Intelligence 41 (2013) 553–559

Contents lists available at ScienceDirect

Intelligence

Differences in intelligence across thirty-one regions of China and their economic and demographic correlates

Richard Lynn [a,*], Helen Cheng [b]

[a] University of Ulster, Coleraine, Northern Ireland, BT52 1SA, UK
[b] Department of Psychology, University College London, London WC1E 6BT, UK

ARTICLE INFO

Article history:
Received 23 June 2012
Received in revised form 14 June 2013
Accepted 8 July 2013
Available online 15 August 2013

Keywords:
Intelligence
China
Chinese regions
Per capita income
Years of education

ABSTRACT

This study reports the differences in intelligence across thirty-one regions of the People's Republic of China. It was found that regional IQs were significantly associated with the percentage of Han in the population (r = .59), GDP per capita (r = .42), the percentage of those with higher education (r = .38, $p < .05$), and non-significantly with years of education (r = .32).

The results of the multiple regression showed that both the percentage of Han in the region and the GDP per capita were significant predictors of regional IQs, accounting for 39% of the total variance.

1. Introduction

Regional differences in intelligence within countries and their economic correlates have been reported in a number of studies. The first of these was found for the United States, for which Davenport and Remmers (1950) reported a correlation of .32 between state IQ and per capita income. More than half a century later, this association was confirmed with a correlation of .59 by McDaniel (2006).

In further studies, regional differences in IQs within countries and positive correlations between these and per capita incomes have been reported for 13 regions of the British Isles (r = .73) (Lynn, 1979), 90 regions of France (r = .61) (Lynn, 1980), 12 regions of Italy (r = .94) (Lynn, 2010), 19 regions of Italy (r = .98) (Templer, 2012), 18 regions of Spain (r = .42) (Lynn, 2012) and 16 regions of Germany (r = .79, .27) (Roivainen, 2012).

In the present paper we examine regional differences in intelligence and their economic and demographic correlates in the People's Republic of China. No study has yet been carried out on this question. However, a number of Chinese studies have examined the intelligence of the Han compared with that of other ethnic groups in China and this is a related issue because the percentage of Han varies across regions. Studies have examined the IQs of more than a dozen of the 56 ethnic groups in China that are officially recognized by the government of the People's Republic of China. All of these have found that the Han had higher average IQs than other ethnic groups.

Two studies have reported that Han have higher average IQs than Tibetans. The first of these was by Zhao, Tong, and Wan (1988) and reported this difference for children aged 9–15 although the mean IQs of the two groups were not provided. The second study by Lu, Fu, Kong, and Wang (1995) tested 40 Tibetan and 40 Han second year junior secondary school pupils (aged 12–13), the same numbers of second year senior secondary school pupils (aged 16–17), and the same numbers of second year university students using the Standard Progressive Matrices and tests of mathematics, all the participants being selected randomly. The results were that in all three age groups Han students had higher average IQs than Tibetan students by 12.6 IQ points ($p < .001$), 8.4 IQ points ($p < .05$) and 5.3 IQ points ($p < .05$), respectively. Han students had higher average scores than Tibetan students on mathematics by .80*d*

* Corresponding author.
E-mail address: lynnr540@aol.com (R. Lynn).

0160-2896/$ – see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.intell.2013.07.009

(standard deviation units) ($p < .01$), 1.28*d* ($p < .001$) and 1.41*d* ($p < .001$), respectively, in the three age groups.

There have been three studies reporting that Han children have higher average IQs than Mongolian. The first of these by Na and O (1994) who reported the IQs of Han (N = 3213) and Mongolian (N = 1481) children aged 5–14. They were tested with an adaptation of Raven's Progressive Matrices designated the Connection Raven's Test (CRT) that combined items from the Standard Progressive Matrices and the Coloured Progressive Matrices. The results were that the Han children obtained a mean IQ of 5.3 IQ points higher than the Mongolian.

