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Developmental Idealism, Body Weight and Shape, and Marriage Entry in Transitional China

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Abstract

New trends toward later and less marriage are emerging in post-reform China. Previous research has examined the changing individual-level socioeconomic and demographic characteristics shaping marriage entry in Chinese adults. Employing a cultural model known as developmental idealism (DI), this study argues that a new worldview specifying an ideal body type has become popular in the West and that this new worldview has been exported to China. This new part of the DI package is likely stratified by gender, has a stronger impact on women than on men, and has likely penetrated urban areas more than rural areas. Drawing on the 1991-2009 longitudinal data from the China Health and Nutrition Survey, this study employs discrete-time logit models to estimate the relationships between various body types and transition to first marriage in Chinese young adults 18-30 years old. Body weight status and body shape are measured by body mass index (BMI) and waist-to-hip ratio (WHR), respectively, and further divided into categories of underweight, normal, and obese. Regression results indicate that larger values of BMI and WHR were associated with delayed entry into first marriage in urban women, whereas being overweight or obese was associated with accelerated transition to first marriage in rural men. Not only were these associations statistically significant, but their strengths were substantively remarkable. Findings from this study suggest that both body weight and body shape have important implications for marital success, independent of individual-level socioeconomic and demographic characteristics, and contribute to evolving gender and rural-urban disparities, as China is undergoing a rapid nutrition transition.

Keywords

body weight; body shape; marriage entry; obesity

Introduction

Despite its distinct traditions concerning family and marriage norms (e.g., patriarchal and patrilineal family organization, universal marriage, young age at marriage entry), new trends in marriage and family formation are occurring in China and resemble the second demographic transition in the West. One prominent example is the slow yet steady increase in age at first marriage during the past five decades. One set of estimates suggest a two-year increase in the median age for men (from 23 to 25 for rural men and from 25 to 27 for urban men) and a three-year increase for women (from 20 to 23 for rural women and from 22 to 25 for urban women) between 1970 and 2000 (Han, 2010). Other estimates show a 1.5-year

increase in the singulate mean age at marriage for women (from 23.3 to 24.7) and a 1.4-year increase for men (from 25.1 to 26.5) between 2000 and 2010 (Jones and Yeung, 2014). Delayed entry into first marriage is particularly notable in well educated women (Ji, 2015; Qian and Qian, 2014) and economically disadvantaged men (Yu and Xie, 2015a).

In light of these emerging trends, demographers have set out to investigate the new determinants of marriage entry in post-reform China. Most studies to date acknowledge, either explicitly or implicitly, the pivotal role of ideational changes – new attitudes toward family formation and gender ideology resulting from Westernization, modernization, and market transition – in affecting the timing of first marriage. Empirically, however, these studies tend to focus on the direct effects of individual-level demographic and socioeconomic characteristics on marriage entry, leaving ideational factors relatively underexamined. For example, Yu and Xie (2015a) posited that rising consumption aspirations, together with the shift of gender ideology toward gender equity within marriage, have contributed to the gendered role of economic prospects in marriage formation during the post-reform era. Drawing on data for urban respondents from the 2003 and 2008 Chinese General Social Surveys, they found a positive effect of employment status on transition to marriage in men. This effect is more pronounced in the late-reform cohort (born after 1974) than in the pre- (born before 1960) and early-reform (born between 1960 and 1974) cohorts. On the other hand, education exhibits a marriage-delaying effect for both men and women, and this effect is also stronger in younger cohorts. Several studies argued that the traditional norm of hypergamy persists despite the rapid increase in Chinese women's education and the resulting narrowed gender gap in educational attainment (Han, 2010; Mu and Xie, 2014; Qian and Qian, 2014). Therefore, the marriage-delaying effect of education is most evident in women with college or higher educational attainment because of the difficulty in finding suitable mates in the marriage market to maintain educational homogamy and female hypergamy.

In this study, I investigate individual-level determinants of marriage entry beyond demographic and socioeconomic characteristics. I draw upon a theoretical framework, known as *developmental idealism* (Thornton, 2001; Thornton, 2005), for understanding body size and shape as new ideational forces behind the transition to first marriage in post-reform China. Taking advantage of the rural-urban gaps in the progress of the nutrition transition (Doak et al., 2002; Du et al., 2002) and the pace of modernization in China (Schafer and Kwon, 2012; Whyte, 2010), this study tests varying effects of body weight status on timing of first marriage by gender and rural-urban strata among the Chinese adults. Given the enduring norm of nearly universal marriage in a narrow band of appropriate ages, or at least the stated desires to do so, (Raymo et al., 2015), I carry out a prospective analysis of transition to first marriage in young Chinese adults 18-30 years old. Specifically, this study seeks to understand: (1) how body weight and body shape are related to marriage entry; and (2) how these relationships may vary by gender and rural-urban residence.

Theoretical background

Developmental idealism

The centuries-old models of developmentalism and modernization theory, embraced by Western scholars, policy makers, and other elites since the Enlightenment, prescribe a linear, universal pathway of development for all societies with varying rates of progress. Furthermore, it is widely believed that the most developed countries are located in northwest Europe and its overseas diasporas (particularly the United States), while countries in the rest of the world are ranked at different lower levels of the developmental hierarchy. Thornton (2001; 2005) argued that the developmental paradigm, “reading history sideways,” and the social science research on family change together produced a package of ideas known as developmental idealism (DI). He (2001: 454-455) originally formulated four basic propositions of DI as follows: (1) modern society is good and attainable; (2) the modern family is good and attainable; (3) a modern family is both a cause and an effect of a modern society; and (4) in a modern society, individuals are free and equal and social relationships are based on consent. In other words, the DI package includes ideas that specify what the good life is and how to achieve it. In the family arena, DI suggests that the new patterns of marriage and family in Western countries – including such attributes as individualism, nuclear households, marriages at mature ages, courtship preceding marriage, gender equality, and planned and low fertility – are modern, good, and attainable and thus should be pursued (Thornton, 2001).

