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Meritocratic Narratives as Cultural Orientations: Explaining Child-Rearing Practices in China

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Abstract

Concerted cultivation practices are not only explained by parents' objective resources, but also by parents' cultural orientations, which are associated with social class. While cultural orientations of parenting styles in Western societies have been studied, the role of beliefs in social reproduction in other parts of the world is still under-researched. The aim of this study was to understand whether social class and meritocratic beliefs of Chinese parents affect their parenting style with regard to children's education and learning. Our findings suggest that both meritocratic beliefs and social class have a positive effect on concerted cultivation practices. The effect of parents' meritocratic beliefs on parenting style is stronger than the effect of social class for boys and urban schools. In addition, meritocratic beliefs reduce class differentials in rural schools, but increase them in urban schools. We discuss the effectiveness of meritocratic beliefs promoting child-rearing practices regardless of the social origin.

Key words: meritocratic beliefs, concerted cultivation, social class, China, causal inference.

Introduction

The meritocratic principle (Young 1958), which emphasizes the central role of ability and effort for status attainment is losing effectiveness as a collective myth (Lamont 2019). Sociologists argue that meritocratic beliefs, or the narratives that abilities and hard work lead to success, are unfulfilled promises (e.g. Mijs 2016a), as success is not ensured for everyone and societies vary in the strength of the link between education and success in life. The idea that these subjective propositions about the distribution of rewards are legitimations of action and structural conditions for certain groups is becoming common among social scientists (Khan 2011; Mijs 2016a, 2019). Furthermore, the degree to which meritocratic beliefs are accepted and perceived as valid principles of distribution differs between social groups. Privileged families may prefer the meritocratic principle to a larger extent and encourage learning activities (Lareau 2011). According to the findings of Becker and Hadjar (2013), lower social classes (e.g. working classes, lower middle class) are more likely to perceive that success still depends on social origin, social position and family than the upper service class. Specifically, parents affected by negative status-inconsistency, i.e. who have acquired a status below that they

would most likely have achieved in light of their educational level, may be assumed to have lost faith in the meritocratic principle.

However, to the best of our knowledge, there not evidence of the role of meritocratic beliefs on social reproduction practices. Substantial efforts have been made to explain the early life course mechanisms of social reproductions since Lareau's (2011) Concerted Cultivation Theory. Middle- and low-class parents differ in their cultural logic of child-rearing. Middle-class parents engage in children's life experiences in a way that better equip them for adulthood. Organised extra-curricular activities, language use and relation with institutions are at the core of their parenting style. Critically reflecting on this theory, researchers have pointed out this differential is explained by class differences in material resources, and not by cultural logics (Chin and Phillips 2004; Bennett, Lutz, and Jayaram 2012). However, any conclusion related to this debate would be vulnerable without specific measurements of cultural beliefs. Our research stands out since we include meritocratic belief representing certain aspect of cultural orientation in as the bridge between structural position and child-rearing practice. A robust test of meritocratic worldviews as cultural orientations is the main contribution of this study to theory development. The analysis uses data from the China Educational Panel Survey, the first large-scale school-based longitudinal survey conducted in China. To our knowledge, it is the first quantitative study testing concerted cultivation hypotheses addressing endogeneity issues. The empirical strategy combines inverse-probability weighting (IPW) to estimate the causal effect of meritocratic beliefs on concerted cultivation and a two-stage regression model to assess the heterogeneity of this effect across social classes.

While cultural orientations and their roles in social stratification, educational decisions or parenting styles are widely studied in Western industrialized societies, the role of meritocratic principles in other parts of the world beyond Europe and the US is still under-researched. If meritocratic beliefs legitimize social advantages, they may also affect actions intended to reproduce those advantages as cultural orientations. Weininger, Lareau and Conley (2015) showed that, in the United States, concerted cultivation is not only explained by parents' objective resources, but also by parents' cultural orientations. Parenting is a reflection of the parents' own worldviews and cultural orientations (Bodovski 2010; England and Srivastava 2013). In this study, we aim to determine whether parents' meritocratic beliefs affect their parenting style with regard to children's education and learning. We test whether beliefs about hard work and abilities as predictors of scholastic success explain practices of concerted cultivation in China and how they vary across social classes. Accordingly, this study's central innovative potential of this study is the analysis of meritocratic beliefs and child-rearing practices in China -as an Eastern Asian country- that is believed to be

characterised by a low level of intergenerational social reproduction (Xie and Zhang 2019; Zhou and Xie 2019). We contribute to the augmentation of Western theories by applying them in a different context. Although there is no equivalent translation into Mandarin Chinese, Confucian philosophy has promoted longstanding meritocratic principles in Western terms. It bonds educational institutions and exam-based qualifications for highly-valued civil service jobs (Hannum et al. 2019). In addition, and in contrast to developed Western societies, educational success in China is not only seen as an individual achievement but is also associated with family honour (Peng 2019). Thus, China is an ideal case for testing whether parents' meritocratic narratives play a role in shaping parenting styles in an Eastern Asian society.

Although there is a trend toward increasing social fluidity throughout the world (Ganzeboom, Treiman, and Ultee 1991; Breen 2010), family socioeconomic status remains a fundamental driver of status attainment. Evidence suggests that societies are not beyond class (Becker and Hadjar 2013), but – depending on societal aspects such as the education system – the meritocratic triad of class of origin, education and class of destination is still a valid concept (Hadjar and Becker 2016). However, the mechanisms through which parents transmit advantage from generation to generation is still a subject for debate (e.g. Roksa and Potter 2011; Carolan 2016). For instance, several studies have discussed whether material or non-material family resources affect children's educational success (Liu and Xie 2015; Mayer 1997). Family income could be directly invested in more and better education, but non-material resources, such as cognitive skills and culture, also explain how parents' advantages are transferred to their children. Among these factors, parenting styles have been shown to affect children's short- and long-term outcomes (Chan and Koo 2011; Pong, Hao, and Gardner 2005; Astone and McLanahan 1991).

Next, we introduce the general framework of the Concerted Cultivation Theory to theorise class differentials in parenting style (Section 1). While discussing cultural orientations of child-rearing practices, we derive the argument that meritocratic narratives motivate concerted cultivation practices as rational mindsets and, at the same time, moderate the effect of social class (Section 2). After contextualizing our research on parenting in China and deriving context-specific hypotheses (Section 3), we describe data and variables (Section 4) and our analytical strategy (Section 5). The findings based on inverse-probability weighting and regression models are reported (Section 6) and are finally discussed regarding the contributions of these results to the literature in social stratification and parenting (Section 7).

The concept of concerted cultivation

According to Lareau (2011), parents from different social classes adopt different cultural repertoires of how children should be reared. Social class shapes the rhythms of children's daily lives. These cultural logics of child-rearing differ by social class and explain an important part of social reproduction.

The general argument posited by Lareau (2011) is that while middle-class parents undertake a process of *concerted cultivation*, working-class and poor parents engage in an *accomplishment of natural growth* approach to child-rearing. They differ in the number of organised activities, the degree of autonomy granted to children, relations with kin, use of the language and interventions in institutions. Families' economic conditions constrain the opportunities for parenting practices that cohere with these child-rearing styles. Parental practices and cultural logic are organised around three aspects examined by Lareau (2011): organization of daily life, language use and interventions in institutions.

Parents engaged in concerted cultivation will *organise activities* for their children in their leisure time, such as sports classes or arts. These activities help to train children for the future. They acquire skills and the dispositions to deal with institutions. In contrast, the lives of working-class and poor children are less structured, less parcelled and less monitored by parents. The world of such children is independent of that of their parents. Instead of engaging in structured activities, they spend their free time in informal play. Parents also differ in *language use*. The difference in sociolinguistic styles has impacts on schooling. Middle-class families understand language as an end in itself. They care about the use of words and vocabulary, as well as a discipline based on language. In contrast, the use of language in working-class and poor families is functional. Parents do not negotiate their standards and children usually accept them unquestioningly. Concerted cultivation through language leads to unequal educational benefits for children from homes that use language differently. The third aspect that differentiates the child-rearing approach of middle-class parents is *intervention in institutions*. Parents from middle-class families are often interventionists and "do not accept a no as an answer". If we consider middle-class parents master the rules of the game (Lareau, Adia Evans, and Yee 2016), they can negotiate institutional standards, and capitalize and transmit their advantage, which provides children with a feeling of empowerment. In contrast, working-class and poor parents feel defiant, scared and powerless. These parents expect teachers and educators to take leadership of their children's schooling.