The second study was by Yang and Gong (1994) and compared 5–6 year old Han (N = 151) and Mongolian (N = 150) children tested with the Chinese revision of the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) translated into the Mongolian language. Both groups of children lived together in Inner Mongolia. The Han children obtained a mean IQ of 99.1 and the Mongolian children obtained a mean IQ of 94.9, giving the Han children an advantage of 4.2 IQ points. In both studies these differences are statistically significant at $p < .01$. Further details of these studies are given in Lynn (2007, 2008).

In further studies, higher average IQs of the Han children were reported in comparisons between Miao and Han aged 7–11 years (Cheng et al., 1995); between Hezhen and Han (Wang, Wang, Liu, Ma, & Liu, 1995); and between Li and Han aged 13–14 years (Yang, Yuan, & Liang, 1995). In a more recent study, Yu (2008) compared the IQs of 450 teenagers of Han, Mongol, Daur and Ewenki ethnic groups aged 12, 14 and 16 year olds in Inner Mongolia using Raven's Progressive Matrices, and reported that among 12 year olds, IQs of the Han children were significantly higher than those of children in Mongol, Daur, and Ewenki ethnic groups by 8.4, 9.1 and 11.1 IQ points, respectively. Among 14 and 16 year olds, significant differences in IQs of 8.4 and 8.5 IQ points respectively ($p < .05$) were only found between Han and Ewenki ethnic groups.

There are a number of Chinese studies on the regional differences in economic development, which have shown that this is associated with foreign direct investment (FDI) (Chen & Liang, 2011; Feng, Zhao, & Du, 2008; Liu & Yin, 2010; Yao & Wang, 2011). For example, using the panel data sample of 1999–2007, Chen and Liang (2011) found that up until the end of 2009, eastern regions accumulatively attracted 82.4% of the total FDI in mainland China, whereas center regions and western regions attracted 11.9% and 6.6% of the total FDI in mainland China, respectively (Chen & Liang, 2011). Inequalities, measured by the Gini coefficients, among different regions and between rural and urban areas have been on the rise, although the Chinese government has endorsed and implemented programs that aim at alleviating inequality. For example, in 1999, the Western Development Program (WDP) was launched to boost the economic development of 12 provincial-level units in western China to reduce poverty in those regions (Fan & Sun, 2008), to counteract the regional economic disparity which was found to have a negative effect on national economic growth (Lee, Peng, Li, & He, 2012).

On the basis of previous studies in other countries, in this paper we examine four hypotheses concerning regional differences in IQs in China. These are that regional IQs in China are positively associated with GDP per capita, years of education and the percentage of Han in the population, and that GDP per capita, years of education and Han in the population are all independently associated with regional IQs.

2. Method

Data on IQs for 31 regions of China were obtained for a sample of 63,636 participants who took the test on a Chinese online IQ testing website (http://tw.iqeq.com.cn/). The data on this website are given in Chinese and hence inaccessible to most readers of this journal. The IQ test was based on the Stanford–Binet test and comprised 60 questions on verbal, quantitative and spatial reasoning. The website does not give any information on the reliability and validity but we would assume that these would be reasonable, as the test was based on the Stanford–Binet test. The time allowed to complete the test was 45 minutes. The test was administered between 2008 and 2011 and the results were published in November 2011.

The data for income were measured as GDP (Gross Domestic Product) per capita in 2011 for each region obtained from the National Bureau of Statistics of China (China NBS Database — *Quarterly Data*). We used the logarithmic transformation for the GDP per capita because of the skewed nature of the GDP. Data on average years of education for each region were obtained from the China Statistical Yearbook (2004) based on the 2000 Population Census. In addition, data for the percentage with higher education (college, university, post graduate) for each region and data for ethnic composition were obtained from the National Bureau of Statistics of China (China NBS Database — *Quarterly Data*), based on the 2010 Population Census.