As Thornton (2001; 2005; 2012) has repeatedly emphasized, the power of DI as an ideational force does not depend largely on whether its propositions (e.g., “modern society and modern family are good and attainable”) are true or false, or good or bad. In fact, the developmental paradigm itself has been challenged and abandoned by many scholars in recent decades (Davis and Harrell, 1993; Goldscheider, 1971; Greenhalgh, 1996; Tilly, 1984). However, what matters most is that once accepted by ordinary people and/or endorsed by governments, organizations, and other institutions, the interrelated values and beliefs of DI can cause changes in a wide array of human behaviors and relationships, including marriage and family. The ideas of DI have been spreading around the world since large-scale globalization began in the 19th century when new means of transportation and telecommunications were invented (Amin, 1989; Blaut, 1993). To the extent that modernization theory and developmentalism remain popular among non-academic elites and the general public worldwide to date, we should not ignore the ideational force of DI for changing marriage and family patterns (Thornton, 2001; Thornton, 2005).

In China, various educators, revolutionaries, political parties, and governments have acted as powerful agents in disseminating the developmental paradigm throughout the 20th century (Davis and Harrell, 1993; Thornton, 2001). One of the most prominent examples is the introduction of the one-child policy in 1979 and its strict enforcement ever since in order to boost state development and modernization as China reentered the global capitalist system (Greenhalgh, 2008). As a result, the propositions of DI have reached the majority of ordinary people and remain persuasive in contemporary China. For example, consistent with the DI propositions, survey data have shown that Chinese people perceive a reverse causal

relationship between development and low fertility (Thornton et al., 2012), and that endorsement of DI is positively associated with endorsement of modern family values, including gender egalitarianism and late marriage for both Han and Muslim Chinese women (Lai and Thornton, 2015).

Body weight and shape

Why and how do body weight and shape affect marital status in young Chinese adults? In this study, I argue that small body size (normal or even underweight as opposed to overweight and obese) and certain body shapes are currently seen as ideal in being both good in themselves – that is, aesthetically superior – and conducive to acquiring other good things such as health, high-paying jobs, and attractive spouses. Sobal and Stunkard (1989) suggested that this particular cultural schema of ideal body type originated in the West and can be traced back to more than a century ago, when Veblen (1889) recognized thinness as a status symbol of the leisure class. By the 1980s, many people in the West, especially high-status women, had accepted and internalized social norms equating thinness with attractiveness – that is, fatness is bad while thinness is healthy, beautiful, and good (Dornbusch et al., 1984; Sobal and Stunkard, 1989).

As the prevalence of obesity continued to rise in the U.S. and other Western countries in the 1990s and eventually turned into a global epidemic (Finucane et al., 2011; Flegal et al., 2012), the social pressure for a thin body and the stigma attached to a fat body have become pervasive (Allon, 1982; Carr and Friedman, 2005; Puhl and Brownell, 2001). This particular cultural schema of ideal body weight and shape has likely become part of the DI package and acted as an ideational force to affect individuals' social and economic outcomes. For example, overweight and obese persons are discriminated against at home by their parents (Crandall, 1995), at school by peers and teachers (Crosnoe and Muller, 2004; Neumark-Sztainer et al., 1998), in the job market and workplace by employers (Cawley, 2004; Morris, 2006), and at clinics and hospitals by health care professionals (Najman et al., 1982; Schwartz et al., 2003). The results of this broad array of discrimination experiences against the overweight and obese include low socioeconomic status (Sobal and Stunkard, 1989; McLaren, 2007), reduced earnings (Cawley, 2004), poor physical and mental health (Haslam and James, 2005; Pinhey et al., 1997), and even perceived unattractive personalities (Carr and Friedman, 2005).

With respect to marriage and family, studies in Western countries often conjecture that being overweight or obese is widely stigmatized and hence discriminated against in the marriage market, whereas thinness is a socially or culturally desirable trait that increases attractiveness to potential mates. Earlier studies report mixed findings; some reveal a significant association but in different directions, depending on the research setting, whereas others report no association at all (Sobal et al., 1992). These studies rely largely on cross-sectional analysis that is unable to resolve the debate between “marital selection” (i.e., body weight affecting entry into or exit from marriage), and “marital causation” (i.e., marital status inducing weight changes) (Sobal et al., 1992). Assuming that body weight signals health status or carries certain cultural values during the process of assortative mating, more recent U.S. studies have adopted a longitudinal design in order to reduce the potential

problem of reverse causality in understanding how body weight status affects the likelihood of being married (Averett and Korenman, 1999; Fu and Goldman, 1996; Gortmaker et al., 1993; Jæger, 2011; Jeffery and Rick, 2002). However, these longitudinal studies are limited by particular measurement and methodological challenges, and the findings on the effect of body weight on marital status remain inconclusive and sometimes contradict one another. For example, drawing upon data from the 1981-1988 National Longitudinal Study of Youth (NLSY), Gortmaker et al. (1993) found that men who were overweight at ages 16-24 were less likely to be married in the subsequent seven years; whereas, using the 1979-1991 NLSY data, Fu and Goldman (1996) found an increased likelihood of first marriage among overweight men. Other studies of smaller, non-representative longitudinal samples reported no significant association between body weight and marital status among young or middle-aged adults (Jæger, 2011; Jeffery and Rick, 2002), or differential effects – positive for elderly men but negative for elderly women (Jæger, 2011).