Besides social reproduction, the two child-rearing approaches have differences in their consequences. On the one hand, children exposed to concerted cultivation develop a sense of entitlement. It is a mindset where pursuing one's own preferences is a right. They learn how to

communicate with adults and therefore they are able to shift situations toward their preferences. On the other hand, the natural growth parenting style of working-class and poor parents generates a sense of constraints in their children, who accept their conditions and do not seek to manage the situation to suit their preferences.

Quantitative evidence has supported Lareau's theory (Bodovski and Farkas 2008; Carolan 2016; Roksa and Potter 2011). Bodovski and Farkas (2008) show for a sample of white Americans that concerted cultivation is a mediator of parental socioeconomic status (SES) and children's achievement. SES is strongly and positively associated with concerted cultivation. At the same time, concerted cultivation is positively associated with test scores and teachers' judgment of children's skills. However, the instrumental value for academic success is modest. Instead, their findings suggest that concerted cultivation functions as cultural consumption. A possible explanation is that the effect of concerted cultivation on achievement is less direct (Carolan 2016). It affects students' academic performance through its effect on attitudes and behaviours that promote educational achievement, such as self-efficacy or mathematics identity. Researchers from different countries have sought to explain inequality by these micro-level interactions within families beyond the context of the United States (e.g. Barg 2019; Matsuoka 2019). With some nuances, the conclusion is similar: parents transmit differential advantages to children through parental practices.

Overall, Concerted Cultivation Theory yields the hypothesis that social class positively affects concerted cultivation practices of child-rearing (H1), i.e. compared to their middle or low class parents, upper-class parents more often engage in concerted cultivation practices.

Meritocratic beliefs and concerted cultivation

Scholars have long argued a relationship between social class, parental values and parenting practices (Kohn, Scotch, and Glick 1979). In the framework of concerted cultivation, the effect of social class on child-rearing practices is explained by the meanings of these behaviours, which are not deductible from class position characteristics (Lareau 2011; Weininger, Lareau, and Conley 2015). Even though Lareau did not directly rule out the key position of values in her causal model of class and parenting, she rooted her argument in Bourdieu's (1979) concept of "habitus", which refers to internalised dispositions that are the bases of thinking, behaviours, perceptions, and evaluations of situations, and thus, includes values of education, attitudes, and child-rearing beliefs and practices (Scharf, Hadjar, and Grecu 2019). This paper argues that parents' meritocratic beliefs, which represent parents'

worldviews about allocation of rewards in society, should have a substantial effect on explaining class-differentiated child-rearing practices.

By meritocratic beliefs, we refer to the perception of reward distribution in the educational system in contrast to individual preferences for inequality (what ought to be), which is an important distinction made by previous studies on social justice beliefs (e.g. Castillo 2011). The perception of meritocracy is a causal belief in frameworks of sociology of culture (Vaisey and Valentino 2018; Small, Harding, and Lamont 2010; Olivos 2020). They are impersonal narratives of how factor X (effort/ability) causes outcome Y (grades at school). Although meritocratic ideals are important normative principles in Chinese tradition, it is unclear whether Chinese parents perceive educational systems as such, and whether these beliefs have cultural efficacy in the explanation of parenting style.

Habitus cannot be understood without reference to one's position in the field generated by the interaction between the economic and cultural capital (Vaisey 2009). Therefore, social structure should also be included in interpreting the role of meritocratic beliefs. Bucca (2016) pointed out that two explanations have been provided for the higher endorsement of meritocratic beliefs by socially advantaged individuals. First, individuals from a higher social class will seek to legitimize their social position as deserved. Khan (2011) provides a detailed account of how meritocratic beliefs work in obscuring social advantages. Beliefs about hard work and belonging to the institutions are used by advantaged parents, students, faculty members, and staff to justify the privilege. Second, research on the differential hypothesis argues that lower status individuals hold structural beliefs about inequalities due to the experience of power and privilege in their membership group (Lockwood 1966). Hence, social justice judgments, such as meritocratic beliefs, are more the result of structural facts than idiosyncratic values (Wegener 1991). Hyman (1953) explained that aspirations are positively related to individuals' positions in the social structure. Lower-class individuals tend not to define high success goals, because they know they will not achieve them. Conversely, higher status individuals overestimate individual attributions of success, which, in turn, will be instrumental for success.

On the other hand, habitus represents actors' dispositions toward action, deploying and reproducing their capital (Vaisey 2009). Moreover, parenting practices convey class-consistent belief systems. Child-rearing behaviours should be motivated by the understanding of their payoffs, which vary across social classes due to the awareness of structural opportunities. From a rational choice perspective (Richard Breen and Goldthorpe 1997), the educational decision-making of parents is based on subjective propositions about costs and benefits, as well as a desire to avoid downward social mobility. Barg (2019) uses this theory to explain the likelihood of initiative in parent-teacher contact as a concerted cultivation practice. She argues that parents are motivated by these beliefs and

are more likely to become involved in behaviours that increase their children's chances of reproducing their social position. Although the original version of this theory sought to sidestep cultural arguments, beliefs about cost and benefits are causal attributions and part of cultural schemes (Vaisey and Valentino 2018; Olivos 2020). Cost-benefit beliefs are narratives or causal links of events through which people interpret their situations (Small, Harding, and Lamont 2010), especially when people calculate the expected benefits in a certain social system. For example, when parents believe that the social system rewards ability and effort, they will be more willing to invest in activities that foster child's talent and skills, which are at the core of concerted cultivation. Therefore, parents who perceive that the educational system meritocratically rewards their children will engage in a more concentrated cultivation approach to child-rearing (H2).

One of the most important criticisms of concerted cultivation is that social class explains child-rearing practices because of differences in material resources (Chin and Phillips 2004; Bennett, Lutz, and Jayaram 2012), and not because of class-specific cultural logics, as emphasized by Lareau (Lareau and Weininger 2003; Lareau 2011) from her Bourdieuan perspective. Although she and her colleagues addressed her starting point of "cultural orientation" (Weininger, Lareau & Conley, 2015), they failed to find an accurate measure of values. Because of their failure to separate value from the resource-based measure of class, the cultural orientations of class differentials in parenting practices still lack support from quantitative researches. In addition, this dilemma also hinders scholars in exploring the interaction between the resource-based mechanism and cultural-based mechanism. In this paper, we propose that economic resources, as constraints of parental investments, interact with parental subjective dispositions represented by meritocratic beliefs. This yields to the hypothesis that the higher the parents' class, the smaller are the economic constraints on parental investment, and the stronger the effect of values on concerted cultivation (H3). Economic resources owned by parents are constraints of how much they can invest in children's ability cultivation (Kornrich and Furstenberg 2013). Even non-economic investment, such as time, is constrained by parents' market positions (Doepke, Sorrenti, and Zilibotti 2019). At the same time, parents interpret and internalize these structural opportunities, shaping their values and worldviews, which also affects child-rearing practices. Figure 1 summarizes the theoretical model.

[Figure 1 about here]

Contextualization: Parenting in China

To understand the role of meritocratic beliefs in China requires describing key characteristics of the educational system and child-rearing culture. The pre-higher education system can be divided into

compulsory and post-compulsory education. First, six years of primary education and three years of junior high school have been part of compulsory education since 1986. Second, there are three years of senior high school. Our study focuses on two waves of a cohort that started in 7th grade. It is crucial to understand the Chinese case and the applicability of a concerted cultivation model. Compulsory education is free, which aims to reduce heterogeneity within compulsory educational resources, and thus extracurricular activities and parenting practices have a more important role in the explanations of class differentials than in other contexts. During junior high school, students sit their first citywide standardized exam to compete for admission opportunities to senior high schools at the end of 9th grade. Both students and parents experience an increase in competitive intensity, which may affect their values and also their parenting practices. The Chinese case puts differences in child-rearing practices into sharper relief.

However, as shown in Western countries, the evidence indicates that educational engagement and family expenditure are much higher for children from a high-socioeconomic origin than for children from a middle or low-socioeconomic origin (Hannum et al. 2019). For instance, higher family socioeconomic status is associated with a greater likelihood of private tutoring and spending on such activities (Zhang and Xie 2016). This “shadow education” offers learning opportunities outside of school that may be included in the child-rearing practices of concerted cultivation and parental effort to organise children’s daily life outside of school. Young and Hannum (2018) went beyond this analysis and found inequalities between children from different socio-economic status in well-being indicators, educational performance, and parental practices, such as parental homework assistance and parent-teacher meetings. Hence, we attempt to extend this literature by testing a more comprehensive class-differential in child-rearing practices and examining whether it is driven by cultural orientations.

