality of their own lives (Diener et al., 2018). It is closely related to people's emotional well-being, including both positive and negative affect (Diener et al., 2017).

The experiences of children and adolescents have long been overlooked in research on subjective well-being. This neglect can be partially attributed to the limited political significance of children's perspectives, given their lack of voting rights, and the skepticism regarding the unreliability and validity of self-reported well-being among young people (Casas, 2011). With the rise of the children's rights movement in the late 1980s, theoretical perspectives on children shifted significantly. The Convention on the Rights of the Child underscored the importance of allowing children to freely express their views on matters affecting them (United Nations Children's Fund, 1989). Simultaneously, the Child Indicator Movement highlighted the significance of considering children's subjective perspectives and treating them as independent units of observation (Ben-Arieh, 2008). Moreover, an expanding body of empirical research has substantiated the reliability and validity of children's self-reports on subjective well-being (Huebner et al., 2011). These transformations have propelled significant advancements in research on children's subjective well-being.

1.2. Household income and child/adolescent subjective well-being

The adverse impact of family financial difficulties on the well-being of children and adolescents, which limits their ability to meet their basic needs, such as food, shelter, and clothing, is well documented (Main, 2019). Other types of material hardship, including lack of access to health, education, and living standards, have also been found to be negatively associated with children's and adolescents' well-being (Gross-Manos & Bradshaw, 2022). Despite the significance of considering the impacts of multidimensional economic disadvantage, household income remains the most commonly used proxy for child poverty and is often employed as an official poverty indicator (Neckerman et al., 2016). In addition to its straightforwardness in measuring child poverty, household income is widely regarded as a key factor contributing to family stability, which is closely linked to the well-being of children and adolescents (Lee et al., 2019).

Most existing studies suggest a positive association between household income and children's happiness (Holder & Coleman, 2008) and a negative association with depressive symptoms (Zhou et al., 2018). These findings indicate that children and adolescents from lower-income families are more likely to experience severe negative life events than their peers, leading to lower happiness and greater depressive symptoms (Rivenbark et al., 2020). However, some scholars argue that the income gradient within children's and adolescents' subjective well-being appears to be nonlinear. Lower-income families have a more positive and steeper association, which flattens as income increases (Kinge et al., 2021). Once basic needs are met, further financial improvements have less impact on subjective well-being (Levin et al., 2011). Additionally, some studies suggest that adolescents' subjective well-being is less influenced by household income (Gadermann et al.,2016). Instead, they emphasize that the quality and frequency of interactions with parents and peers are the most important predictors of adolescent subjective well-being (Carlsson et al., 2014).

Overall, the results of studies on the relationship between household income and the subjective well-being of children and adolescents remain inconsistent. More importantly, most of these studies have only considered household income as a static and stable factor, assessing the associations between adolescents' current household income levels and their subjective well-being. The impact of changes in family economic status on adolescents' well-being has been overlooked.

1.3. Household income mobility and child/adolescent subjective well-being

The impact of income mobility on individuals' subjective well-being has received increasing attention since the 1990s (Diener et al., 1993). Income mobility reflects changes in the income position (e.g., quintile, decile, centile, or rank) of each recipient unit at two or more time points. If the recipient unit consists of an individual at two different time points, the change is referred to as intragenerational income mobility; if the recipient unit consists of a parent and a child, the change in income is referred to as intergenerational income mobility (Fields, 2008).

Most studies in this field have focused on intergenerational rather than intragenerational income mobility (Cheng & Song, 2019). For example, studies from the U.K. (Dolan & Lordan, 2021) and the U.S. (Nikolaev & Burns, 2014) have analyzed the associations between intergenerational income mobility and the subjective well-being of adult offspring. Both studies revealed that upward mobility increased adult offsprings' subjective well-being, including their happiness, mental health, and life satisfaction; that downward mobility decreased their subjective well-being; and that the negative effects of downward mobility were greater than the positive effects of upward mobility. However, the impact of intragenerational income mobility experienced by individuals on their subjective well-being remains understudied. People may not continuously stay in the same income bracket or class throughout their lives (Levesque et al., 2021). Zhao et al. (2017) suggested that experiencing downward mobility in one's career life, coupled with stress, frustration, and pessimistic expectations for the future, has a more negative impact on adult subjective well-being than does intergenerational downward mobility, which can be buffered by resources from the parental generation.

Although most children and adolescents are not directly engaged in economic activities, they are inevitably affected by the economic fluctuations experienced by their parents, which, in turn, impact their well-being (Levesque et al., 2021). However, very few studies have examined the associations of household income mobility experienced by children and adolescents with mental health or subjective well-being (e.g., Bjorkenstam et al., 2017; Choi et al., 2017; Lee et al., 2019). The results of these few studies are inconclusive. Some have noted that children who experience increases in household income are less likely to suffer from negative affect or mental health disorders. For example, a study by Strohschein (2005) reported that increases in household income were associated with reduced depression and antisocial behaviors in children, while decreases in household income were linked to increased depression and antisocial behaviors. In contrast, a community-based income experimental study revealed that children's anxiety and depressive symptoms were unaffected by increases in household income (Costello et al., 2003). More importantly, previous studies have focused on negative affect or mental health disorders, neglecting positive affect such as happiness, which may be independent of negative affect in children and adolescents (Huppert & Whittington, 2003).

1.4. The mediating role of parental care

According to ecological systems theory (Bronfenbrenner, 1992), the family is the most important microsystem that affects the development of children and adolescents. A key parental responsibility within this microsystem is providing care for their children (Palmer, 1993). Multiple studies have indicated that a lack of parental care is significantly associated with lower levels of child subjective well-being, including

increased depression (Chang et al., 2024) and decreased happiness (Dai & Chu, 2018). Moreover, parental care can be influenced by economic changes. Several studies have focused on the impact of macroeconomic shifts on parental care, identifying distinct patterns in parental care behavior in response to these changes (Cai, 2022; Schneider et al., 2017). Nevertheless, to our knowledge, the mechanisms by which household income mobility affects parental care and adolescent subjective well-being remain unexplored.

1.5. The moderating role of age, sex, and initial household economic status

A strand of research has shown that the influence of household income on adolescent subjective well-being varies across different groups, including those differing by age and sex (Goodman et al., 2003; Knies, 2022; Zhou et al., 2018). From the perspective of income mobility, there is also compelling evidence that age, sex, and initial household economic status play pivotal roles as moderators of income mobility's effects on adult subjective well-being. Previous studies have suggested that young professionals who ascend in their careers, women, and individuals with lower income statuses are more susceptible to the negative effects of unstable income sources (Foremny et al., 2024; Lai et al., 2023). However, limited attention has been given to the moderating effects of these three factors on the mental health or well-being of children and adolescents.