Despite the inconclusive findings in the U.S., the new DI worldview of “what is thin is healthy, beautiful, and good and hence should be sought after” has likely been disseminated to China, where rapid economic growth and urbanization have fueled the nutrition transition; that is, a shift from significant malnutrition due to poverty to increases in obesity and degenerative diseases due to improved living standards (Popkin, 2002) is taking place. In fact, despite the persistence of malnutrition in some poor subpopulations (Doak et al., 2005), the rates of overweight and obesity are surging in the Chinese population. In less than two decades, the prevalence of overweight and obesity has doubled in both adults – from 13% in 1993 to 26% in 2009 (Xi et al., 2012) and children – from 5% in 1991 to 13% in 2006 (Cui et al., 2010). Given the potentially huge disease burden associated with obesity, the Chinese government has launched an ambitious program known as Healthy China 2020, which will not only provide universal healthcare access and treatment for the entire population by the year 2020 but also promote healthy diets and active lifestyles (Hu et al., 2011; Yang et al., 2013). Such government-sponsored health campaigns, together with other educational programs and the mass media, help to provide the intellectual justification and establish legitimacy for exporting the Western worldview on body image to China. Once accepted by Chinese young adults, this DI worldview may affect their marriage-related decision-making and behaviors, leading to my first research hypothesis as follows:

Hypothesis 1: Excessive body weight and an unhealthy body shape reduce an individual's attractiveness and marriageability, thus delaying his/her marriage entry.

The DI worldview on what body type is good in marriage is likely stratified by gender. Psychological studies of body image have shown that thinness is often viewed as a key characteristic of beauty for women but not for men in Western cultures (Haworth-Hoepfner, 2000). Men and women also differ in how body fat is distributed in that men tend to accumulate more abdominal fat while women generally store more lower-body fat. This sex difference in body fat distribution may contribute to sex differences in metabolic and cardiovascular risks (Cartier et al., 2009; Karastergiou et al., 2012). Lower-body fat has also been hypothesized to increase the supply of neurodevelopmental resources, and thus a lower waist-to-hip ratio is found to be predictive of higher cognitive test scores in women and their children (Lassek and Gaulin, 2008). Taken together, these findings suggest that body shape

is indicative of health status, especially for women and their fertility, which in turn helps to explain the widespread men's preferences for women's low waist-to-hip ratios, in both Western and non-Western populations (Dixson et al., 2007; Swami et al., 2006). The gender aspect of the DI worldview on body image may have already been exported to China. A recent study of young adults aged 18-30 in urban China found evidence of discrimination in the job market against overweight and obese women but not men (Pan et al., 2011).

Therefore, my second hypothesis states that:

Hypothesis 2: The effects of body weight and body shape are stronger for women than for men.

Lastly, any particular idea or proposition of DI from the West may not be unanimously accepted by non-Western populations. Indigenous populations can modify or even resist various aspects of DI based on their cultural heritage, religious beliefs, historical experiences, and socioeconomic conditions (Thornton, 2001). In contemporary China, the rural-urban divide is arguably the most fundamental socioeconomic and demographic marker (Whyte, 2010). During the post-reform era, inequalities between rural and urban populations have been rising in terms of their socioeconomic status (Zhao, 2006), access to quality health care (Xu and Short, 2011) and health outcomes (Hou, 2008; Zimmer et al., 2007), despite the overall improvement in living conditions and population health. The urban Chinese have been shifting towards a high-fat, high-energy-density and low-fiber diet and decreased physical activity in work and leisure, all at a faster pace than their rural peers (Du et al., 2002). Consequently, chronic diseases, many of which correlate with obesity, have become the major source of disease burden in urban China, whereas infectious diseases remain prevalent in rural areas (Zhao, 2006). Therefore, the particular DI worldview of “what is thin is healthy, beautiful, and good” has probably penetrated the urban areas more than the rural areas, leading to my third hypothesis:

Hypothesis 3: The effects of body weight and body shape on marriage entry are stronger in urban areas than in rural areas.

Data and measures

Subjects for this study were adult participants ages 18-30 in the China Health and Nutrition Survey (CHNS), a panel survey that includes more than 4,000 households across 9 provinces in contemporary China. The CHNS data are not nationally representative, but the households were selected through a multistage, random cluster sampling process from a diverse set of nine provinces in northeast, central, and south China. All the individuals in the sampled households were interviewed. Together, these nine provinces are home to more than 40% of China's population, or 548.56 million people. The average response rate at the individual level is 88% across waves. Details on the design and sampling of CHNS are available elsewhere (Popkin et al., 2010). Due to both the high response rate and the diversity of population sampled, the CHNS data allows us to make inferences about a large proportion of the Chinese population.

This study draws on data from the most recent seven waves of the survey: 1991, 1993, 1997, 2000, 2004, 2006, and 2009. The sample is restricted to young adults who were never

married at the onset of each wave. The longitudinal data tracked the marital status of the same adult respondents ages 18 or older over time and thereby permitted constructing the dependent variable, a binary indicator of whether a respondent made the transition into marriage between two consecutive waves. The CHNS data did not fully capture the specific time points of entry into marriage, resulting in so-called “interval censoring.” Nevertheless, the temporal ordering of life events helps to alleviate the problem of reverse causality and facilitate the identification of the effects of body weight and shape on marital status.

The key predictors in this study are body mass index (BMI) and waist-to-hip ratio (WHR) to capture overall body weight and shape, respectively. Both variables were derived from objective anthropometric measures taken by trained health workers using a portable stadiometer, providing accurate and reliable assessments of body weight and shape that were rarely available in previous research. BMI was calculated as the ratio of body weight to height squared (kg/m^2). WHR was calculated as waist circumference (cm) divided by hip circumference (cm) and then rescaled to 0-100 to avoid too many decimal points in regression coefficients. In addition to these linear operationalizations, categorical variables were created to capture potential non-linear associations of body weight and shape with marital status. BMI was divided into three groups, including underweight (less than 18.5), normal (18.5 or greater but less than 23), and overweight or obese (23 or greater), according to the recommended cut-off points by the World Health Organization (WHO) for Asia-Pacific populations (WHO et al., 2000). WHR was dichotomized as central obese (0.9 or greater in men and 0.85 or greater in women) and not according to WHO's general recommendation (WHO, 2008) due to its lack of ethnicity-specific guidelines.