The 31 regions are of three kinds. These are: (1) 22 Provinces: these are under provincial or regional government control; (2) four Municipalities: these are the highest level classification for cities and are under central government control; (3) five Autonomous Regions: these are the first-level administrative subdivision of China; like Provinces, the Autonomous Regions have their own local government, but compared with Provinces they have more legislative rights. The Autonomous Regions have a higher percentage of ethnic minorities which are given in parentheses: Tibet (93.9), Ningxia Hui (38), Guangxi Zhuang (38), Xinjiang Uyghur (59) and Inner Mongolia (21). In addition to these 31 regions, China has the two Special Administrative Regions of Hong Kong and Macau, which are not included in this analysis.

3. Results

Descriptive statistics for the 31 Chinese regions are presented in Table 1. This gives the mean IQs, number of respondents from each region, mean years of education, percentage of those with higher education, GDP (Gross Domestic Product) per capita and the percentages of the ethnic groups. The percentages of ethnic groups (per region) are representative of the populations given in the National Bureau Statistics of China (China NBS Database — *Quarterly Data*), based on the 2010 Population Census. The average of the percentages of Han in the 31 regions is 85.1, and the percentage of Han in the population of China is 92% based on 2010 census (China NBS Database — *Quarterly Data*).

Comparisons of IQs, years of education and GDP per capita by the type of regions (provinces, municipalities and autonomous regions) were examined using ANOVA. For IQs, there

Table 1
Chinese regions, IQs, years of education and percentage of higher education, GDP per capita and ethnic composition.

Region	Capital	Number of participants	IQ	Years of education[a] and percentage of higher education[b]		GDP US$ per capita[b]	Ethnic populations[b]	Ethnic composition[b] (%)
Anhui Province	Hefei	2111	107	6.98	7.3	3086	Han	99.0%
							Hui	0.6%
Beijing Municipality	Beijing	6635	107	9.99	32.8	12,447	Han	96.0%
							Manchu	2.0%
							Hui	2.0%
							Mongol	0.3%
Chongqing Municipality	Chongqing	1070	105	7.28	9.1	5341	Han	95.0%
Fujian Province	Fuzhou	1319	104	7.49	9.0	7246	Han	98.0%
							She	1.0%
							Hui	0.3%
Gansu Province	Lanzhou	612	107	6.54	8.0	2380	Han	91.0%
							Hui	5.0%
							Dongxiang	2.0%
							Tibetan	2.0%
Guangdong Province	Guangzhou	5510	106	8.08	9.1	7787	Han	99.0%
							Zhuang	0.7%
							Yao	0.2%
Guangxi Zhuang Autonomous Region	Nanning	1291	102	7.58	6.6	2987	Han	62.0%
							Zhuang	32.0%
							Yao	3.0%
							Miao	1.0%
							Dong	0.7%
							Gelao	0.4%
Guizhou Province	Guiyang	887	104	6.15	5.8	1938	Han	62.0%
							Miao	12.0%
							Buyei	8.0%
							Dong	5.0%
							Tujia	4.0%
							Yi	2.0%
							Gelao	2.0%
							Sui	1.0%
							Other	2.0%
Hainan Province	Haikou	547	101	7.68	8.4	3520	Han	82.6%
							Li	15.8%
							Miao	0.8%
							Zhuang	0.7%
Hebei Province	Shijiazhuang	1650	104	7.74	7.9	4235	Han	96.0%
							Manchu	3.0%
							Hui	0.8%
							Mongol	0.3%
Heilongjiang Province	Harbin	1376	104	8.25	9.5	4000	Han	95.0%
							Manchu	3.0%
							Korean	1.0%
							Mongol	0.4%
							Hui	0.3%
Henan Province	Zhengzhou	3317	105	7.72	7.0	3611	Han	98.8%
							Hui	1.0%
Hubei Province	Wuhan	2522	106	7.77	10.2	5434	Han	95.6%
							Tujia	3.7%
							Miao	0.4%
Hunan Province	Changsha	2372	106	7.80	8.2	3652	Han	90.0%
							Tujia	4.0%
							Miao	3.0%
							Dong	1.0%
							Yao	1.0%
Inner Mongolia Autonomous Region	Hohhot	513	102	7.76	10.8	8854	Han	79.0%
							Mongol	17.0%
							Manchu	2.0%
							Hui	0.9%
							Daur	0.3%
Jiangsu Province	Nanjing	5170	108	7.05	11.5	9535	Han	99.6%
							Hui	0.2%
Jiangxi Province	Nanchang	2312	105	7.55	7.6	3140	Han	99.7%
							She	0.2%
Jilin Province	Changchun	1248	103	8.24	10.4	4668	Han	91.0%
							Korean	4.0%