1.6. The present study

Studies on the associations between household income mobility and adolescents' subjective well-being have predominantly been conducted in developed countries, such as the U.S. (Costello et al., 2003; Strohschein, 2005), Sweden (Bjorkenstam et al., 2017), and South Korea (Choi et al., 2017; Lee et al., 2019). There is a paucity of relevant research on Chinese adolescents, who account for 13 % of adolescents globally (United Nations Children's Fund, 2023). Over the past 30 years of reform and opening up, the Chinese economy has experienced ultrarapid growth, which has not only increased national income but also widened the income gap (Hu, 2017). In recent decades, the Chinese economy has transitioned toward a "new normal" of moderate economic growth amidst ongoing structural changes (Lu, 2017). Concurrently, the

Chinese government has made significant efforts to eradicate absolute poverty and promote income growth among the lowest strata. Within this context, the issue of relative income inequality has come to the forefront (Zhang, 2021). Against this backdrop, it is crucial to pay attention to the impact of economic changes in households, as the fundamental social unit of the country, on the subjective well-being of young people.

Therefore, the current study examined the associations between household income mobility experienced by Chinese adolescents and their subjective well-being. We also aimed to identify the potential mediating effects of parental care on these associations and whether they were moderated by adolescent age, adolescent sex, and initial household economic status. Fig. 1 presents our research framework.

2. Methods

2.1. Data sources and participants

The current study used publicly available data from the China Family Panel Studies (CFPS) conducted by the Institute of Social Science Survey (ISSS) of Peking University. The CFPS is a longitudinal biennial survey that evaluates China's economic development and social changes, as reflected by a nationally representative sample of households and residents (Xie & Hu, 2014). The project received ethical approval from the Peking University Biomedical Ethics Review Committee (Ref.: IRB00001052-14010). The CFPS uses a multistage (county/district, community, and household) probability proportional-to-size sampling strategy with implicit stratification to ensure its representativeness of Chinese society. The CFPS conducted the baseline survey in 2010 and five waves of follow-up surveys in 2012, 2014, 2016, 2018, and 2020. Each wave included an individual and a household dataset. Because the statistical caliber of household income in the 2010 questionnaire differed from that in later surveys and the 2020 household dataset has not yet been released, four waves of data (from 2012 to 2018) were used in this study.

We divided households into five equally sized income quintiles based on household income per capita. Household income quintiles represented household income position, ranging from the first quintile (the lowest 20 %) to the fifth quintile (the highest 20 %). We extracted adolescent data (from individuals aged 10–19 years) from the 2018
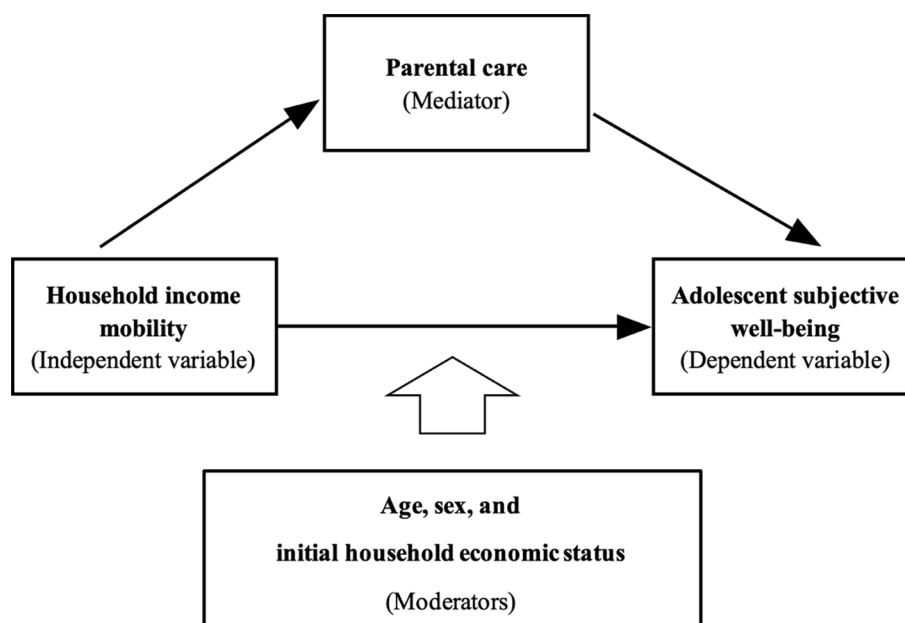

Fig. 1. Research framework.

individual dataset. To capture the household income positions in which the adolescents lived each year, we matched the individual adolescent data with each year's household income quintile data. We used listwise deletion to remove missing values across individual variables ($n = 610$), which led to a sample size of 3,607 adolescents. All adolescents had household income quintile information available for 2018 and 2016, 3,436 had this information available for 2014, and 3,254 had this information available for 2012.

2.2. Measures

2.2.1. Household income mobility

We calculated the income mobility of the 2012–2018, 2014–2018, and 2016–2018 periods by treating 2018 as the final year and 2012, 2014, and 2016 as the base years, respectively. Household income mobility experienced from the base year to 2018 was calculated as the household income quintile in which adolescents lived in the final year (2018) minus the quintile in which they lived in the base year. To assess the different effects of upward and downward income mobility, income changes from base year t (i.e., 2012, 2016 and 2018) to 2018 were decomposed into positive and negative components (York & Light, 2017). The positive component represents the magnitude of *upward income mobility* by recording all negative values as zero. Similarly, the negative component represents the magnitude of *downward income mobility* by recording all positive values as zero. Specifically, we defined:

$Up_{i,2018-t} = income_{i,2018} - income_{i,t}$ if $(income_{i,2018} - income_{i,t}) > 0$, otherwise 0.

$Down_{i,2018-t} = -(income_{i,2018} - income_{i,t})$ if $(income_{i,2018} - income_{i,t}) < 0$, otherwise 0.

2.2.2. Adolescent subjective well-being

In the current study, adolescents' subjective well-being included both positive affect (i.e., happiness) and negative affect (i.e., depressive symptoms). Happiness was assessed using a single self-reported question: "How happy do you feel?" Responses were rated on a scale from 0 to 10, with 10 indicating the highest level of happiness (Wang et al., 2022). Although this measure consists of only one item, it has been shown to have sufficient reliability and validity (Abdel-Khalek, 2006). Additionally, this approach has been widely utilized in previous studies (Zhang et al., 2021). Depressive symptoms were measured by the 8-item Centre for Epidemiological Studies Depression Scale (CES-D8), a widely used and validated tool to assess the severity of depressive symptoms among adolescents over the past two weeks (Van de Velde et al., 2009). The scale consists of 8 items: (1) "I feel down", (2) "I find it hard to do anything", (3) "I can't sleep well", (4) "I feel happy", (5) "I feel lonely", (6) "I am happy in life", (7) "I feel sad", and (8) "I feel like life cannot go on". All items are scored on a 4-point Likert scale from 0 (almost never) to 3 (most of the time), with two reverse-scored items. The total score ranges from 0 to 24, with higher scores indicating greater depression severity. The CES-D8 has good reliability and validity in the Chinese population (Zhou & Sun, 2021). Cronbach's α in this study was 0.72.