Other variables were constructed in similar ways as has been done in previous research (Chen et al., 2010; Xu et al., 2013; Xu and Short, 2011). Rural-urban residence was measured dichotomously. An urban community is an administratively defined community known as a “street committee” (*ju-wei-hui*), with an average population of about 3,000, while a rural community refers to a natural village, with an average population of about 3,800. Age and education were measured continuously in years. Birth cohorts were divided into three groups: those born in 1970 or earlier, those born between 1971 and 1980, and those born in 1981 or afterwards, according to the major periods in China's recent history and the data distribution of this study. Household income per capita was measured in Chinese *yuan* (RMB), inflated to 2009 levels, and log transformed in regression analysis. Occupation was categorized into four groups, including farmers or other agricultural workers, unskilled workers, skilled workers or professionals, and unemployed or other miscellaneous. Self-rated health was included to control for subjectively assessed general health status and grouped into poor or fair, good, and excellent compared to others of same age. Regional variations were controlled by a set of dummy variables indicating residence in the northeastern, coastal, inland, and mountainous southern provinces.

Method

Success in transition into marriage is not well differentiated by comparing people's ultimate marital status by middle age, but is better reflected in the timing of marriage, since it remains a universal norm to get married in China. Thus, similar to Fu and Goldman (1996),

this study employed a discrete-time model to analyze correlates of risk of first marriage. Specifically, body weight and shape along with other control variables measured at the i th wave among respondents who had never married yet (i.e. still at the risk of first marriage) are used to predict whether they had entered marriage by the $(i+1)$ th wave through a logit link. Lagging covariates produced a clear ordering of life events for easier identification of the temporal process of mate selection. The discrete-time logit models permit the use of time-varying covariates and thus take into account the possibility that body weight and shape as well as other potentially important factors related to the marriage process may change over the life course. They also adjust for the fact that some adults remained single by age 30, known as the right-censoring.

As in other longitudinal studies, sample attrition over time poses a potential source of bias in the CHNS. Less than 6% of observations had missing values on the dependent or independent variables in any given wave. Unfortunately, between about 30-50% had missing values for the same respondents in the following waves due to loss to follow-up, resulting in missing information on the change in marital status between two consecutive waves. However, exploratory analysis suggested that marital status in any given wave did not predict the probability of having missing values in the following wave after controlling for age, gender, education, and family income, indicating that missingness at random assumption and sequential ignorability are plausible (Gelman and Hill, 2007). Therefore, unlike previous studies that did not make any statistical adjustment, this study applied an inverse probability weighting technique to address the missing data problem (Fitzmaurice et al., 2004).

Specifically, a dichotomous variable indicating missing values in a subsequent wave was regressed on a number of variables including age, birth cohort, education, family income, occupation, self-rated health, and region of residence in the current wave. Probabilities of dropping out of the study in the next wave were then predicted based on the regression estimates. The respondents who had a high probability of dropping out but remained in the survey were weighted upward, while those who had a low probability were weighted downward, resulting in more balanced data than without any statistical adjustment. These inverse probability weights were used in the discrete-time logit models of entry into first marriage to reduce bias and improve efficiency in the estimates. Preliminary analysis produced more significant coefficient estimates without inverse probability weighting, indicating more conservative and hence robust results after adjusting for missing data. Nevertheless, caution should be applied when interpreting the results. After dropping cases with missing information, the final sample consists of 1,749 and 919 person-year records for men and women, respectively.

All the models were fit to men and women separately given notable gender differences in marriage selection and body weight profiles. The contrasts between rural and urban populations were achieved by interacting the dichotomous indicator of rural-urban residence with BMI and WHR instead of further stratifying the sample. This model specification preserves the statistical power by maintaining a sample size as large as possible and is more parsimonious by fixing the effects of other control variables for rural and urban respondents of the same gender. For each measure of body weight status, two models were fitted

sequentially, the first one without and the second one with the interaction term. Robust standard errors were estimated using the Huber-White sandwich estimators to adjust for repeated measures of the same respondents over time. Preliminary analysis explored random effects models as an alternative analytical strategy. However, only a few respondents contributed to more than two observations since most of them entered marriage within three waves. Thus, random effects models were confronted by a convergence problem under certain specification and thus not pursued here.

Results

Descriptive statistics

Descriptive statistics of the dependent variables are presented in Table 1. The number of records in a single wave decreased from 763 in 1991 to 184 in 2006 as the respondents either exited from the risk pool after entry into marriage or became right-censored after age 30. Men and women differed little in their average BMI (about 21) and distributions of overall body weight status (about 13-15% underweight, 70% normal, and 14-17% overweight or obese). Women had on average a lower WHR (79.4) than men (83.8), but they also suffered from a greater prevalence of central obesity (19.1%) than men (13.1%). These rates remain substantially lower than those in the U.S. or among Asian Americans (Schiller et al., 2012), but they are suggestive of an emerging obesity epidemic in China.

Turning to other covariates, the average age was 21.1 in women and 22 in men, and more than half of the sample belonged to the 1971-1980 cohort. The average years of schooling were 9.1 for men and women. Men in the sample came from on average slightly wealthier households and were more likely to be farmers but less likely to be unskilled workers, unemployed, or engaged in other types of employment. Women had a slightly stronger tendency than men to rate their health as poor or fair. Only about one third or fewer respondents lived in urban areas, and women were more likely to come from the coastal region but less likely to live in the south compared to men.