In recent decades, China has undergone rapid urbanization. This has led to a decreasing significance of ascribed characteristics in the explanation of social inequalities as part of the process of modernization (Treiman 1970). This generates substantial differences between rural and urban areas, which are considered one of the most important sources of inequality in post-reform China (Wu 2019). The *hukou* system divides China into two societies (Chan 2009), where residents of rural areas are entitled to fewer rights and benefits than the urban population. The system requires people to register in the area where they reside, being classified as agricultural or non-agricultural residents. Therefore, differences in child-rearing overlap with broader inequalities. Conversely, the same social stratification model suggests that individual achievement increases its effectiveness. Thus, in urban environments, individuals may realize and internalize that individual effort and abilities are criteria

for allocating rewards in modern and rationalized societies. Using a comparative approach, Kunovich and Slomczynski (2007) showed that the level of meritocracy in certain countries is associated with support of meritocratic principals. Hence, we hypothesise that, in schools located in urban areas, the effect of meritocratic beliefs is stronger than social class (H4a), while in schools located in rural areas, social class is a more important determinant of concerted cultivation practices than meritocratic beliefs (H4b).

Finally, a large body of literature on Chinese parenting focuses on the son preference, which is rooted in a long-standing traditional patrilineal culture. This is not only a cultural characteristic of China, but also of other East Asian societies such as Korea and Taiwan (Raymo et al. 2015). Although the one-child policy has improved educational opportunities for girls (Lee 2012), parents should treasure their children regardless of their sex and not make differences in child-rearing practices between boys and girls. However, even though the son preference has weakened, a substantial proportion of the population still prefers to have a boy if they only have one child (Yeung and Hu 2013; Raymo et al. 2015). If the son preference is still a cultural anchor in China, parents will invest more in sons than daughters and expect higher pay-off from these practices. When parents have a daughter, they will invest what they have, while for boys they will make a greater effort. Therefore, a stronger effect of social class than meritocratic beliefs is expected for girls (H5a). In contrast, parents of boys are more sensitive to pay-off expectations than those of girls and the investment in parenting will be more independent of social class. Thus, we expect a stronger effect of meritocratic beliefs than social class for boys (H5b).

Overall, the theoretical predictions assess the effect of meritocratic beliefs and concerted cultivation, considering characteristics of China. The urban and rural divide and son preference are a context-specific hypothesis that enables us to provide a better understanding of the logic of social reproduction through parenting in China.

Data and Variables

Data

We analyse data from the first and second wave of the China Educational Panel Survey (CEPS 2015). The sample comprises 10,279 seventh graders surveyed in 2013-2014, with a follow-up in eighth grade. This survey is a longitudinal, large-scale probabilistic and representative sample of seventh and ninth graders from 438 classes from 112 schools in 28 counties in mainland China. Of the 10,279 seventh graders in the baseline, a total of 9,440 students were surveyed in the follow-up at eighth

grade. Our analyses consider parents' and children questionnaires. The final analytic sample after listwise deletion included 8062 observations.

Dependent variable

Following the conceptualization proposed by Bodovski and Farkas (2008), concerted cultivation is measured by a 13-item index of Concerted Cultivation ($\alpha=0.744$). Our operationalization includes their three-dimension indicator (parental perceptions of their responsibilities, organized after-school activities, and parent/school relationship) and language use pattern. As explained in our framework, language use is a crucial dimension in Lareau's theory, which is not included in the measure designed by Bodovski and Farkas (2008). The items are detailed in Table 1. The IRT GRM model² is used to calculate the latent characteristic of concerted cultivation in parenting actions. As a latent variable, the index captures the "shared" variance of the observed parental practices to infer the child-rearing logic.

[Table 1 about here]

Independent variables

Parents' occupation is used as the measure of parents' class status. Following the tradition in stratification research since Blau and Duncan (1967), and sociological research in the Chinese context (e.g. Wu and Treiman 2007), we use the father's occupation as the main measure of parents' class status. Due to the patrilineal nature of Chinese culture, the educational level of the father has traditionally been considered over that of the mother. If students' fathers are leaders in government/company/public institutions, they are grouped as high class. If their fathers are professionals, they are grouped as middle class. Otherwise, if their fathers are technical workers, workers, clerks, services, farmers, self-employed or unemployed, they are grouped into low class. The mother's occupation is used when the father's occupation is missing.

Parental meritocratic beliefs are measured by two binary indicators of perception of meritocracy. Classic definitions of meritocratic beliefs consider individual effort and abilities as predictors of success (Young 1958). However, both components have different implications in the explanation of achievement. Paradoxically, abilities are considered as the non-meritocratic component of meritocracy. They are highly dependent on family origin and genetic endowments. Thus, studies on meritocratic beliefs have focused on individual effort as the true meritocratic

² This model accounts for the difficulty and discrimination of each item by incorporating the difficulty of each item as information in scaling each of the 13 items.

component of meritocracy (Mijs 2019; Bucca 2016). In this study, we consider both measures independently. As a measure of beliefs about individual effort, respondents were asked “*Do you think hard work affects a student’s academic achievement?*”, where 1 signified “yes” and 0 “No”. Similarly, the attributional belief of abilities was measured asking “*Do you think that ability affects a student’s academic achievement?*” Descriptive statistics of the independent variables are reported in Table 2.

Controls

Control variables include students’ cognitive scores, and a set of time-invariant demographic characteristics of students (gender, *hukou* residency status, whether living with both parents, whether living in school on weekdays, and only child status), and parents (father’s education in years, mother’s education in years, and perceived parents’ relationship). Regarding time-varying controls, the models include parents’ education expectation in years, and cultural resources (books and desk at home). Descriptive statistics of time-variant and time-invariant control variables are reported in Table 2 and Table 3, respectively.

[Table 2 about here]

[Table 3 about here]

Analytic strategy

In our theoretical models, the treatment, meritocratic beliefs, is time-varying. That is to say, we permit variance in meritocratic belief between the two waves. In addition, we also allow for the variance in class status to capture the class mobility. However, when we include variance of class and meritocratic beliefs in the model, the detailed relationship between them become more complicated. If the effect of class on meritocratic beliefs (at the same stage) is understood as justification (Khan 2011), the meritocratic beliefs at a previous time stage may have an effect on people’s class status in the current time stage, since actors’ emotions and behaviours are driven by internalized values (D’Andrade 1995). Class status at Time 2 becomes the mediator between the meritocratic beliefs at Time1 and Time 2. That is to say, class is a time-varying mediator, and moderator at the same time, and our theoretical framework is extended into the dynamic one presented in Figure 2.

When including all the time-varying mediators as controls in the fixed effects, biases caused by over-control and collider should also be taken into consideration (Wodtke, Harding, and Elwert 2011). More specifically, in our case, putting all the variables into the model, aims to over-control the mediated effect (b_2*b_3), therefore underestimating the effect of meritocratic belief. When there are unobserved variables affecting $Class_{t2}$ and $Meritocratic\ Beliefs_{t1}$, including $Class_{t2}$ will induce

the correlation between the unobserved variable and *Meritocratic Beliefs*_{t1}, and therefore biases the effect of meritocratic beliefs on concerted cultivation parenting style.

[Figure 2 about here]

In order to tackle the time-varying treatment, time-varying mediator and time-varying moderator at the same time, we separate our analysis strategy into two stages. In Stage 1, we follow Wodtke et al's (2011) recommendations, using marginal structural models to tackle time-varying treatment and time-varying mediator at the same time, and estimating the causal effect of meritocratic beliefs. In Stage 2, regression-with-residuals models are used to estimate the heterogeneous causal effects with time-varying moderators. Inverse-probability weights are also used in this stage to adjust for time-varying confounders in both stages. Details of the analytical strategy can be found in Supplementary Material 2.

Results

The results of the marginal structural models are reported in Table 4. They indicate that the effects of both meritocratic beliefs on concerted cultivation are positive and significant. This result is robust for the whole sample, and subsamples of gender and area. Parents who believe that ability or hard work are predictors of academic performance will engage in concerted cultivation child-rearing practices to a greater extent than parents who do not endorse meritocratic beliefs. Meritocratic beliefs function as cultural orientations of concerted cultivation practices. These effects support Hypothesis 2. In Table 4, we also report the analysis of the context-specific gender and region differences. Although both boys and girls exhibit positive effects, parents of boys who endorse meritocratic beliefs are more prone to engage in concerted cultivation practices than parents of girls. These effects support the son preference prediction. Similarly, the effects of meritocratic beliefs are also stronger in urban schools. Overall, the main predictions of meritocratic beliefs are confirmed.