2.2.3. Parental care

Parental care was evaluated based on whether parents provided care when their children were sick, which is considered a key parental responsibility (Funk et al., 2020). This measure was adapted from an item in the parental care (antipathy and neglect) section of the Childhood Experiences of Care and Abuse (CECA) questionnaire, a well-established and reliable tool for assessing parental care deficiencies in children and adolescents (Gerra et al., 2009). In this study, respondents were asked, "Who took care of you when you were sick in the last year?" A response was coded as 1 if the primary caregivers during illness were the parents and 0 otherwise.

2.2.4. Covariates

Based on the findings of previous studies, all models controlled for the following variables (using the 2018 data) that may have affected adolescents' subjective well-being: age (Lee et al., 2019; Zhou et al., 2018), sex (male or female) (Carlsson et al., 2014; Lee et al., 2019), residential area (urban or rural) (Zhou et al., 2018), self-rated health (Carlsson et al., 2014), family size (Strohschein, 2005), academic pressure (Leung et al., 2021), quality of interpersonal relationships (Carlsson et al., 2014), family structure (two-parent families, single-parent families, or no-parent families) (Carlsson et al., 2014), living arrangement (living with both parents, living with only the father, living with only the mother, or living with no parent) (Murphy et al., 2016), and current household income status (Lee et al., 2019). Self-rated health ranged from 1 to 5 (i.e., unhealthy, fair, relatively healthy, healthy, very healthy). Family size reflects the number of people living in the household. Academic pressure ranged from 1 to 5, with higher scores indicating greater pressure. The quality of interpersonal relationships was defined by adolescents' self-rated social relationships on a scale of 0 to 10, with higher scores indicating better interpersonal relationships. In terms of family structure, single-parent families included children living with one parent following either a parental divorce or the death of one parent.

2.3. Statistical analyses

2.3.1. Regression analyses

The adjusted associations between household income mobility and adolescents' subjective well-being were estimated with OLS regression models using Equation (1):

$$SWB_{i,2018} = \beta_0 + \beta_1 Up_{i,2018-t} + \beta_2 Down_{i,2018-t} + \beta_3 X_{i,2018} + \varepsilon_i \qquad (1)$$

where $SWB_{i,2018}$ represents the level of happiness and severity of depressive symptoms experienced by adolescent i in 2018, $Up_{i,2018-t}$ denotes the upward mobility of household income experienced by adolescent i from base year t (i.e., 2012, 2014, or 2016) to 2018, $Down_{i,2018-t}$ denotes the downward mobility of household income experienced by adolescent i from base year t to 2018, $X_{i,2018}$ represents a vector of covariates, and ε_i represents a stochastic error term. In addition, given that household income may be nested within a region's economic development, we controlled for the fixed effects of a province in all regression models. Specifically, we first explored the associations of adolescents' individual and family characteristics (i.e., all covariates) with their subjective well-being and then added household income mobility to the OLS regression models.

2.3.2. Mediation analyses

To further explore how household income mobility impacts adolescents' subjective well-being, we tested parental care as a mediator in two causal steps (Baron & Kenny, 1986). First, we examined the associations between household income mobility and parental care according to Equation (2):

$$P(parentalcare = 1|x) = \delta_0 + \delta_1 Up_{i,2018-t} + \delta_2 Down_{i,2018-t} + \delta_3 X_{i,2018} + \varepsilon_i \qquad (2)$$

We then used Equation (3) to test the second step by adding *parentalcare* as an additional independent variable to Equation (1):

$$SWB = \beta'_0 + \beta'_1 Up_{i,2018-t} + \beta'_2 Down_{i,2018-t} + \beta'_3 X_{i,2018}$$
$$+ \beta'_4 parentalcare_{i,2018} + \varepsilon_i \qquad (3)$$

where β'_1 and β'_2 represent the direct effects of income mobility on adolescents' subjective well-being, and $\delta_1 \times \beta'_4$ and $\delta_2 \times \beta'_4$ represent the mediating effects. A mediating effect was considered present if δ_1, δ_2 and β'_4 were significantly different from zero. If β'_1 and/or β'_2 were significant, we concluded that parental care had a partial mediating effect; otherwise, we assumed that parental care had a full mediating

effect.

2.3.3. Moderation analyses

We also tested whether adolescents' age, sex, and initial household economic status moderated the associations between household income mobility and adolescents' subjective well-being. In terms of household economic status, an adolescent was considered to live in a low-income household if their household was in the bottom 40 % of all participants (i.e., first or second quintile) in the base year, and an adolescent was considered to live in a middle- or high-income household if the base-year household income was in the third to fifth quintile. The interaction terms of income mobility × age, sex, and initial household economic status were included in Equation (1).

2.3.4. Sensitivity analyses

We conducted three sensitivity analyses to examine the robustness of the results. First, we used two different measurements of household income mobility based on household income deciles and centiles instead of quintiles. We divided household income into 10 deciles and 100 centiles, two other common ways of describing an individual's income position (Fields, 2008). Second, instead of treating the dependent variables as continuous, we used ordered logistic regression models to analyze happiness as an ordinal variable and logistic regression models to determine whether the adolescents met the clinically significant depression threshold (1 = yes, 0 = no), with depression scores as a dichotomous variable. Participants were considered to have clinical depression if their CES-D8 scores were equal to or greater than 9 (Briggs et al., 2018). Third, since the CES-D8 assesses both positive and negative emotions, we partitioned it into two variables, positive feelings and negative symptoms, to evaluate the robustness of measuring subjective well-being. Positive feelings encompassed two items: "I feel happy" and "I live a happy life." The total score for positive feelings ranged from 0 to 6, with higher scores indicating greater subjective well-being. Negative symptoms included the remaining six items, with scores ranging from 0 to 18, where higher scores indicated lower subjective well-being. The Cronbach's α of these two variables were 0.71 and 0.74, respectively.

All analyses were conducted in STATA 15 (StataCorp, 2017). The unstandardized regression coefficients in ordinary least squares (OLS) models and odds ratios (ORs) in logistic regression and ordered logistic regression models are reported.