Using the midpoints between two consecutive waves to impute the age at first marriage, Figure 1 plots the Kaplan-Meier estimates of survival rates, that is, the cumulative proportion of the respondents who remained unmarried by a given age, stratified by gender and rural-urban residence. Rural women entered first marriage at a median age of 24, earlier than rural men (25) and urban women (25), followed by urban men (26). The gender gap in age at first marriage within rural or urban strata reflects the longstanding norm and expectation for men to build up and secure the economic foundation of marriage (Holmgren, 1985), despite China's development and modernization in the recent decades. On the other hand, later marriage for urban men and women than for their rural counterparts may partly result from the former's better educational and occupational attainments during the market transition (Wang and Yang, 1996). The estimated median age at first marriage in the CHNS sample was consistently higher for each group by about one year than the 2010 Census data (NBSC 2011), probably due to inaccurate imputations using the mid-point between two waves of the CHNS. However, the sample gender and rural-urban patterns still hold in the 2010 and 2000 census data (Han, 2010).

Regression estimates

Table 2 shows the coefficient estimates from the discrete-time logit models using BMI. The coefficient of BMI was not significant in Model 1 for either men or women, providing no support for *Hypothesis 1*. Urban residence was associated with a reduced likelihood of first marriage compared to rural residence (marginally significant in men), confirming the patterns revealed from the Kaplan-Meier estimates. After adding the interaction between BMI and urban residence (Model 2), the main effect of urban residence became marginally significant in women though not significant in men, partially confirming *Hypothesis 2*. The coefficient for the main effect of BMI remained insignificant, indicating no association in rural residents. The interaction term was marginally significant in both men and women, partially confirming *Hypothesis 3* about a stronger effect of BMI in urban areas. However, the marginally significant interaction between BMI and rural-urban residence does not reveal conclusively whether or not the effect of BMI was itself significant in urban residents, especially given the insignificant main effect of BMI. To obtain the estimated net effect of BMI in urban residents, Model 2 was refitted by switching the reference group from rural to urban in both the main and the interaction terms with everything else unchanged. The mean coefficient estimates and the associated 95% confidence intervals for the effects of BMI in urban men and women were plotted in Figure 2 (top-left panel) together with those in rural residents. On average, every one unit increase in BMI was associated with about a 0.17 decrease in the log-odds (or 15.5% lower odds) of entry into first marriage in urban women, but did not affect any other group.

Table 3 presents the coefficient estimates from the models using WHR. Again, the main effect of WHR was not significant either with or without the interaction term, providing no evidence for *Hypothesis 1*. The interaction between WHR and rural-urban residence was significant in women only, providing partial support to *Hypotheses 2* and *3*. After refitting Model 2 with urban residence as the reference group, the mean coefficient estimates and the associated 95% confidence intervals were again plotted in Figure 2 (top-right panel) for men and women, rural and urban separately. On average, every one unit increase in WHR (rescaled to the range of 0-100) was associated with about a 0.08 decrease in the log-odds (or 7% lower odds) of first marriage in urban women, but did not affect any other group.

Table 4 reports the coefficient estimates from the models using categorical body weight status. The main effect of being overweight or obese on entry into first marriage was positively significant as in Model 1, but the interaction effect was not the same as in Model 2, making it unclear which group was driving the results. Again, the uncertainty was lifted after refitting the same models using different reference categories. Compared to having normal weight, being overweight or obese had 1.54 smaller log-odds (or 78.6% lower odds) of first marriage in urban women (see the bottom-left panel in Figure 2), although this association was only marginally significant. By contrast, being overweight or obese was associated with a 0.46 increase in the log-odds (or 58.9% higher odds) in rural men. Table 5 presents the coefficient estimates from the models using the binary indicator of central obesity. Neither was the main nor the interaction effect significant for having a body shape classified as central obesity.

Among other covariates, age was, not surprisingly, positively associated with the timing of first marriage, a pattern that is consistent with the prevailing norm of getting married as a marker of successful transition into adulthood in China. There is some evidence of an interesting cohort difference in that confronted by an increasingly heavier economic burden to start a new family, men of the post-80s generation entered first marriage much later than those born in the 1970s (Xue, 2013). Overall, socioeconomic variables had little impact, which may be attributed to the universal marriage norms predicting that people of low SES also manage to get married through assortative mating. Nevertheless, among men, those who were unemployed or engaged in miscellaneous occupations tended to delay their first marriage compared to agricultural workers, a finding that is consistent with prior research (Yu and Xie, 2015a). Health status was strongly valued by women in selecting their potential mates as better self-rated health increased the chance of entry into marriage in men but not in women. The different effects of cohort, occupation, and self-rated health between men and women are suggestive of the enduring traditional gendered norms and expectations about a husband's role as the breadwinner. In light of the stringent job and housing markets, especially in urban China, these findings imply likely increased economic hardship for young men in attracting potential mates in the near future.

Discussion and conclusion

Family demographers have observed emerging trends toward later and less marriage in China and other East Asian countries, which resembles the second demographic transition in the West (Raymo et al., 2015). Cultural models have been proposed and employed to explain such new trends of family formation in the West (Lesthaeghe, 2010; Thornton, 2001; Thornton, 2005; Thornton, 2010). Demographic research on marriage entry in post-reform China recognizes the shifting attitudes toward marriage and family but empirically tends to focus on individual-level socioeconomic and demographic determinants of marriage entry. Against this background, the current study makes two important contributions to the literature. First, I employ DI as a theoretical framework to examine the worldview of ideal body type as an ideational force to affect marriage entry in Chinese young adults. The findings of the significant impacts of body weight and body shape, independent of a battery of personal socioeconomic and demographic characteristics, help to produce a fuller picture of the determinants of transition to first marriage. Second, situated in transitional China, this study broadens the application scope of DI as a theoretical framework to explain changing marriage and family patterns in non-Western countries. Several studies have applied the DI framework for understanding cohabitation (Yu and Xie, 2015b), beliefs about fertility change (Thornton et al., 2012) and family values (Lai and Thornton, 2015), and perceptions about development and inequality (Xie et al., 2012). However, to the best of my knowledge, this is the first study that explicitly applies the DI framework to investigating marriage entry in China or East Asia.