(continued on next page)

Table 1 (*continued*)

Region	Capital	Number of participants	IQ	Years of education[a] and percentage of higher education[b]		GDP US$ per capita[b]	Ethnic populations[b]	Ethnic composition[b] (%)
							Manchu	4.0%
							Mongol	0.6%
							Hui	0.5%
Liaoning Province	Shenyang	1594	105	8.41	12.5	7788	Han	84.0%
							Manchu	13.0%
							Mongol	2.0%
							Hui	0.6%
							Korean	0.6%
							Xibe	0.3%
Ningxia Hui Autonomous Region	Yinchuan	217	103	7.03	10.1	3968	Han	62.0%
							Hui	34.0%
							Manchu	0.4%
Qinghai Province	Xining	419	101	6.12	9.4	3562	Han	54.0%
							Tibetan	21.0%
							Hui	16.0%
							Tu	4.0%
							Salar	1.8%
							Mongol	1.8%
Shaanxi Province	Xi'an	2014	105	7.71	11.2	4008	Han	99.5%
							Hui	0.4%
Shandong Province	Jinan	3270	106	7.58	9.3	7317	Han	99.3%
							Hui	0.6%
Shanghai Municipality	Shanghai	5710	108	9.30	22.8	12,784	Han	99.0%
Shanxi Province	Taiyuan	1512	104	8.02	9.3	3883	Han	99.7%
							Hui	0.2%
Sichuan Province	Chengdu	1510	105	7.07	7.1	3129	Han	95.0%
							Yi	2.6%
							Tibetan	1.5%
							Qiang	0.4%
Tianjin Municipality	Tianjin	1312	105	8.99	18.3	13,058	Han	99.0%
Tibet Autonomous Region	Lhasa	109	103	3.43	6.1	2558	Tibetan	92.8%
							Han	6.1%
							Monpa	0.3%
							Hui	0.3%
							Other	0.2%
Xinjiang Uyghur Autonomous Region	Ürümqi	997	103	7.73	11.6	4633	Uyghur	45.0%
							Han	41.0%
							Kazakh	7.0%
							Hui	5.0%
							Kyrgyz	0.9%
							Mongol	0.8%
							Dongxiang	0.3%
							Pamiris	0.2%
							Xibe	0.2%
Yunnan Province	Kunming	1310	103	6.33	6.2	2327	Han	67.0%
							Yi	11.0%
							Bai	3.6%
							Hani	3.4%
							Zhuang	2.7%
							Dai	2.7%
							Miao	2.5%
							Hui	1.5%
							Tibetan	0.3%
							De'ang	0.2%
Zhejiang Province	Hangzhou	3200	107	7.46	9.9	9083	Han	99.2%
							She	0.4%

[a] China Statistical Yearbook (2004) — based on the 2000 Population Census.
[b] Based on the 2010 Population Census, National Bureau Statistics of China (China NBS Database — *Quarterly Data*).

were significant differences between provinces and autonomous regions, and between municipalities and autonomous regions ($F_{2,28} = 5.78$, $p < 0.01$). IQs were the highest in the municipalities and lowest in the autonomous regions. For years of education, there were also significant differences between municipalities and provinces, and between municipalities and autonomous regions ($F_{2,28} = 5.63$, $p < 0.01$). Autonomous regions had the shortest years of education. For GDP per capita, again autonomous regions had significantly lower levels compared with both municipalities and provinces ($F_{2,28} = 6.29$, $p < 0.01$).