3. Results

3.1. Characteristics of participants in 2018

The average age of the participants in the sample was 14.23 years (SD=2.86), with 47.46 % being female. More than half the participants (56.58 %) lived in rural areas, and the average size of their households was 4.88 (SD=1.82). The means of adolescent self-rated health, academic pressure, and quality of interpersonal relationships were 3.88 (SD=0.93), 2.94 (SD=1.05), and 7.08 (SD=1.95), respectively. Regarding family structure, 88.19 % of the adolescents lived in two-parent families, 11.39 % lived in single-parent families, and 0.42 % lived in nonparent families. Additionally, 23.35 % of the adolescents had at least one absent parent. The participants' average level of happiness was 8.03 (SD=2.01). The average CES-D8 score was 4.21 (SD=3.21), and 9.87 % of participants met the clinical depression criterion, as indicated by a CES-D8 score equal to or greater than 9. The characteristics of participants are shown in Table 1.

3.2. Descriptive statistics of household economic status and income mobility

In terms of household economic status in base years, 56.00 %, 50.15 %, and 46.34 % of adolescents lived in low-income households (i.e. the first and second quintiles) in 2016, 2014, and 2012, respectively. In

Table 1
Descriptive statistics.

	N (%) or Mean (SD)	Range
Characteristics of participants in 2018 (N=3,607)		
Age	14.23 (2.86)	10–19
Sex		
Male	1,895 (52.54 %)	
Female	1,712 (47.46 %)	
Residential area		
Rural	2,041 (56.58 %)	
Urban	1,566 (43.42 %)	
Self-rated health	3.88 (0.93)	1–5
Family size	4.88 (1.82)	1–15
Academic pressure	2.94 (1.05)	1–5
Interpersonal relationships	7.08 (1.95)	0–10
Family structure		
Two-parent families	3,181 (88.19 %)	
Single parent families	411 (11.39 %)	
No parent families	15 (0.42 %)	
Living arrangement		
Living with both parents	2765 (76.65 %)	
Living with only the father	203 (5.63 %)	
Living with only the mother	353 (9.79 %)	
Living with no parent	286 (7.93 %)	
Happiness	8.03 (2.01)	0–10
Severity of depressive symptoms	4.21 (3.21)	0–23
Have clinical depressionNo clinical depression	356 (9.87 %)	
No clinical depression	3,251 (90.13 %)	
Parental care		
Yes	2,525 (70.00 %)	
No	1,082 (30.00 %)	
Household economic status and income mobility		
Household income quintiles in 2018 (N=3,607)		
1st quintile (lowest)	917 (25.42 %)	
2nd quintile	992 (27.50 %)	
3rd quintile	853 (23.65 %)	
4th quintile	568 (15.75 %)	
5th quintile (highest)	277 (7.68 %)	
Household economic status in the base year		
Household economic status in 2016 (N=3,607)		
Low-income households	2,020 (56.00 %)	
Middle- or high-income households	1,587 (44.00 %)	
Household economic status in 2014 (N=3,436)		
Low-income households	1,723 (50.15 %)	
Middle- or high-income households	1,713 (49.85 %)	
Household economic status in 2012 (N=3,254)		
Low-income households	1,508 (46.34 %)	
Middle- or high-income households	1,746 (53.66 %)	
Household income mobility		
2016–2018 (N=3,607)		
Upward mobility	0.43 (0.74)	0–4
Downward mobility	0.35 (0.68)	0–4
2014–2018 (N=3,436)		
Upward mobility	0.43 (0.77)	0–4
Downward mobility	0.58 (0.95)	0–4
2012–2018 (N=3,254)		
Upward mobility	0.44 (0.79)	0–4
Downward mobility	0.73 (1.06)	0–4

Note. Low-income households: household income in the 1st and 2nd quintiles; Middle- or high-income households: household income in the 3rd, 4th and 5th quintiles.

2018, 25.42 % of adolescents were from households in the lowest income quintile, and 7.68 % were from households in the highest income quintile. Although income mobility increased with longer time intervals, the mean income mobility of all households was lower than one for any time interval. From 2016 to 2018, the means of upward mobility and downward mobility were 0.43 (SD=0.74) and 0.35 (SD=0.68), respectively. These values were 0.43 (SD=0.77) and 0.58 (SD=0.95) from 2014 to 2018 and 0.44 (SD=0.79) and 0.73 (SD=1.06) from 2012 to 2018, respectively. The descriptive statistics of household economic status and income mobility are shown in Table 1.

Table 2 shows the details of the directions and magnitudes of household income mobility for the periods 2016–2018, 2014–2018, and 2012–2018. In general, many households stayed in their original

Table 2
Descriptive statistics of income mobility.

		Magnitude	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
			Household income quintiles in 2016				
2016–2018 (N=3,607)	Upward mobility	4	1.71 %	–	–	–	–
		3	3.62 %	2.37 %	–	–	–
		2	11.99 %	8.36 %	5.16 %	–	–
		1	30.73 %	24.36 %	20.75 %	13.60 %	–
	No mobility	0	51.95 %	38.80 %	37.48 %	41.60 %	43.49 %
	Downwardmobility	1	–	26.11 %	26.79 %	28.40 %	26.03 %
		2	–	–	9.81 %	11.20 %	17.47 %
		3	–	–	–	5.20 %	8.22 %
		4	–	–	–	–	4.79 %
			Household income quintiles in 2014				
2014–2018 (N=3,436)	Upward mobility	4	2.37 %	–	–	–	–
		3	6.35 %	3.26 %	–	–	–
		2	14.57 %	9.89 %	4.22 %	–	–
		1	33.75 %	24.89 %	17.44 %	10.89 %	–
	No mobility	0	42.96 %	34.02 %	32.70 %	32.47 %	26.54 %
	Downwardmobility	1	–	27.93 %	28.07 %	29.15 %	22.65 %
		2	–	–	17.57 %	16.61 %	17.85 %
		3	–	–	–	10.89 %	16.48 %
		4	–	–	–	–	16.48 %
			Household income quintiles in 2012				
2012–2018 (N=3,254)	Upward mobility	4	3.06 %	–	–	–	–
		3	8.33 %	3.30 %	–	–	–
		2	18.06 %	9.14 %	5.35 %	–	–
		1	33.33 %	24.75 %	17.92 %	9.94 %	–
	No mobility	0	37.22 %	32.74 %	28.62 %	23.86 %	18.78 %
	Downwardmobility	1	–	30.08 %	30.35 %	32.60 %	24.22 %
		2	–	–	17.77 %	20.68 %	22.08 %
		3	–	–	–	12.92 %	17.63 %
		4	–	–	–	–	17.30 %