Overall, the empirical findings in this study suggest that, as part of the DI package, the worldview of thinness being healthy and beautiful and fatness being bad has been exported to China but penetrated into different subpopulations to varying degrees, thereby only affecting marriage entry in certain subgroups. Specifically, among the four sex- and residence-specific subgroups, urban women are most vulnerable to the negative impacts of

the Western worldview regarding body weight and shape. Both a larger body weight and relatively more fat accumulated in the abdomen rather than the lower body significantly delayed the timing of first marriage in urban women. These findings are consistent with the positive views of good health and aesthetic superiority attached to women's low BMI and WHR by their potential mates (Buss, 2004; Jæger, 2011). The significant effect of WHR in this study also implies that research on the socioeconomic and demographic consequences of body type should not be restricted to examining overall body weight alone, but also incorporate body fat distribution as an independent factor. A recent study showed that the employment rate in urban China was about 10-17% lower in young overweight or obese women, classified based on BMI, compared to their normal or underweight counterparts (Schafer and Kwon, 2012). Thus, it will be interesting to further assess the relative effect of unhealthy body shape on labor market outcomes, independent of the effect of excessive body weight.

Furthermore, the effect sizes of both body weight and shape were quite substantial. For example, assuming an urban woman with the average waist and hip circumferences in this sample (77 and 92 cm, respectively), her odds of first marriage would decline by about one fourth had her waist circumference increased by 3 cm while her hip circumference remained unchanged (equal to about a 3.3-unit increase in WHR rescaled to the range 0-100). Such a change can be easily achieved within a three-year period as the average annual growth in WHR was estimated to be 1.44 in Chinese women (Xu et al., 2012). Given that the prevalence of overweight and obesity continues to rise in China and Chinese women in particular tend to gain extra weight at a faster pace than men (Schafer and Kwon, 2012), these findings imply that urban women are facing growing discriminations based on their physiques in both the job (Pan et al., 2011) and marriage markets.

It is worth noting that certain subgroups have likely not accepted the new worldview in favor of a thin rather than a fat body. The regression estimates indicate that neither rural women nor urban men were affected by body weight or shape with respect to their timing of first marriage. In contrast, there appeared to be a positive return to overweight and obesity in rural men since being overweight or obese was associated with an earlier entry into marriage than normal weight. These findings are consistent with the gendered discrimination against the overweight and obese in Western populations (Gortmaker et al., 1993; Fu and Goldman, 1996), and also underscore the uneven pace of the nutrition transition between rural and urban populations in China (Du et al., 2002). These between-group contrasts also highlight the persistent gender inequality and rural-urban disparity in a wide array of family behaviors despite China's success in economic growth and development. To the extent that family is an important social institution throughout a person's life course, any attempt to achieve gender or rural-urban equity is unlikely to succeed without addressing these gaps in the family domain.

Several limitations remain in this study. First, the CHNS data are not nationally representative. Thus, the results from this study cannot be generalized to the entire Chinese population, although significant inferences can be made for a large proportion of the total population. Second, missing data due to sample attrition over time poses a potential threat to the accuracy of regression estimates in this study. The inverse probability weighting

technique helps to adjust for the missing data, but it does not solve the problem once and for all. Third, the exact timing of entry into marriage was not captured but only measured to an interval of time. Thus, it is unclear whether there existed any systematical measurement error in this regard across different groups, which would lead to biased estimates in this study. These limitations can be addressed in future research that employs new large-scale longitudinal data of high quality. Fortunately, it will not be long before that data is available, as greater efforts have recently been devoted to such data collection (e.g., Gan, 2012; Xie, 2012).

Despite these limitations, this study is among the first to reveal the heterogeneous returns to body weight status in contemporary China's marriage market. It also expands the scope of the existing Western literature on the relationship between body weight and marital status to developing countries. Capitalizing on the prospective design of the CHNS and its rich data, this study has improved upon previous research on body weight and marital status in several important aspects. First, measures of body weight status are derived from objective anthropometric data rather than self-reported data. Second, this study distinguishes the role of body shape from that of overall body weight, which has been extensively examined, in shaping marriage entry. Third, using temporally lagged covariates in discrete-time models of transition to first marriage allows me to better alleviate the potential problem of marital selection. Future research can benefit from including direct measures of personal attitudes toward body weight and body shape as additional covariates to better understand cultural influences on marriage behaviors.

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Figure 1.
Kaplan-Meier survival estimates of entry into first marriage.