[Table 4 about here]

Tables 5 and 6 show estimates from the two-stage regression with residuals. The findings indicate that both social class and meritocratic beliefs (including belief in hard work and belief in ability) at Grade 7 and Grade 8 have a significant direct effect on concerted cultivation, which provides evidence that both social class (Hypothesis 1) and meritocratic beliefs (Hypothesis 2) have a direct effect on parenting style. These results confirm the theoretical prediction of Lareau's work for the case of China: parents from a higher social class are more likely to engage in logics of concerted cultivation. When comparing the effect of social class and meritocratic beliefs, there are no

statistical differences, as shown in the first column of each table. Standardized coefficients are similar in magnitude.

However, an interesting difference can be observed when we compare the relative sizes of the effect of class and meritocratic beliefs in the subsamples. The standardized coefficients of class are larger than the meritocratic beliefs in Grade 7 in both urban and rural schools. This pattern continues until Grade 8 in rural schools, while the magnitude of the effect of meritocratic beliefs is larger than the class status in cities schools. These results support the modernization hypothesis that meritocratic beliefs have a greater effect than class in cities, while class still has a dominant effect in rural areas (hypothesis 4a and 4b). Regarding children's gender, the effect of class is relatively larger than the effect of meritocratic beliefs in Grade 7 for both boys and girls. This pattern remains consistent for girls' parents in Grade 8, (the differences in the coefficients of both class and meritocratic beliefs between Grades 7 and 8 are non-significant). However, for boys' parents, the effect of class is smaller (even though it does not change significantly from Grade 7) than that of meritocratic beliefs, which is significantly larger than in Grade 7. Therefore, we observe a larger effect of meritocratic beliefs than class in boys' parents, and a smaller effect than class in girls' parents (Hypotheses 5a and 5b about gender differences are thus supported). Parents of daughters will engage in concerted cultivation only when it can be afforded.

In addition, the difference between the relative effects of class and meritocratic beliefs in Grades 7 and 8 supports the dynamic process in parenting even in a short time period, which illustrates the importance of the dynamic perspective adopted in this study. Differences are sharper closer to senior high school.

[Table 5 about here]

[Table 6 about here]

Tables 1A and 2A in Supplementary Material 2 incorporate the interaction between meritocratic beliefs and social class to understand whether the former operate as cultural orientations of the latter. The main effects of meritocratic beliefs at both time stages are positive and significantly different from 0, but their interactions are not significant in either Grade 7 or 8, which means the difference of the effect of meritocratic beliefs by social class is not significantly different from 0 in the whole sample. Overall, this evidence fails to support the heterogeneity of the effect of meritocratic beliefs by social class (Hypothesis 3); they are homogenous across the board. However, it does not contradict the idea that cultural logic drives the effect of social class on parenting practices, which is crucial in Lareau's theory. The homogeneity of the effect of meritocratic beliefs across class means

the difference in the degree of concerted cultivation caused by such beliefs does not change significantly across class, rather that the effect of social class on concerted cultivation is unrelated to parents' meritocratic belief.

Although this general conclusion is drawn, the findings suggest a regional difference in the role of meritocratic beliefs as drivers of concerted cultivation. The effect of social class on parenting style is contingent on meritocratic beliefs, depending on whether children study at rural or urban schools and closer to senior high school. The aggregated sample obscures the role of meritocratic beliefs.

Figure 3 illustrates the heterogeneity of the effect of meritocratic beliefs. For urban schools, the endorsement of meritocratic beliefs increases the class differential in concerted cultivation practices. Upper-class parents will engage more in concerted cultivation than low-class parents, and this difference is larger when they endorse meritocratic beliefs. Conversely, Figure 4 shows the opposite pattern for rural schools. The endorsement of meritocratic beliefs will reduce the class differential in concerted cultivation. Therefore, meritocratic beliefs play a role as moderators of parenting strategies of social reproduction, but the logics are different between rural and urban school. A substantive interpretation of this effect is provided in the next section.

[Figure 3 about here]

[Figure 4 about here]

Conclusion

Concerted cultivation has been proposed as an explanation of social reproduction through child-rearing practices (Bodovski and Farkas 2008; Matsuoka 2019; Lareau 2011; Weininger, Lareau, and Conley 2015). However, scholars have argued that class differentials are explained by differences in material resources (Chin and Phillips 2004; Bennett, Lutz, and Jayaram 2012) and there are few studies applying this theory beyond Western societies (for a recent application in Japan see Matsuoka 2019). This study aimed to test whether parental meritocratic beliefs intervene in concerted cultivation practices of parents in China, and how they interact with social class.

The main findings of this study confirm the predictions of the Concerted Cultivation Theory and contribute to theory development by specifying the role of meritocratic beliefs on the explanations of child-rearing practices. Parents from higher social classes engage in concerted cultivation practices.

This represents significant evidence supporting the applicability of Lareau's work in Eastern Asian societies. Furthermore, for the first time, a robust estimation has addressed endogeneity issues. This effect is confounded neither by school-level resources nor resources related to relevant sociodemographic variables, such as migrant status, *hukou* residency status or educational level. The findings show that subjective propositions about reward allocations in the educational system have a robust and direct effect on parenting style. This effect is even comparable to the effect of social class. Child-rearing practices are culturally oriented for both beliefs about hard work and ability as predictors of scholastic success. Meritocratic beliefs shed light on the rationality of parenting practices in a similar way as rational choice theories (Barg 2019). They are part of a mindset where concerted cultivation practices pay off. Indeed, they moderate the effect of social class under certain circumstances, increasing class differentials in urban schools and decreasing them in rural schools. In a striking assertion, Lareau suggested that "*other things matter in addition to social class*" (Lareau 2011, 36). Meritocratic beliefs seem to be one of them. However, social justice research usually considers the difference between inequality preferences and perceptions (Castillo 2011). More research is needed to understand whether cultural norms about meritocracy (what ought to be) might deviate from the effect found for perception of meritocracy.

Our findings indicate that, in the case of China, gender and the rural-urban divide produce important differences in the effect of meritocratic beliefs on concerted cultivation practices. Beliefs about hard work and ability are stronger for boys and urban schools. A stronger effect of social class for girls is also a confirmation of son preference still prevailing in China. Both modernization and son preference are substantial characteristics that explain the logic of child-rearing practices. The first is a cultural characteristic of Eastern Asian societies and modernization is an ongoing process in China.

Notwithstanding the overall pattern, the role of meritocratic beliefs as cultural drivers of social class reproduction differs between rural and urban schools. Meritocratic beliefs reduce the effect of social class in rural China, while they foster class differences in child-rearing practices in urban schools. Future studies could address the patterns between both kinds of beliefs in rural and urban China. We might hypothesize that parents in urban schools make sense of their social class experiences, and meritocratic beliefs are instrumental to their success. Low-class parents in urban school do not translate their meritocratic beliefs into concerted cultivation practices as middle- and upper-class parents do, because they are aware of their disadvantage. This may derive from a more realistic appraisal of structural inequalities as research on the differential hypothesis has argued (Bucca 2016; Hyman 1953; Lockwood 1966; Wegener 1991). However, in rural China, meritocratic

beliefs operate in the opposite direction, which is explained by the value of education in rural areas (Kong 2016). More disadvantaged rural parents understand that education is the means by which children can “walk out” of the village, which makes them more involved in their schooling. In Chinese tradition, better preserved in rural areas, “*a carp leaping over the gate has passed a competitive examination*”. Thus, low-class rural parents internalize meritocratic principles and compensate for structural inequalities by promoting education and development of talents for social mobility.

Some limitations may be addressed by future studies. In the theoretical framework, parents’ class status affects their values, worldviews and, cultural schemes, which in turn has an effect on parents’ own behaviour. Therefore, beliefs could affect their own class status at the next time stage. This framework is assumed, rather than empirically tested, in this paper because of the limitation of the data. In order to test this long-term correlated relationship between people’s class status and cultural values, and how this correlated relationship affects people’s parenting style, longitudinal data set throughout different time stages (e.g. from a young child to teenager) and longitudinal multilevel analyses are necessary. While although the China Education Panel Survey includes rich information about parents’ values, class status, and parenting style, it only implemented two waves, both of which were collected in middle school. The time interval is too short to test the correlated relationship between class and meritocratic belief. In addition, the time span does not enable us to test the effect on status achievement. There is no available data in China to test the long-term effects of parenting practices and fully understand social reproduction through concerted cultivation.