quintile, especially in the shorter term. For example, 51.95 % of the bottom-quintile households in 2016 remained in the same quintile after two years. Moreover, the poorest households had lower mobility than the richest households during any time interval. For example, 42.96 % of the poorest quintile of households in 2014 remained in the same quintile after four years, while this value was 26.54 % for the richest households. Additionally, the magnitude of the changes in household income quintiles across time was very small for the poorest households. For example, more than 80 % of households in the first quintile in 2016 did not move or merely moved upward by one quintile, and only 1.71 % of households moved upward by four quintiles to the top income group. Although approximately 30 % of households moved from the first to the second quintile from 2016 to 2018, they remained low-income households. This pattern persisted as the time interval increased to four or six years. Although households' ability to move upward increased over time, the bottom income quintile exhibited less mobility overall, with only 29.45 % of the first quintile households in 2012 moving up more than one quintile after 6 years. Table S1 in the Appendix shows detailed information on each income quintile (i.e., median and range) from 2012 to 2018.

3.3. Associations between household income mobility and adolescent subjective well-being

Model 1 (a and b) in Table 3 shows the associations of covariates (i. e., adolescents' individual and family characteristics) with their subjective well-being. Older adolescents (happiness: B=-0.05, $p < 0.001$; depressive symptoms: B=0.11, p < 0.001) and adolescents who experienced greater academic stress (happiness: B=-0.09, $p < 0.001$; depressive symptoms: B=0.44, p < 0.001) exhibited lower subjective well-being than their counterparts. Better self-reported physical health (happiness: B=0.31, $p < 0.001$; depressive symptoms: B=-0.65, p < 0.001) and better interpersonal relationships (happiness: B=0.37, $p < 0.001$; depressive symptoms: B=-0.22, p < 0.001) were also associated with greater subjective well-being in adolescents. Boys were less happy

than girls (B=-0.24, $p < 0.001$), but depressive symptoms did not significantly differ by gender (P=-0.16, $p > 0.05$). Compared with their counterparts from two-parent families, adolescents living in single-parent families were less happy (B=-0.41, p < 0.01). With respect to living arrangements, adolescents who did not have mothers reported lower levels of happiness (B=-0.43, $p < 0.01$), and those who did not have fathers or mothers reported greater levels of depressive symptoms (B=0.66, $p < 0.01$) than those who lived with both parents. No significant relationship was found between current household income quintiles and adolescent subjective well-being.

Models 2 (a and b), 3 (a and b) and 4 (a and b) in Table 3 show the associations between household income mobility and adolescents' subjective well-being for 2016–2018, 2014–2018, and 2012–2018. In terms of upward mobility, each one-quintile increase from 2016 to 2018 was associated with a 0.26-point increase in adolescents' severity of depressive symptoms (Model 2b, $p < 0.001$) and a 0.12-point decrease in adolescents' happiness (Model 2a, $p < 0.05$) in 2018. From 2014 to 2018, each one-quintile increase was associated with a 0.26-point increase in adolescents' severity of depressive symptoms (Model 3b, $p < 0.001$), but the effects on happiness were not significant (Model 3a, B=-0.06, $p > 0.05$). No significant associations were observed between upward mobility from 2012 to 2018 and adolescents' severity of depressive symptoms (Model 4b, B=0.06, $p > 0.05$) or their happiness (Model 4a, B=-0.03, $p > 0.05$) in 2018. In addition, downward mobility had no significant effect on either happiness or the severity of depressive symptoms at any time point.

3.4. The mediating effects of parental care

We further tested whether parental care mediated the above-mentioned significant associations. Table 4 shows that parental care mediated the associations between household income mobility (2016–2018) and adolescents' subjective well-being. Specifically, each one-quintile increase in household income from 2016 to 2018 was associated with an 18 % decrease in the odds of adolescents being

Table 3
Associations between household income mobility and adolescents' subjective well-being.

	Happiness	Depression	Happiness	Depression	Happiness	Depression	Happiness	Depression
	B (SE)	*B* (SE)	*B* (SE)	*B* (SE)	*B* (SE)	*B* (SE)	*B* (SE)	*B* (SE)
	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b
Age	−0.05***	0.11***	−0.05***	0.10***	−0.05***	0.10***	−0.05***	0.10***
	(0.01)	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)
Sex (ref.: female)	−0.24***	−0.16	−0.24***	−0.16	−0.24***	−0.13	−0.24***	−0.13
	(0.06)	(0.10)	(0.06)	(0.10)	(0.06)	(0.10)	(0.06)	(0.11)
Residential area (ref.: rural)	0.01	0.05	−0.02	0.10	−0.02	0.12	−0.02	0.11
	(0.07)	(0.12)	(0.07)	(0.12)	(0.07)	(0.12)	(0.07)	(0.12)
Academic stress	−0.09**	0.44***	−0.09**	0.43***	−0.09*	0.44***	−0.08**	0.43***
	(0.03)	(0.05)	(0.03)	(0.05)	(0.03)	(0.05)	(0.03)	(0.05)
Self-rated health	0.31***	−0.65***	0.31***	−0.66***	0.31***	−0.66***	0.32***	−0.67***
	(0.04)	(0.06)	(0.04)	(0.06)	(0.04)	(0.06)	(0.04)	(0.06)
Interpersonal relationships	0.37***	−0.22***	0.37***	−0.22***	0.37***	−0.22***	0.38***	−0.21***
	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)
Family size	−0.02	−0.03	−0.01	−0.03	−0.02	−0.04	−0.02	−0.05
	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)
Family structure (ref.: two-parent families)								
Single parent families	−0.41**	−0.12	−0.40**	−0.12	−0.41**	−0.17	−0.46**	−0.16
	(0.13)	(0.20)	(0.13)	(0.20)	(0.13)	(0.21)	(0.13)	(0.21)
No parent families	−0.57	0.15	−0.59	0.18	−2.92***	0.30	−3.10***	2.36***
	(0.55)	(0.80)	(0.55)	(0.79)	(0.24)	(1.43)	(0.55)	(1.43)
Living arrangement (ref.: living with two-parents)								
Living with only father	−0.43**	0.24	−0.41**	0.21	−0.41**	0.28	−0.37**	0.28
	(0.16)	(0.26)	(0.16)	(0.26)	(0.16)	(0.27)	(0.16)	(0.26)
Living with only mother	−0.05	0.11	−0.05	0.10	−0.01	0.11	−0.03	0.22
	(0.12)	(0.19)	(0.12)	(0.19)	(0.12)	(0.19)	(0.12)	(0.20)
Living with no parent	−0.06	0.66**	−0.05	0.63**	−0.07	0.70**	−0.12	0.69**
	(0.13)	(0.23)	(0.13)	(0.23)	(0.14)	(0.24)	(0.14)	(0.24)
Household income quintiles in 2018 (ref.: 1st quintile)								
2nd quintile	−0.07	0.19	−0.01	0.08	0.02	0.07	0.02	0.07
	(0.09)	(0.15)	(0.09)	(0.15)	(0.09)	(0.16)	(0.10)	(0.16)
3rd quintile	0.04	−0.05	0.14	−0.26	0.16	−0.28	0.14*	−0.21
	(0.09)	(0.15)	(0.10)	(0.16)	(0.10)	(0.17)	(0.10)	(0.17)
4th quintile	−0.01	−0.26	0.14	−0.56**	0.16	−0.59**	0.12	−0.51*
	(0.10)	(0.17)	(0.12)	(0.19)	(0.12)	(0.20)	(0.12)	(0.20)
5th quintile	−0.01	−0.13	0.19	−0.44	0.20	−0.55*	0.13	−0.29
	(0.13)	(0.23)	(0.15)	(0.26)	(0.16)	(0.27)	(0.15)	(0.27)
Upward mobility (2016–2018)			−0.12*	0.26***				
			(0.05)	(0.08)				
Downward mobility (2016–2018)			0.05	−0.08				
			(0.05)	(0.08)				
Upward mobility (2014–2018)					−0.06	0.26***		
					(0.05)	(0.08)		
Downward mobility (2014–2018)					0.07	−0.02		
					(0.04)	(0.06)		
Upward mobility (2012–2018)							−0.03	0.06
							(0.05)	(0.07)
Downward mobility (2012–2018)							0.03	−0.02
							(0.04)	(0.06)
Province fixed-effect controlled	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,607	3,607	3,607	3,607	3,436	3,436	3,254	3,254
(Pseudo) R^2	0.22	0.13	0.22	0.14	0.23	0.14	0.23	0.14