Pearson correlations were calculated among the measures and are shown in Table 2. There were statistically significant correlations between regional IQs and the percentage of the

Han ethnic group in the regions (r = .59, $p < .001$), GDP per capita (r = .42, $p < .05$), and the percentage of those with higher education (r = .38, $p < .05$). Years of education were associated with regional IQ in an expected positive direction at .32, but failed to reach statistical significance at the .05 level.

Because of the positive inter-correlations between the measures used in the study, to ascertain whether education, ethnic compositions and GDP per capita were independently associated with regional IQs, we conducted a multiple regression analysis on the variables used in the study using IQs as the dependant variable. The results are given in Table 3. This shows that when education, ethnic composition, and logged GDP per capita were all entered into the equation, both the percentage of Han in the region and the GDP per capita were significant predictors of regional IQs, accounting for 39% of the total variance. There is a possible problem with this analysis that in 7 regions the percentages of Han are more than 99% and this could distort the regression results. To examine this possibility, we excluded these 7 regions and reran the regression analyses. The results are very similar to those of the total sample (N = 31) with a slightly reduced predictive power of the percentage of Han on regional IQs. In the regression model, with sample size N = 25 (excluding the 7 regions in which the percentages of Han are more than 99%), the predictive power of the percentages of Han on the regional IQs is reduced from the total variance explained of $R^2 = .39$ to $R^2 = .27$.

4. Discussion

The present study was carried out to test four hypotheses regarding IQs in the thirty-one regions in China. These were, first, that regional IQs would be positively associated with per capita income. This hypothesis was confirmed by the statistically significant correlation of .42 ($p < .05$). As noted in the introduction, this positive association replicates many previous studies of regional differences in IQs in other countries, including the United States, the British Isles, France, Italy, Spain and Germany. We propose that the interpretation of these positive associations is that they arise from a positive feedback loop in which IQ is a significant determinant of incomes, and incomes are a significant determinant of IQs acting through better nutrition and other environmental inputs.

The second hypothesis that was examined was that regional IQs would be significantly associated with years of education. The basis of this hypothesis was that it has been found in numerous studies that years of education have a positive association with IQs (e.g. Ceci, 1991). However, although the present results found a positive association across the Chinese regions between IQs and years of education of .32, this correlation was not statistically significant and so this hypothesis was not confirmed at a statistically significant level. However, the association between regional IQs and the percentage with higher education (college, university, post graduate) reached a statistically significant level (r = .38, $p < .05$).

The third hypothesis that was examined was that regional IQs would be significantly associated with the percentage of Han in the population. This hypothesis was confirmed by a statistically significant correlation of .59 ($p < .001$). This result confirms a number of studies reviewed in the introduction finding that the Han have higher average IQs than those of other ethnic peoples.

The fourth hypothesis that was examined was that per capita, years of education and the percentage of Han in the population would all be independently associated with regional IQs. The results of the multiple regression showed that both the percentage of Han in the region and the GDP per capita were significant predictors of regional IQs, accounting for 39% of the total variance.

The results go some way to explaining why IQs are generally higher in the eastern regions. This can be attributed to the greater percentages of Han and the higher levels of GDP per capita. The highest IQs of 108 are in Jiangsu (99.6% Han) and Shanghai (99.0% Han), which are both on the east coast. The second highest IQs of 107 are in Anhui (99.0% Han) and Zhejiang (99.2% Han), which are also on the east coast, and in Beijing (96.0% Han), which is close to the east coast. Gansu (IQ = 107) is a geographical exception because it is in the north-center but it has 91.0% Han. By contrast, the western regions have generally lower IQs and smaller percentages of Han. The lowest IQ of 101 is in the western region of Qinghai (54.0% Han) and the southern island of Hainan (82.6% Han). The second lowest IQ of 102 is in the western regions of Guangxi Zhuang (62.0% Han) and Inner Mongolia (79.0% Han), and third lowest IQ of 103 is in the western regions of Tibet (6.10% Han), Yunnan (67.0% Han), Jilin (91.0% Han), Ningxia Hui (62.0% Han) and Xingiang Uyghur (41.0% Han).