All in all, empirical research in a wide variety of contexts is needed to establish the conditions under which families tend to determine the fate of their children. However, this study has revealed significant class differences within the case of China and class-specific cultivation practices. Meritocratic beliefs are important cultural orientations of parental practices and social inequalities. Both cultural and resource-related components seem to play a role in social reproduction.

References

- Astone, Nan Marie, and Sara S. McLanahan. 1991. “Family Structure, Parental Practices and High School Completion.” *American Sociological Review* 56 (3): 309.
<https://doi.org/10.2307/2096106>.
- Barg, Katherin. 2019. “An Analysis of Social Class Differentials in Parent-Initiated Contact with Teachers.” *British Journal of Sociology of Education* 40 (3): 289–308.
<https://doi.org/10.1080/01425692.2018.1540294>.

- Becker, Rolf, and Andreas Hadjar. 2013. "'Individualisation' and Class Structure: How Individual Lives Are Still Affected by Social Inequalities." *International Social Science Journal* 64 (213–214): 211–23. <https://doi.org/10.1111/issj.12044>.
- Bennett, Pamela R., Amy C. Lutz, and Lakshmi Jayaram. 2012. "Beyond the Schoolyard: The Role of Parenting Logics, Financial Resources, and Social Institutions in the Social Class Gap in Structured Activity Participation." *Sociology of Education* 85 (2): 131–57. <https://doi.org/10.1177/0038040711431585>.
- Blau, Peter, and Otis Dudley Duncan. 1967. *The American Occupational Structure*. New York: John Wiley & Sons. <https://eric.ed.gov/?id=ED066526>.
- Bodovski, Katerina. 2010. "Parental Practices and Educational Achievement: Social Class, Race, and *Habitus*." *British Journal of Sociology of Education* 31 (2): 139–56. <https://doi.org/10.1080/01425690903539024>.
- Bodovski, Katerina, and George Farkas. 2008. "'Concerted Cultivation' and Unequal Achievement in Elementary School." *Social Science Research* 37 (3): 903–19. <https://doi.org/10.1016/J.SSRESEARCH.2008.02.007>.
- Bourdieu, Pierre. 1979. *Distinction : A Social Critique of the Judgement of Taste*. Cambridge, MA: Harvard University Press.
- Breen, R. 2010. "Educational Expansion and Social Mobility in the 20th Century." *Social Forces* 89 (2): 365–88. <https://doi.org/10.1353/sof.2010.0076>.
- Breen, Richard, and John H. Goldthorpe. 1997. "Explaining Educational Differentials: Towards a Formal Rational Action Theory." *Rationality and Society* 9 (3): 275–305. <https://doi.org/10.1177/104346397009003002>.
- Bucca, Mauricio. 2016. "Merit and Blame in Unequal Societies: Explaining Latin Americans' Beliefs about Wealth and Poverty." *Research in Social Stratification and Mobility* 44 (June): 98–112. <https://doi.org/10.1016/j.rssm.2016.02.005>.
- Carolan, Brian V. 2016. "Unequal Academic Achievement in High School: The Mediating Roles of Concerted Cultivation and Close Friends." *British Journal of Sociology of Education* 37 (7): 1034–55. <https://doi.org/10.1080/01425692.2015.1013085>.
- Castillo, Juan Carlos. 2011. "Legitimacy of Inequality in a Highly Unequal Context: Evidence from the Chilean Case." *Social Justice Research* 24 (4): 314–40. <https://doi.org/10.1007/s11211-011-0144-5>.
- CEPS. 2015. "China Education Panel Survey, CEPS 2014-2015." <https://ceps.ruc.edu.cn/index.php?r=index/index&hl=en>.
- Chan, Kam Wing. 2009. "The Chinese Hukou System at 50." *Eurasian Geography and Economics*

- 50 (2): 197–221. <https://doi.org/10.2747/1539-7216.50.2.197>.
- Chan, T. W., and A. Koo. 2011. “Parenting Style and Youth Outcomes in the UK.” *European Sociological Review* 27 (3): 385–99. <https://doi.org/10.1093/esr/jcq013>.
- Chin, Tiffani, and Meredith Phillips. 2004. “Social Reproduction and Child-Rearing Practices: Social Class, Children’s Agency, and the Summer Activity Gap.” *Sociology of Education* 77 (3): 185–210. <https://doi.org/10.1177/003804070407700301>.
- D’Andrade, Roy G. 1995. *The Development of Cognitive Anthropology*. Cambridge, UK: Cambridge University Press.
- Doepke, Matthias, Giuseppe Sorrenti, and Fabrizio Zilibotti. 2019. “The Economics of Parenting.” *Annual Review of Economics* 11 (1): 55–84. <https://doi.org/10.1146/annurev-economics-080218-030156>.
- England, Paula, and Anjula Srivastava. 2013. “Educational Differences in US Parents’ Time Spent in Child Care: The Role of Culture and Cross-Spouse Influence.” *Social Science Research* 42 (4): 971–88. <https://doi.org/10.1016/J.SSRESEARCH.2013.03.003>.
- Ganzeboom, Harry B. G., Donald J. Treiman, and Wout C. Ultee. 1991. “Comparative Intergenerational Stratification Research: Three Generations and Beyond.” *Annual Review of Sociology* 17 (1): 277–302. <https://doi.org/10.1146/annurev.so.17.080191.001425>.
- Hadjar, Andreas, and Rolf Becker. 2016. “Education Systems and Meritocracy: Social Origin, Educational and Status Attainment.” In *Education Systems and Inequalities: International Comparisons*, edited by Andreas Hadjar and Christiane Gross, 231–58. Bristol: Policy Press.
- Hannum, Emily, Hiroshi Ishida, Hyunjoon Park, and Tony Tam. 2019. “Education in East Asian Societies: Postwar Expansion and the Evolution of Inequality.” *Annual Review of Sociology* 45 (1): 625–47. <https://doi.org/10.1146/annurev-soc-073018-022507>.
- Hyman, Herbert. 1953. “The Value Systems of Different Classes: A Social-Psycho- Logical Contribution to the Analysis of Stratification.” In *Class, Status, and Power: A Reader in Social Stratification*, 426–42. Glencoe, Ill: Free Press.
- Khan, Shamus Rahman. 2011. *Privilege : The Making of an Adolescent Elite at St. Paul’s School*. Princeton, NJ: Princeton University Press.
- Kohn, Melvin L., Norman A. Scotch, and Ira D. Glick. 1979. “The Effects of Social Class on Parental Values and Practices.” In *The American Family: Dying or Developing*, edited by David Reiss and H Hoffman, 45–77. New York: Springer Science+Business Media. https://doi.org/10.1007/978-1-4757-9150-1_3.
- Kong, Peggy. 2016. *Parenting, Education, and Social Mobility in Rural China: Cultivating Dragons and Phoenixes*. New York: Routledge.