Note. Robust standard errors in parentheses; *B*: unstandardized regression coefficients; ref. = reference group; *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

primarily cared for by their parents when they were sick in the past year (OR=0.82, $p < 0.01$). Moreover, primarily receiving care from parents when sick was significantly associated with more happiness (B=0.21, $p < 0.01$) and fewer depressive symptoms (B=-0.32, $p < 0.01$). Although the coefficients decreased slightly after parental care was included, the associations between upward mobility from 2016 to 2018 and adolescents' happiness (B=-0.11, $p < 0.05$) and depressive symptoms (B=0.25, $p < 0.01$) remained significant. The results showed that the associations between upward mobility from 2016 to 2018 and adolescents' happiness and depressive symptoms were partially mediated by parental care.

Parental care did not mediate the association between upward mobility from 2014 to 2018 and adolescents' subjective well-being, given that upward mobility during this time period had no significant effect on parental care (OR=0.94, $p > 0.05$). Moreover, there was no significant relationship between downward mobility and parental care. Since household income mobility from 2012 to 2018 had no significant impact on adolescents' happiness or depressive symptoms and income

mobility from 2014 to 2018 had no significant impact on adolescents' happiness, we did not consider the role of parental care here.

3.5. Moderating effects of age, sex, and initial household economic status

Table 5 presents the moderating effects of adolescents' age, sex, and household economic status in the base year on the associations between upward mobility (2016–2018 and 2014–2018) and adolescents' subjective well-being. Regarding the moderating effects of adolescents' age, the negative effects of upward mobility on subjective well-being were stronger among older adolescents (2016–2018: moderating effect on happiness: B=-0.04, $p < 0.01$; depressive symptoms: B=0.06, $p < 0.01$; 2014–2018: moderating effect on depressive symptoms: B=0.08, $p < 0.05$).

In terms of the moderating effects of adolescents' sex, the severity of depressive symptoms was more strongly associated with upward mobility (2016–2018: B=-0.24, $p < 0.05$; 2014–2018: B=-0.26, $p <$

Table 4

The mediating effects of parental care in the associations between income mobility and adolescents' subjective well-being.

	2016–2018			2014–2018	
	Parental care	Happiness	Depression	Parental care	Depression
	OR (SE)	*B* (SE)	*B* (SE)	OR (SE)	*B* (SE)
Upward mobility	0.82**	−0.11*	0.25**	0.94	0.26**
	(0.05)	(0.05)	(0.08)	(0.06)	(0.08)
Downward mobility	1.03	0.05	−0.08	0.96	−0.03
	(0.07)	(0.05)	(0.08)	(0.05)	(0.06)
Parental care		0.21**	−0.32**		−0.34**
		(0.07)	(0.13)		(0.13)
Model controlled for covariates	Yes	Yes	Yes	Yes	Yes
Model controlled for province fixed effects	Yes	Yes	Yes	Yes	Yes
N	3,601	3,607	3,607	3,426	3,436
(Pseudo) *R²*	0.13	0.22	0.14	0.13	0.14

Note. Robust standard errors in parentheses; *B*: unstandardized regression coefficients; OR: odds ratios. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

0.05) among females than males.

In terms of the moderating effects of baseline household economic status, compared with those from middle- or high-income households in the base year, adolescents from low-income households in the base year were likely to report fewer depressive symptoms after experiencing upward mobility in the 2016–2018 period (*B*=-0.42, *p* < 0.05).

Due to nonsignificant results in the main analyses, we did not test the moderating effects of household upward income mobility from 2012 to 2018 on happiness and depressive symptoms or of household upward mobility from 2014 to 2018 on happiness. Moderating analyses were also not considered for downward mobility for the same reason.

3.6. Results of sensitivity analyses

As shown in Table S2, Table S3, Table S4 and Table S5 in the Appendix, the results of the sensitivity analyses were generally consistent with those of the main analyses. First, after changing the measurement of household income mobility from household income quintiles to deciles and centiles, the association between upward mobility (2016–2018 and 2014–2018) and adolescents' depressive symptoms remained positive. The association between upward mobility from 2016 to 2018 and adolescents' happiness remained negative. Second, the direction and significance of the ordered logistic models for happiness were generally consistent with those of the OLS models. The inclusion of clinical depression as a dichotomous variable also yielded results that were generally consistent with the results of using CES-D8 scores as a continuous variable. Finally, the results from the alternate measurements of subjective well-being obtained by partitioning the CES-D8 scale score into positive feelings and negative symptoms remained robust.