Figure 2.
Coefficient estimates (with 95% confidence intervals) for the effects of body weight and shape on risk of first marriage from discrete-time logit models

Table 1

Descriptive statistics of the independent variables

	Women	Men
Body mass index (BMI)	20.7	20.9
Overall body weight (%)		
Underweight	15.0	13.0
Normal	71.0	70.3
Overweight/Obese	14.0	16.7
Body Shape		
Waist-to-hip ratio (WHR)	79.4	83.8
Central obese (%)	19.1	13.1
Age (years)	21.1	22.0
Cohort (%)		
<=1970	19.4	24.5
1971-1980	65.4	58.4
>=1981	15.2	17.2
Years of education	9.1	9.1
Household income per capita (RMB)	4311.7	4685.3
Occupation (%)		
Unemployed/Other	28.4	24.7
Farmer	29.8	36.5
Unskilled worker	23.7	21.3
Skilled worker/Professional	18.1	17.5
Self-rated health (%)		
Poor/Fair	18.4	14.1
Good	60.3	62.4
Excellent	21.3	23.4
Urban (%)	35.4	29.0
Region (%)		
Northeast	11.5	9.4
Coastal	27.0	21.6
Inland	33.2	33.6
South	28.3	35.4
N	919	1749

Table 2
Estimated coefficients from discrete-time logit models of marriage entry on body weight (continuous measure)

	Women		Men	
	Model 1	Model 2	Model 1	Model 2
Urban (ref: Rural)	-0.49 (0.25) *	3.00 (1.80) †	-0.25 (0.14) †	1.32 (0.95)
BMI	-0.06 (0.04)	0.00 (0.05)	0.01 (0.02)	0.04 (0.03)
Urban × BMI		-0.17 (0.09) †		-0.07 (0.04) †
Age (years)	0.27 (0.04) ***	0.27 (0.04) ***	0.16 (0.02) ***	0.16 (0.02) ***
Cohort (ref: 1971-1980)				
≤1970	-0.72 (0.30) *	-0.71 (0.29) *	-0.46 (0.14) ***	-0.47 (0.14) ***
>=1981	-0.10 (0.32)	-0.10 (0.33)	-0.28 (0.17) †	-0.30 (0.17) †
Years of education	-0.03 (0.04)	-0.03 (0.04)	-0.02 (0.02)	-0.02 (0.02)
Household income per capita (logged)	0.02 (0.16)	0.03 (0.16)	-0.01 (0.07)	0.00 (0.07)
Occupation (ref: Farmer)				
Unemployed/Other	-0.32 (0.36)	-0.27 (0.36)	-0.81 (0.17) ***	-0.83 (0.18) ***
Unskilled worker	0.48 (0.32)	0.52 (0.32)	-0.05 (0.17)	-0.05 (0.17)
Skilled worker/Professional	0.34 (0.37)	0.38 (0.37)	-0.21 (0.19)	-0.20 (0.19)
Self-rated health (ref: Poor/Fair)				
Good	0.47 (0.30)	0.48 (0.30)	0.47 (0.17) **	0.49 (0.17) **
Excellent	0.16 (0.34)	0.15 (0.34)	0.59 (0.19) **	0.61 (0.19) ***
Region (ref: South)				
Northeast	1.18 (0.39) **	1.22 (0.39) **	0.23 (0.21)	0.22 (0.21)
Coastal	0.96 (0.34) **	0.93 (0.34) **	0.02 (0.15)	0.01 (0.15)
Inland	1.07 (0.31) ***	1.11 (0.32) ***	0.22 (0.13) †	0.22 (0.13) †
Constant	-7.35 (1.52) ***	-8.67 (1.64) ***	-4.39 (0.73) ***	-4.97 (0.80) ***
N	919	919	1749	1749

Note: BMI = body mass index; robust standard errors are shown in parentheses.

† $p < .1$

Xu

$p < .001$

 $10' < d$
**
 $50' < d$
*

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Table 3

Estimated coefficients from discrete-time logit models of marriage entry on body shape (continuous measure)

	Women		Men	
	Model 1	Model 2	Model 1	Model 2
Urban (ref: Rural)	-0.65 (0.28) *	5.51 (2.85) †	-0.31 (0.15) *	-0.90 (1.84)
WHR	-0.02 (0.02)	0.00 (0.02)	-0.01 (0.01)	-0.02 (0.01)
Urban × WHR		-0.08 (0.04) *		0.01 (0.02)
Age (years)	0.21 (0.04) ***	0.21 (0.04) ***	0.13 (0.02) ***	0.13 (0.02) ***
Cohort (ref: 1971-1980)				
<=1970	-0.21 (0.44)	-0.22 (0.44)	-0.23 (0.21)	-0.23 (0.21)
>=1981	-0.44 (0.33)	-0.44 (0.33)	-0.43 (0.16) **	-0.43 (0.16) **
Years of education	-0.03 (0.04)	-0.03 (0.04)	-0.03 (0.03)	-0.03 (0.03)
Household income per capita (logged)	0.07 (0.17)	0.07 (0.18)	-0.11 (0.07)	-0.11 (0.07)
Occupation (ref: Farmer)				
Unemployed/Other	-0.63 (0.40)	-0.57 (0.40)	-0.80 (0.18) ***	-0.80 (0.18) ***
Unskilled worker	0.27 (0.37)	0.33 (0.37)	0.01 (0.17)	0.01 (0.17)
Skilled worker/Professional	0.20 (0.41)	0.24 (0.41)	0.05 (0.20)	0.04 (0.20)
Self-rated health (ref: Poor/Fair)				
Good	0.32 (0.30)	0.34 (0.30)	0.53 (0.17) **	0.53 (0.17) **
Excellent	0.23 (0.35)	0.22 (0.35)	0.70 (0.20) ***	0.70 (0.20) ***
Region (ref: South)				
Northeast	0.96 (0.44) *	0.90 (0.44) *	0.32 (0.23)	0.32 (0.23)
Coastal	0.92 (0.36) **	0.90 (0.36) *	0.13 (0.17)	0.13 (0.17)
Inland	0.87 (0.33) ***	0.87 (0.33) ***	0.33 (0.14) *	0.33 (0.15) *
Constant	-5.23 (2.00) **	-7.26 (2.22) ***	-1.21 (1.02)	-1.05 (1.15)
N	609	609	1409	1409

Note: WHR = waist-to-hip ratio, rescaled from 0-1 to 0-100 by multiplying 100; robust standard errors are shown in parentheses.