- Kornrich, Sabino, and Frank Furstenberg. 2013. "Investing in Children: Changes in Parental Spending on Children, 1972-2007." *Demography* 50 (1): 1–23.
<https://doi.org/10.1007/s13524-012-0146-4>.
- Kunovich, Sheri, and Kazimierz M. Slomczynski. 2007. "Systems of Distribution and a Sense of Equity: A Multilevel Analysis of Meritocratic Attitudes in Post-Industrial Societies." *European Sociological Review* 23 (5): 649–63. <https://doi.org/10.1093/esr/jcm026>.
- Lamont, Michèle. 2019. "From 'Having' to 'Being': Self-worth and the Current Crisis of American Society." *The British Journal of Sociology* 70 (3): 660–707. <https://doi.org/10.1111/1468-4446.12667>.
- Lareau, Annette. 2011. *Unequal Childhoods : Class, Race, and Family Life*. Berkeley, CA: University of California Press.
- Lareau, Annette, Shani Adia Evans, and April Yee. 2016. "The Rules of the Game and the Uncertain Transmission of Advantage: Middle-Class Parents' Search for an Urban Kindergarten." *Sociology of Education* 89 (4): 279–99.
<https://doi.org/10.1177/0038040716669568>.
- Lareau, Annette, and Elliot Weininger. 2003. "Cultural Capital in Educational Research: A Critical Assessment." *Theory and Society* 32 (5/6): 567–606.
https://www.jstor.org/stable/3649652?seq=1#metadata_info_tab_contents.
- Lee, Ming Hsuan. 2012. "The One-Child Policy and Gender Equality in Education in China: Evidence from Household Data." *Journal of Family and Economic Issues* 33 (1): 41–52.
<https://doi.org/10.1007/s10834-011-9277-9>.
- Liu, Airan, and Yu Xie. 2015. "Influences of Monetary and Non-Monetary Family Resources on Children's Development in Verbal Ability in China." *Research in Social Stratification and Mobility* 40 (June): 59–70. <https://doi.org/10.1016/j.rssm.2015.02.003>.
- Lockwood, David. 1966. "Sources of Variation in Working Class Images of Society." *The Sociological Review* 14 (3): 249–67. <https://doi.org/10.1111/j.1467-954X.1966.tb01164.x>.
- Matsuoka, Ryoji. 2019. "Concerted Cultivation Developed in a Standardized Education System." *Social Science Research* 77: 161–78. <https://doi.org/10.1016/j.ssresearch.2018.08.011>.
- Mayer, Susan E. 1997. *What Money Can't Buy : Family Income and Children's Life Chances*. Harvard University Press.
- Mijs, Jonathan. 2016a. "The Unfulfillable Promise of Meritocracy: Three Lessons and Their Implications for Justice in Education." *Social Justice Research* 29 (1): 14–34.
<https://doi.org/10.1007/s11211-014-0228-0>.
- . 2016b. "Stratified Failure: Educational Stratification and Students' Attributions of Their

- Mathematics Performance in 24 Countries.” *Sociology of Education* 89 (2): 137–53.
<https://doi.org/10.1177/0038040716636434>.
- . 2019. “The Paradox of Inequality: Income Inequality and Belief in Meritocracy Go Hand in Hand.” *Socio-Economic Review*, 1–29. <https://doi.org/10.1093/ser/mwy051>.
- Olivos, Francisco. 2020. “Untangling Causal Beliefs: A Lay Theory of Happiness Determinants Using a Factorial Survey.” *Poetics*. <https://doi.org/10.1016/j.poetic.2020.101442>.
- Peng, Yinni. 2019. “Getting Rural Migrant Children into School in South China: Migrant Agency and Parenting.” *Asian Population Studies* 15 (2): 172–89.
<https://doi.org/10.1080/17441730.2019.1578531>.
- Pong, Suet-ling, Lingxin Hao, and Erica Gardner. 2005. “The Roles of Parenting Styles and Social Capital in the School Performance of Immigrant Asian and Hispanic Adolescents.” *Social Science Quarterly* 86 (4): 928–50. <https://doi.org/10.1111/j.0038-4941.2005.00364.x>.
- Raymo, James M., Hyunjoon Park, Yu Xie, and Wei-jun Jean Yeung. 2015. “Marriage and Family in East Asia: Continuity and Change.” *Annual Review of Sociology* 41 (1): 471–92.
<https://doi.org/10.1146/annurev-soc-073014-112428>.
- Roksa, Josipa, and Daniel Potter. 2011. “Parenting and Academic Achievement: Intergenerational Transmission of Educational Advantage.” *Sociology of Education* 84 (4): 299–321.
<https://doi.org/10.1177/0038040711417013>.
- Scharf, Jan, Andreas Hadjar, and Alyssa Grecu. 2019. “Applying Social Production Function Theory to Benefits of Schooling: The Concept of Values of Education.” *British Journal of Sociology of Education* 40 (7): 847–67. <https://doi.org/10.1080/01425692.2019.1604207>.
- Small, Mario Luis, David J. Harding, and Michèle Lamont. 2010. “Reconsidering Culture and Poverty.” *The ANNALS of the American Academy of Political and Social Science* 629 (1): 6–27. <https://doi.org/10.1177/0002716210362077>.
- Treiman, Donald J. 1970. “Industrialization and Social Stratification.” In *Social Stratification: Research and Theory for the 1970s*, edited by E Laumann, 207–34. Indianapolis: BobbsMerrill. <https://doi.org/10.1111/j.1475-682X.1970.tb01009.x>.
- Vaisey, Stephen. 2009. “Motivation and Justification: A Dual-Process Model of Culture in Action.” *American Journal of Sociology* 114 (6): 1675–1715. <https://doi.org/10.1086/597179>.
- Vaisey, Stephen, and Lauren Valentino. 2018. “Culture and Choice: Toward Integrating Cultural Sociology with the Judgment and Decision-Making Sciences.” *Poetics* 68: 131–43.
<https://doi.org/10.1016/J.POETIC.2018.03.002>.
- Wegener, Bernd. 1991. “Relative Deprivation and Social Mobility: Structural Constraints on Distributive Justice Judgments.” *European Sociological Review* 7 (1): 3–18.

- <https://doi.org/10.1093/oxfordjournals.esr.a036575>.
- Weininger, Elliot B., Annette Lareau, and Dalton Conley. 2015. "What Money Doesn't Buy: Class Resources and Children's Participation in Organized Extracurricular Activities." *Social Forces* 94 (2): 479–503. <https://doi.org/10.1093/sf/sov071>.
- Wodtke, Geoffrey, David J. Harding, and Felix Elwert. 2011. "Neighborhood Effects in Temporal Perspective." *American Sociological Review* 76 (5): 713–36. <https://doi.org/10.1177/0003122411420816>.
- Wu, Xiaogang. 2019. "Inequality and Social Stratification in Postsocialist China." *Annual Review of Sociology* 45 (1): 363–82. <https://doi.org/10.1146/annurev-soc-073018-022516>.
- Wu, Xiaogang, and Donald J. Treiman. 2007. "Inequality and Equality under Chinese Socialism: The *Hukou* System and Intergenerational Occupational Mobility." *American Journal of Sociology* 113 (2): 415–45. <https://doi.org/10.1086/518905>.
- Xie, Yu, and Chunni Zhang. 2019. "The Long-Term Impact of the Communist Revolution on Social Stratification in Contemporary China." *Proceedings of the National Academy of Sciences of the United States of America* 116 (39): 19392–97. <https://doi.org/10.1073/pnas.1904283116>.
- Yeung, Wei-Jun Jean, and Shu Hu. 2013. "Coming of Age in Times of Change: The Transition to Adulthood in China." Edited by Wei-Jun Jean Yeung, Cheryll Alipio, and Frank F. Furstenberg. *The ANNALS of the American Academy of Political and Social Science* 646 (1): 149–71. <https://doi.org/10.1177/0002716212468667>.
- Young, Michael Dunlop. 1958. *The Rise of the Meritocracy*. New York: Transaction Publishers.
- Young, Natalie, and Emily Hannum. 2018. "Childhood Inequality in China: Evidence from Recent Survey Data (2012-2014)." *China Quarterly* 236: 1063–87. <https://doi.org/10.1017/S0305741018001303>.
- Zhang, Yueyun, and Yu Xie. 2016. "Family Background, Private Tutoring, and Children's Educational Performance in Contemporary China." *Chinese Sociological Review* 48 (1): 64–82. <https://doi.org/10.1080/21620555.2015.1096193>.
- Zhou, Xiang, and Yu Xie. 2019. "Market Transition, Industrialization, and Social Mobility Trends in Postrevolution China." *American Journal of Sociology* 124 (6): 1810–47. <https://doi.org/10.1086/703346>.

Figure 1.
Theoretical Model.

Figure 2.
Causal Relationships between Class Status, Meritocratic Beliefs and Concerted Cultivation.

Figure 3. Effects of meritocratic beliefs in 8th grade by social class for urban schools.

Figure 4. Effects of meritocratic beliefs in 8th grade by social class for urban schools.

Table 1.