4. Discussion

Adolescent subjective well-being is vital for both adult life satisfaction and overall development across the lifespan (Coffey et al., 2015; Hoyt et al., 2012). Although the relationship between income and happiness has been widely discussed (Killingsworth et al., 2023; Oishi et al., 2022), the impact of changes in household income over time on adolescent subjective well-being remains less explored. Therefore, using

Table 5

The moderating effects of age, sex and household economic status in the base year.

	2016–2018 (*N*=3,607)					
	Happiness	Depression	Happiness	Depression	Happiness	Depression
	B (SE)	*B* (SE)	*B* (SE)	*B* (SE)	*B* (SE)	*B* (SE)
Upward mobility	0.42*	−0.59				
	(0.21)	(0.32)				
Upward mobility × age	−0.04**	0.06**				
	(0.01)	(0.02)				
Upward mobility			−0.08	0.40***		
			(0.06)	(0.10)		
Upward mobility × sex (ref.:female)			−0.10	−0.24*		
			(0.07)	(0.12)		
Upward mobility					−0.22	0.67***
					(0.11)	(0.18)
Upward mobility × household economic status in 2016 (ref.:middle- or high-income household)					0.09	−0.42*
					(0.11)	(0.18)
Model controlled for covariates	Yes	Yes	Yes	Yes	Yes	Yes
Model controlled for province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
(Pseudo) *R²*	0.22	0.13	0.22	0.14	0.22	0.14
	2014–2018 (*N*=3,436)					
Upward mobility		−0.86**				
		(0.29)				
Upward mobility × age		0.08*				
		(0.02)				
Upward mobility				0.41***		
				(0.11)		
Upward mobility × sex (ref.:female)				−0.26*		
				(0.12)		
Upward mobility						0.32
						(0.18)
Upward mobility × household economic status in 2014 (ref.:middle- or high-income household)						−0.05
						(0.18)
Model controlled for covariates		Yes		Yes		Yes
Model controlled for province fixed effects		Yes		Yes		Yes
(Pseudo) *R²*		0.13		0.14		0.14

Note. Robust standard errors in parentheses; *B*: unstandardized regression coefficients; ref. = reference group. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

a representative sample of Chinese adolescents (*N*=3,607), the current study investigated the associations of 2-year (2016–2018), 4-year (2014–2018), and 6-year (2012–2018) household income mobility with adolescents' subjective well-being in 2018.

Our analysis reveals that half of the families in our study were classified as low-income, falling within the first or second quintile. This finding aligns with a study conducted in Sweden (Weitoft et al., 2008). Furthermore, our results indicate that these low-income families had limited opportunities for upward mobility to middle- or high-income levels over two to six years. One possible explanation is that children typically consume resources – such as food, healthcare, and education – without directly contributing to household income. Moreover, parents may reduce their earnings by opting for informal or part-time work to care for their children, further limiting household income (McVicar et al., 2019).

Consistent with previous studies (Andersen & Teicher, 2008; Carlsson et al., 2014; Leung et al., 2021; Murphy et al., 2016; Uusitalo-Malmivaara, 2014), we found that older age, greater academic stress, poorer self-rated health, poorer interpersonal relationships, incomplete family structure, and absent parents were associated with worse subjective well-being among adolescents. In terms of the associations between household income mobility and adolescents' subjective well-being, however, the findings of the present study with a sample of adolescents from a developing, middle-income country contradict those of previous studies conducted in developed, high-income countries (e.g., Bjorkenstam et al., 2017; Choi et al., 2017; Lee et al., 2019). Specifically, we found that upward mobility in household income within a shorter time period (2–4 years) was associated with decreased subjective well-being, which is inconsistent with findings from previous studies (Costello et al., 2003; Strohschein, 2005). We further explored potential explanations for these results from the perspective of parental care. Mediation analyses revealed that greater upward mobility over a two-year period correlated with a lower likelihood of Chinese adolescents receiving parental care when sick, leading to decreased subjective well-being.

These divergent results should be interpreted in the context of China's macroeconomic and social environment. Generally, a society with greater income inequality tends to exhibit larger income gaps between specific ranking positions than a society with lower income inequality (Quispe-Torreblanca et al., 2021). In an unequal society, upwardly moving a grade or bracket requires a greater increase in income, making it more challenging to achieve (Quispe-Torreblanca et al., 2021). Notably, China ranks the highest in income inequality globally (Xie & Zhou, 2014). Moreover, in recent years, Chinese society has increasingly experienced "neijuan" (involution), characterized by intense internal competition where individuals feel compelled to work harder and achieve more, often without corresponding rewards or progress. Indeed, our findings showed that many Chinese households with children stayed in their original quintile, especially in the shorter term (2–4 years). When opportunities for upward mobility become scarce, achieving upward mobility inevitably demands greater allocation of time and effort from Chinese breadwinners to earn income (Grossman & Mendoza, 2003). Parents often work extended hours, take on excessive workloads, or travel far from home for better job opportunities in pursuit of higher income (Murphy et al., 2016; Xie et al., 2023). Although increased income from hardworking parents can create better physical living conditions for children and adolescents, it challenges parents' ability to fulfill their parenting duties (Dinh et al., 2017). As a result, the benefits of upward mobility for households might be offset by the costs of striving for upward mobility, including changes in parental care that might ultimately reduce children's subjective well-being.

Furthermore, we found that the heterogeneous effect of upward mobility on adolescent subjective well-being varied by age, sex, and initial household economic status. First, the negative effects of upward mobility on adolescents' subjective well-being were stronger among older adolescents. This might be because happiness tends to decrease with age (Uusitalo-Malmivaara, 2014), while symptoms of depression tend to increase with age (Andersen & Teicher, 2008) among adolescents. Older adolescents are more likely to experience school challenges, peer problems, stress, and school dissatisfaction than younger adolescents (Uusitalo-Malmivaara, 2014). As a result, improvements in the family's economic situation may have little impact on their subjective well-being.

Second, upward mobility more strongly increased negative affect in female adolescents. It is important to consider that economic advantages are not uniformly distributed among all household members (Main, 2019). The preference for sons over daughters is a common norm in traditional Chinese society, impacting the allocation of resources within families (Liu et al., 2023). Generally, family resources tend to shift toward boys during the parenting process, resulting in girls benefiting less than boys from improvements in household economic status in terms of mental well-being (Aurino, 2017).

Third, adolescents from low-income families in the base year reported fewer depressive symptoms after experiencing short-term (2 years) upward mobility than did their counterparts from middle- and high-income families. This finding can be explained by the nonlinear relationship between household income and adolescent subjective well-being, where the positive impact of increased household income on reducing negative emotions diminishes as income rises (Kinge et al., 2021). As a result, adolescents from low-income families may experience a greater reduction in negative emotions with an increase in income than those from middle- and high-income families.