† $p < .1$

Xu

$p < .001$

 $10' < d$
**
 $50' < d$
*

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Table 4
Estimated coefficients from discrete-time logit models of marriage entry on body weight (categorical measure)

	Women		Men	
	Model 1	Model 2	Model 1	Model 2
Urban (ref: Rural)	-0.51 (0.25)	* -0.40 (0.27)	-0.28 (0.14)	* -0.18 (0.16)
Overall body weight (ref: Normal)				
Underweight	-0.29 (0.32)	-0.39 (0.43)	0.10 (0.16)	0.07 (0.21)
Overweight/Obese	-0.59 (0.35)	† -0.23 (0.38)	0.31 (0.15)	* 0.46 (0.18)
Urban × Underweight		0.22 (0.63)		0.05 (0.34)
Urban × Overweight/Obese		-1.31 (0.87)		-0.45 (0.30)
Age (years)	0.27 (0.04)	*** 0.28 (0.04)	*** 0.16 (0.02)	*** 0.16 (0.02)
Cohort (ref: 1971-1980)				
≤1970	-0.76 (0.30)	* -0.77 (0.29)	** -0.43 (0.14)	** -0.44 (0.14)
>=1981	-0.11 (0.32)	-0.12 (0.33)	-0.31 (0.17)	† -0.33 (0.17)
Years of education	-0.03 (0.04)	-0.03 (0.04)	-0.02 (0.02)	-0.02 (0.02)
Household income per capita (logged)	0.04 (0.17)	0.05 (0.17)	-0.01 (0.07)	-0.01 (0.07)
Occupation (ref: Farmer)				
Unemployed/Other	-0.27 (0.36)	-0.25 (0.36)	-0.80 (0.17)	*** -0.81 (0.17)
Unskilled worker	0.54 (0.32)	† 0.58 (0.32)	-0.04 (0.17)	-0.04 (0.17)
Skilled worker/Professional	0.39 (0.38)	0.41 (0.37)	-0.22 (0.19)	-0.22 (0.19)
Self-rated health (ref: Poor/Fair)				
Good	0.45 (0.30)	0.45 (0.30)	0.48 (0.17)	** 0.48 (0.17)
Excellent	0.12 (0.34)	0.10 (0.34)	0.60 (0.19)	*** 0.61 (0.19)
Region (ref: South)				
Northeast	1.20 (0.39)	** 1.25 (0.39)	*** 0.22 (0.21)	0.21 (0.21)
Coastal	0.95 (0.34)	** 0.93 (0.34)	** -0.02 (0.15)	-0.02 (0.15)
Inland	1.07 (0.31)	*** 1.11 (0.32)	*** 0.20 (0.13)	0.20 (0.13)

	Men		Women	
	Model 1	Model 2	Model 1	Model 2
Constant	-4.07 (0.66)	-4.08 (0.66)***	-8.59 (1.32)	-8.78 (1.35)***
N	1749	1749	919	919

Note: Robust standard errors are shown in parentheses.

† $p < .1$
* $p < .05$
** $p < .01$
*** $p < .001$.

Table 5

Estimated coefficients from discrete-time logit models of marriage entry on body shape (categorical measure)

	Women		Men	
	Model 1	Model 2	Model 1	Model 2
Urban (ref: Rural)	-0.65 (0.29) *	-0.49 (0.30)	-0.30 (0.15) *	-0.29 (0.16) †
Central obese (ref: No)	-0.15 (0.31)	0.13 (0.36)	-0.28 (0.18)	-0.27 (0.21)
Urban × Central obese		-0.97 (0.70)		-0.05 (0.38)
Age (years)	0.20 (0.04) ***	0.20 (0.04) ***	0.13 (0.02) ***	0.13 (0.02) ***
Cohort (ref: 1971-1980)				
<=1970	-0.17 (0.44)	-0.20 (0.44)	-0.23 (0.21)	-0.23 (0.21)
>=1981	-0.44 (0.33)	-0.45 (0.33)	-0.43 (0.16) **	-0.43 (0.16) **
Years of education	-0.03 (0.04)	-0.04 (0.04)	-0.03 (0.03)	-0.03 (0.03)
Household income per capita (logged)	0.09 (0.17)	0.09 (0.18)	-0.11 (0.07)	-0.11 (0.07)
Occupation (ref: Farmer)				
Unemployed/Other	-0.62 (0.40)	-0.57 (0.40)	-0.81 (0.18) ***	-0.81 (0.18) ***
Unskilled worker	0.29 (0.36)	0.31 (0.37)	0.02 (0.17)	0.02 (0.17)
Skilled worker/Professional	0.26 (0.41)	0.29 (0.41)	0.04 (0.20)	0.04 (0.20)
Self-rated health (ref: Poor/Fair)				
Good	0.32 (0.30)	0.35 (0.30)	0.52 (0.17) **	0.52 (0.17) **
Excellent	0.25 (0.35)	0.25 (0.35)	0.69 (0.20) ***	0.69 (0.20) ***
Region (ref: South)				
Northeast	0.97 (0.44) *	0.96 (0.44) *	0.33 (0.24)	0.33 (0.24)
Coastal	0.93 (0.36) **	0.90 (0.36) *	0.13 (0.17)	0.13 (0.17)
Inland	0.87 (0.33) **	0.85 (0.33) *	0.33 (0.14) *	0.33 (0.15) *
Constant	-6.79 (1.40) ***	-6.85 (1.41) ***	-2.43 (0.69) ***	-2.43 (0.69) ***
N	609	609	1409	1409

Note: Robust standard errors are shown in parentheses.

† $p < .1$

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$p < .001$

 $p < .10$
**
 $p < .05$
*

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