Measurement of Dependent Variable

Dimension	Sub-dimension	Item	Mean	Std. Dev.	Min	Max	Obs
Language Patterns		Whether discussing with the child when confronting disagreement	0.59	0.49	0	1	8062
Perception of Responsibility	Academic Activities	Frequency of talking about school issues	2.24	0.61	1	3	8062
		Frequency of talking about relationships with teachers	2.25	0.65	1	3	8062
		Frequency of tutoring child's homework	2.21	1.17	1	5	8062
		Frequency of checking homework	1.52	1.03	0	4	8062
	Daily activities	Frequency of talking about peer relationships	2.20	0.63	1	3	8062
		Frequency of talking about emotions	2.20	0.68	1	3	8062
		Frequency of having dinner together	5.61	0.96	1	6	8062
	Educational Trips	Frequency of visiting museums	2.07	1.04	1	6	8062
Organized After-School Activities	Whether attending cram school	0.35	0.48	0	1	8062	
	Frequency of watching shows/competitions/movies	2.11	1.17	1	6	8062	
Parent-School Relationship	Frequency of contacting with teachers	2.33	1.01	1	4	8062	
	Whether attending parents' meeting	0.88	0.32	0	1	8062	
Concerted Cultivation Index			0	1	-2	3	8062

Table 2.

Descriptive statistics of time-varying variables

	Grade 7		Grade 8		Min	Max	Obs
	Mean	Std. Dev.	Mean	Std. Dev.			
Class	1.34	0.70	1.38	0.71	1	3	8062
Belief in hard work	0.85	0.35	0.88	0.32	0	1	8062
Belief in ability	0.89	0.31	0.92	0.28	0	1	8062
Parents' educational expectation (year)	17.35	3.13	16.85	3.08	7	22	8062
Whether have individual desk at home	0.80	0.40	0.79	0.41	0	1	8062
Books at home	3.27	1.22	3.10	1.16	1	5	8062

Table 3.

Descriptive statistics of time-invariant control variables

	Mean	Std. Dev.	Min	Max	Obs
Cognitive Score	0.06	0.86	-2.03	2.33	8062
Gender	0.50	0.50	0	1	8062
Migrant	0.18	0.39	0	1	8062
Hukou	0.48	0.50	0	1	8062
Whether Living with one or neither parents	0.23	0.42	0	1	8062
Only child	0.46	0.50	0	1	8062
Mother's education (year)	9.84	3.50	0	19	8062
Father's education (year)	10.54	3.14	0	19	8062
School location (1=Urban, 0=Rural)	0.41	0.49	0	1	8062

Table 4.

School-Fixed Effects of Duration-Weighted Exposure to Meritocratic Beliefs on Concerted Cultivation

	Total		Boys		Girls		Schools in Cities		Schools in Towns or Villages	
	B	β	B	β	B	β	B	β	B	β
Belief in hard work	0.149***	0.046	0.162**	0.050	0.148*	0.045	0.218**	0.067	0.110*	0.034
	(0.039)		(0.052)		(0.059)		(0.069)		(0.047)	
Belief in ability	0.201***	0.046	0.241***	0.055	0.168*	0.038	0.274**	0.063	0.161**	0.037
	(0.044)		(0.057)		(0.074)		(0.085)		(0.052)	

Note: Standard errors in parentheses, standard error=bootstrap standard error with 2000 iterations. * $p < 0.05$,** $p < 0.01$, *** $p < 0.001$.

Table 5.

School-Fixed Two-Stage Regression with Residuals of Parent's Belief in Hard Working and Concerted Cultivation

	Total		Boys		Girls		Schools in Cities		Schools in Towns or Villages	
	B	β	B	β	B	β	B	β	B	β
<i>Grade 7</i>										
Class	0.087***	0.245	0.075***	0.214	0.105***	0.279	0.093***	0.209	0.074***	0.169
	(0.012)		(0.018)		(0.019)		(0.016)		(0.019)	
Belief in hard work	0.042***	0.226	0.015	0.132	0.070***	0.326	0.053*	0.278	0.037**	0.171
	(0.012)		(0.016)		(0.017)		(0.023)		(0.013)	
<i>Grade 8</i>										
Class	0.056***	0.205	0.044**	0.176	0.065***	0.232	0.053***	0.144	0.057***	0.193
	(0.010)		(0.015)		(0.016)		(0.013)		(0.016)	
Belief in hard work	0.049***	0.207	0.068***	0.281	0.026	0.102	0.071***	0.292	0.038**	0.138
	(0.010)		(0.014)		(0.016)		(0.016)		(0.012)	
_cons	0.001	-0.363	-0.043***	-0.384	0.046***	-0.319	0.198***	-0.331	-0.143***	-0.371
	(0.002)		(0.004)		(0.002)		(0.007)		(0.007)	
N	8062		4068		3994		3297		4765	

Note: Standard errors in parentheses, standard error=bootstrap standard error with 2000 iterations. Models of the two-stage regression included the residuals of class as predictors from the first step of modelling, rather than the class itself. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 6.

School-Fixed Two-Stage Regression with Residuals of Parent's Belief in Ability and Concerted Cultivation

	Total		Boys		Girls		Schools in Cities		Schools in Towns or Villages	
	B	β	B	β	B	β	B	β	B	β
<i>Grade 7</i>										
Class	0.090***	0.249	0.074***	0.211	0.114***	0.293	0.098***	0.216	0.074***	0.166
	(0.012)		(0.018)		(0.019)		(0.015)		(0.020)	
Belief in ability	0.044**	0.257	0.026	0.180	0.062**	0.338	0.048	0.299	0.043**	0.209
	(0.013)		(0.016)		(0.021)		(0.026)		(0.015)	
<i>Grade 8</i>										
Class	0.060***	0.211	0.046**	0.178	0.072***	0.245	0.056***	0.149	0.064***	0.203
	(0.010)		(0.015)		(0.017)		(0.013)		(0.016)	
Belief in ability	0.052***	0.241	0.071***	0.315	0.026	0.121	0.078***	0.358	0.039**	0.158
	(0.012)		(0.015)		(0.018)		(0.020)		(0.015)	
_cons	0.000	-0.436	-0.042***	-0.471	0.047***	-0.361	0.196***	-0.429	-0.142***	-0.433
	(0.003)		(0.005)		(0.002)		(0.006)		(0.007)	
N	8062		4068		3994		3297		4765	

Note: Standard errors in parentheses, standard error=bootstrap standard error with 2000 iterations. The models of the two-stage regression included the residuals of class as predictors from the first step of modelling, rather than the class itself. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Supplementary material 1

Stage One: Marginal Structural Model

There are two key elements in conducting marginal structural modelling. The first is the duration-weighted exposure to the treatment. Let $MB_t \in \{0,1\}$ represent parents' meritocratic belief at time t , where $MB_t = 1$ denotes belief in meritocracy. The sequence of exposure to meritocratic beliefs experienced by a parent through time t could be written as $\overline{mb}_t = (a_1, \dots, a_t)$. Let CC be the observed parenting style, which is a continuous variable representing the extent of concerted cultivation, then $CC_{\overline{mb}_t}$ is the potential score for parents who experience the sequence of $\overline{mb}_t$. CC equals $CC_{\overline{mb}_t}$ for the sequence the parent experienced, but for the other sequences the parents did not experience, $CC_{\overline{mb}_t}$ is unobserved (counterfactual). For example, for a parent who held meritocratic beliefs throughout all time stages, then $CC_{(1,1)}$ is his/her observed outcome, while all the other potential outcomes of other sequences, such as $CC_{(0,1)}$, $CC_{(0,0)}$ are all unobserved. The average causal effect of a specific exposure trajectory $\overline{mb}_t$ and another $\overline{a}_t'$ is defined as the expected difference between the two potential outcomes $E(CC_{\overline{mb}_t} - CC_{\overline{mb}_t'}) = E(CC_{\overline{mb}_t}) - E(CC_{\overline{mb}_t'})$. Wodtke et al. (2011) specified a duration-weighted exposure as the average of wave-specific treatments to represent every sequence of exposure experience and put this duration-weighted exposure into the regression of the outcome. Following this method, our model could be defined as:

$$CC_{\overline{mb}_t} = \beta_0 + \beta_1(\sum_1^2 mb_t/2)$$

This model allows for comparison between exposure sequences of treatment. However, in observational data, this model is defined on the assumption that the treatment at each wave is independent of the potential outcomes given observed covariate and treatment history (Robins, 1986, 1999). That is to say, the parents with same combination of observed covariates values do not systematically hold different meritocratic beliefs.

In order to satisfy this assumption, inverse probability weighting is used to adjust for confounding of time-varying covariates (Robins, Hernán, & Brumback, 2000). Inverse-probability weighting calculates the probability of an individual receiving the treatment, conditional on their observed baseline and time-varying covariates. Individuals are weighted by the inverse of their probability to create a "pseudopopulation" where the treatment group and the control group are balanced in terms of distribution of potential confounders across treatment levels. This approach

literally removes time-varying confounders that are in the pathway between the treatment and the outcome, thus avoiding the problem of over-control and collider bias.