Additionally, we found that downward income mobility did not significantly impact adolescents' subjective well-being. Generally, parents' love for their children leads them to shield their children from harsh experiences, employing a series of protective mechanisms such as information witholding strategies and sacrificing personal necessities to meet their children's needs (Main & Bradshaw, 2016; Power, 2004). This result might be explained by the mediating mechanism that downward mobility did not significantly link with the likelihood of adolescents being able to receive parental care when they were sick.

4.1. Limitations and future research

First, although our study was based on longitudinal data with repeated observations at the household level over time, we did not establish a perfect causal relationship between household income mobility and adolescents' subjective well-being due to unresolved endogeneity issues. Future studies should adopt a more rigorous analytical approach, such as a fixed effects model, to better identify causal relationships. Also, our study exclusively examined the effects of relatively short-term household income mobility experienced by adolescents (i.e., two to six years) on their subjective well-being and did not consider long-term effects. While short-term effects are important, as adolescence is a period of significant change and heightened sensitivity to proximal exposure (Green et al., 2018), it is also important for future research to utilize longer-term data to explore how household income mobility experienced during childhood and adolescence impacts subjective well-being across the lifespan.

Second, the current study explored the impact of income mobility on adolescent subjective well-being without considering the broader impact of multidimensional economic conditions, including access to health, education, and standard of living. While income is a crucial factor for families to obtain material welfare, our results should be interpreted with caution, as income alone may not adequately represent a family's economic status (Main, 2019). Indeed, some research has found discrepancies between child poverty measured monetarily and that measured through multidimensional methods (Kim, 2019). Future research should adopt a multidimensional approach to measuring economic hardship to fully describe the relationship between changes in family economic status and adolescent subjective well-being.

Third, in terms of measuring adolescents' subjective well-being, both happiness and depressive symptoms were assessed at a single time point, which might introduce information bias due to potential mood swings among participants. Moreover, we were unable to test other indicators of subjective well-being, such as adolescents' life satisfaction, because they were not measured in the adolescent sample in the CFPS. Future research should consider using more stable and comprehensive tools to measure adolescents' subjective well-being, such as the daily diary approach (Yan et al., 2022). Additionally, a truly child-centric approach, particularly qualitative methods, should be employed in future research to provide valuable insights into the interactive influence of household economic conditions on children's and adolescents' subjective well-being.

Fourth, we used a single-item measure from the parental care section of the CECA questionnaire (Gerra et al., 2009). While we do not believe this limitation significantly undermines our conclusion that parental care mediated the relationship between household income mobility and adolescent subjective well-being, it may account for the limited mediating effect observed between upward mobility and adolescents' subjective well-being. Future research should consider using the full parental care scale to more accurately estimate the mediated effect and to explore whether different aspects of parental care have distinct impacts. Additionally, we were unable to distinguish between the mediating effects of paternal and maternal care, as the questionnaire included only a general question on parental care rather than separate questions for each parent. Since adolescents' relationships with their fathers and mothers may impact their emotional well-being differently (Cortes-Garcia et al., 2019), future research should distinguish between the roles of fathers and mothers in the associations between household income mobility and adolescents' subjective well-being. Furthermore, parents' subjective well-being, which was excluded from our analyses due to a high proportion of missing values, may serve as another mechanism deserving more attention.

4.2. Implications

Despite its limitations, the current study offers several important implications for improving adolescents' subjective well-being. First, our results indicate that raising children places families at a disadvantage within the income distribution. To alleviate the financial burden on families with children, the government should increase investments in public services related to childcare, such as education, healthcare, and housing. Furthermore, severe income class segregation and income inequality make it more difficult for adults to achieve income gains and effective parenting. The Chinese government should address income inequality through more effective income distribution policies.

Second, the findings indicate that upward income mobility can negatively impact adolescents' subjective well-being due to the decreased likelihood of receiving adequate parental care. While it is undeniable that families need work and income to thrive, an increase in household income should not come at the expense of parental care. Household income alone is not the sole determinant of children's subjective well-being; the parenting environment associated with income changes, such as the level of parental care, may be key. Therefore, it is crucial for parents and the government to work together to ensure that parents can be present at home. Parents should strive balance their roles as workers and caregivers to ensure sufficient time for family bonding. On the policy front, increasing the accessibility of parental care for adolescents through family-friendly policies, such as paid parental leave and more flexible working hours, could be an important direction for government action.

Third, our findings emphasize the need for families to focus on older and female adolescents, who may benefit less from improvements in family income. Ensuring that all adolescents benefit from their family's economic progress is essential. Notably, adolescents from low-income families may experience greater improvements in subjective well-being with increased household income, suggesting that targeted economic support for these adolescents could be effective. However, economic support alone cannot fully compensate for the reduction in parental care. Thus, policy efforts should also aim to empower families to offer better care for their children. A combined approach of economic support and family-based behavioral interventions may offer a promising solution for low-income families (Ismayilova et al., 2018).

5. Conclusions

This study, using a representative sample of Chinese adolescents, investigated the associations between household income mobility and subjective well-being, including happiness and depressive symptoms. To our knowledge, this is the first study to investigate the underlying mechanisms of these associations. Unlike the direct effects of household income on the subjective well-being of adult family members who are directly involved in economic activities, our study reveals that changes in household income have more indirect and complex impacts on adolescents' subjective well-being.

We suggest that raising children can make families more susceptible to economic difficulties and limit their upward mobility. Importantly, if families achieve upward mobility at the cost of reduced childcare, the potential benefits of increased income may not extend to children and could even harm their subjective well-being. The subjective well-being of older adolescents, female adolescents, and those from initially advantaged backgrounds tends to decline more steeply with upward income mobility, implying that those groups may benefit less from income growth. Additionally, downward income mobility does not significantly affect adolescent subjective well-being, possibly due to the protective mechanisms provided by parents. Thus, economic progress and upward mobility should not come at the expense of children's subjective well-being. Collaboration between the government and families is crucial to address the conflicts between work and family responsibilities, ensuring that parents are available and supportive to their children.

Author contributions:

Qian-Wen Xie: conceptualization, methodology, writing – review and editing, writing—original draft, formal analysis, and visualization.

Xiangyan Luo: data curation, writing – original draft, and visualization.

Shuang Lu: writing – review and editing.

Xu Li Fan: writing – review and editing.

Shi Li: conceptualization, writing – review and editing.

All authors contributed to the article and approved the submitted version.

Data availability statement

This study used publicly accessible secondary data provided on the CFPS website (https://opendata.pku.edu.cn/).

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

This study used publicly accessible secondary data provided on the CFPS website (https://opendata.pku.edu.cn/).

Appendix A. Supplementary data

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