Figure 1A.
Causal Relationships between Class Status, Meritocratic Beliefs and Concerted Cultivation in the Pseudopopulation weighted by Inverse-probability Weighting.

Stage Two: Two-Stage Regression with Residuals

In the case that class status is simultaneously a time-varying mediator and a time-varying moderator, we attempt to estimate a moderated intermediate causal effect (Wodtke & Almirall, 2015). Let $CC_{(mb_1, mb_2)} = CC_{\overline{mb}_t}$ represent the outcome, which is concerted cultivation, $C_1, C_2(MB_1)$ represent the moderator. The moderated intermediate effect could be identified as the following function:

$$\begin{aligned} E(CC_{(mb_1, mb_2)} | C_1, C_2(mb_1)) \\ = \beta_0 + \varepsilon_1(C_1) + \mu_1(C_1, mb_1) + \varepsilon_2(C_1, mb_1, C_2(mb_1)) \\ + \mu_2(C_1, mb_1 C_2(mb_1), mb_2) \end{aligned}$$

where intercept $\beta_0 = E(CC_{(0,0)})$ is the mean of the group who have never held meritocratic beliefs. The two functions including treatment $\mu_1(C_1, mb_1)$ and $\mu_2(C_1, mb_1 C_2(mb_1), mb_2)$ are our primary interest. $\varepsilon_1(C_1)$ and $\varepsilon_2(C_1, mb_1, C_2(mb_1))$ are called nuisance functions. This model is also known as the structural nested mean model (Robins, 1994).

However, the estimates of this model, conditioned on all the past moderators still risk inducing the over-control and collider bias mentioned above (Wodtke & Almirall, 2015). Almirall and his colleges (Almirall et al., 2014; Almirall, Ten Have, & Murphy, 2010) proposed an alternative method that replaces the exact value of moderators with their residuals in nuisance functions. This method is processed in two steps. First, we regress the time-varying moderators by baseline controls, past covariates and treatment history to obtain the residuals at each time stage.³ Next, we use the residuals to replace the absolute values of moderators in nuisance functions with the decidualized values (the residual of class in our case). The process of revisualization removes the associations with the past treatment but the associations with other variables remain (e.g. the outcome). Therefore, conditioning the residuals does not eliminate the indirect effect between the previous treatments, and does not induce the potential association between previous treatment and unobserved confounders (Wodtke & Almirall, 2015).

Inverse-probability weights are also used in this stage to adjust for time-varying confounders by the weighting method. The advantages of inverse-probability include that it does not require the clear identification of time-varying moderators and time-varying confounders and it combines all information in multi-dimension confounders into one weight, which decreases the risk of error in specifying the nuisance functions (Wodtke & Almirall, 2015).

³ In our model, the time-varying moderator, class, is a 3-category ordinal variable. We use ordered logit model to estimate the residuals.

Figure 2A.

Causal Relationships between the Residual of Class Status, Meritocratic Beliefs and Concerted Cultivation in the Pseudopopulation weighted by Inverse-probability Weighting.

References

- Almirall, D., Griffin, B. A., McCaffrey, D. F., Ramchand, R., Yuen, R. A., & Murphy, S. A. (2014). Time-varying effect moderation using the structural nested mean model: estimation using inverse-weighted regression with residuals. *Statistics in Medicine*, 33(20), 3466–3487. <https://doi.org/10.1002/sim.5892>
- Almirall, D., Ten Have, T., & Murphy, S. A. (2010). Structural Nested Mean Models for Assessing Time-Varying Effect Moderation. *Biometrics*, 66(1), 131–139. <https://doi.org/10.1111/j.1541-0420.2009.01238.x>
- Robins, J. (1986). A new approach to causal inference in mortality studies with a sustained exposure period-application to control of the healthy worker survivor effect. *Mathematical Modelling*, 7(9–12), 1393–1512. [https://doi.org/10.1016/0270-0255\(86\)90088-6](https://doi.org/10.1016/0270-0255(86)90088-6)
- Robins, J. (1994). Correcting for non-compliance in randomized trials using rank preserving structural failure time models. *Communications in Statistics - Theory and Methods*, 23(8), 2379–2412.
- Robins, J. (1999). Association, Causation, and Marginal Structural Models. *Synthese*, 121(1/2), 151–179. <https://doi.org/10.2307/20118224>
- Robins, J., Hernán, M. Á., & Brumback, B. (2000). Marginal Structural Models and Causal Inference in Epidemiology. *Epidemiology*, 11(8), 550–560. Retrieved from https://journals.lww.com/epidem/Fulltext/2000/09000/Marginal_Structural_Models_and_Causal_Inference_in.11.aspx/
- Wodtke, G., & Almirall, D. (2015). *Estimating Heterogeneous Causal Effects with Time-Varying Treatments and Time-Varying Effect Moderators: Structural Nested Mean Models and Regression-with-Residuals* (PSC Research Reports No. 15–839). Retrieved from <https://pdfs.semanticscholar.org/a43e/64ce8345b617dccb93d4a490f030e97d9371.pdf>

Wodtke, G., Harding, D. J., & Elwert, F. (2011). Neighborhood Effects in Temporal Perspective. *American Sociological Review*, 76(5), 713–736. <https://doi.org/10.1177/0003122411420816>

Supplementary material 2

Table 1A.

Two-Stage Regression with Residuals of Moderating Effect of Class on Parent's Belief in Hard Work

	Total	Boys	Girls	Schools in Cities	Schools in Towns or Villages
<i>Grade 7</i>					
Class	0.108*	0.098	0.131	0.194**	0.035
	(0.044)	(0.055)	(0.076)	(0.062)	(0.065)
Belief in Hard Work	0.107***	0.039	0.179***	0.147**	0.107**
	(0.028)	(0.036)	(0.044)	(0.052)	(0.033)
Class* Belief in Hard Work	0.009	0.001	0.010	-0.077	0.079
	(0.045)	(0.056)	(0.079)	(0.063)	(0.069)
<i>Grade 8</i>					
Class	0.059	0.059	0.055	-0.083	0.164**
	(0.055)	(0.066)	(0.106)	(0.088)	(0.066)
Belief in Hard Work	0.137***	0.191***	0.071	0.178***	0.099**
	(0.031)	(0.039)	(0.048)	(0.053)	(0.036)
Class* Belief in Hard Work	0.042	0.0185	0.063	0.197*	-0.088
	(0.058)	(0.068)	(0.107)	(0.091)	(0.071)
_cons	-0.207***	-0.235***	-0.168***	-0.094	-0.306***
	(0.036)	(0.046)	(0.058)	(0.067)	(0.042)
N	8062	4068	3994	3297	4765

Note: Standard errors in parentheses, standard error=bootstrap standard error with 2000 iterations. The models of the two-stage regression included the residuals of class as predictors from the first step of modelling, rather than the class itself. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 2A.

Two-Stage Regression with Residuals of Moderating Effect of Class on Parent's Belief in Ability

	Total	Boys	Girls	Schools in Cities	Schools in Towns or Villages
<i>Grade 7</i>					
Class	0.108*	0.129*	0.101	0.215**	0.007
	(0.053)	(0.063)	(0.096)	(0.073)	(0.079)
Belief in Ability	0.129**	0.0730	0.183**	0.153*	0.139***
	(0.033)	(0.041)	(0.054)	(0.063)	(0.038)
Class* Belief in Ability	0.013	-0.036	0.056	-0.091	0.106
	(0.054)	(0.066)	(0.098)	(0.074)	(0.083)
<i>Grade 8</i>					
Class	0.134*	0.077	0.221	-0.015	0.239**
	(0.066)	(0.070)	(0.134)	(0.109)	(0.075)
Belief in Ability	0.163***	0.226***	0.079	0.234***	0.112**
	(0.034)	(0.044)	(0.057)	(0.064)	(0.041)
Class* Belief in Ability	-0.038	-0.000	-0.114	0.119	-0.164*
	(0.068)	(0.074)	(0.136)	(0.111)	(0.080)
_cons	-0.258***	-0.304***	-0.187**	-0.163	-0.353***
	(0.043)	(0.054)	(0.071)	(0.084)	(0.049)
<i>N</i>	8062	4068	3994	3297	4765

Note: Standard errors in parentheses, standard error=bootstrap standard error with 2000 iterations. The models of the two-stage regression included the residuals of class as predictors from the first step of modelling, rather than the class itself. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.