The higher IQs obtained by the Han compared with those of other ethnic groups found in studies of individuals summarized in the introduction and in regions found in the present data raise the question of how this can be explained. There are genetic differences between the Han and other ethnic groups and it is possible that there is a genetic factor responsible for the IQ difference between the Han and other ethnic groups. Southern and northern Han have similar frequencies of Y-chromosome haplogroups carrying the M122-C mutations

Table 2
Correlations among IQs, years of education received, GDP per capita, and regional ethnic composition in thirty-one regions in China.

Measures	Means (SD)	Regional IQ	Years of education	GDP per capita
Regional IQ	105 (1.91)	–		
Years of education received	.10 (.05)	.32	–	
GDP per capita log US$	3.68 (.23)	.42*	.66***	–
Han %	85.1 (15.78)	.59***	.69***	.43*

* $p < .05$.
*** $p < .001$.

Table 3
Regressions of the thirty-one regional IQ scores in China by years of education received, GDP per capita, and ethnic composition.

Measures	Regional IQ scores		
	β	*t*	*p*
Years of education received	−.44	1.89	.067
Log GDP per capita	.40*	2.14	.042
Regional ethnic Han population %	.72***	3.66	.001
Variance explained	R = .67		
	$R^2 = .45$		
	R^2 adjusted = .39		
	$F_{(3,27)} = 7.46$***		

(53.8%, 54.2% for northern and southern Han, respectively); whereas haplogroups O1b-M110, O2a1-M88 and O3d-M7, which are prevalent in southern natives (local minority ethnic groups, which include the samples of Daic, Hmong-Mien and Austro-Asiatic), are only observed at low frequencies in some southern Han (4%), and are absent in northern Han (Wen et al., 2004). It has been suggested by Rindermann, Woodley, and Stratford (2012) that frequencies of 14 Y chromosomal haplogroups may be related to IQs. In a study of 47 countries they found that seven haplogroups (I, R1a, R1b, N, J1, E, T[+L]) were significant predictors of national cognitive ability accounting for 51% of the variance in national intelligence. These findings are only suggestive that there could be genetic factors responsible for the IQ differences between Han and other ethnic groups.

In some regions, for example, in Inner Mongolia Autonomous Region, the GDP per capita is more than twice as high as those in Jiangxi and Henan Provinces and the average years of education in these three regions are about the same, yet the regional IQs are 102 vs 105/105 in these three regions. It seems that the likely causal factor is the differences in the percentage of Han among the three regions (79.0% vs 99.7/98.8%).

The levels of GDP per capita in general are higher in the eastern regions. As noted in the introduction, one of the explanations for this is that eastern regions attracted more FDI compared with center regions and western regions (Chen & Liang, 2011; Feng et al., 2008; Liu & Yin, 2010; Yao & Wang, 2011). Thus, ethnic minority groups in less developed regions of China may suffer from the double disadvantages of less FDI and lower IQs.

The principal conclusions to be drawn from the present study are that the findings replicate a number of previous studies in other countries noted in the introduction reporting that there is a positive association between regional differences in IQs and GDP per capita; they confirm several studies on children and college students noted in the introduction reporting that the Han have higher average IQs than other ethnic peoples, that there are greater percentages of Han in the eastern regions, and this contributes significantly to explaining why IQs and per capita incomes are higher in the eastern regions than in the northern, western and southern regions with their larger ethnic minority populations.

There are two principal limitations of this study. First, the lower IQs obtained in regions with larger ethnic minorities could be partly attributable to poorer language proficiency because although the Chinese language is taught from primary schools onwards as the official language, many people of the minority groups speak their own language at home and this may adversely affect the mastery of the official language. Second, taking the test was voluntary and the average IQ of those taking the test will likely have been a little higher than the average of the population. This is suggested by the fact that the test was normed on a mean of 100 and SD of 15, but the mean of the sample that took the test was 105. It is likely that those taking the test will have been more selective samples in the regions with lower IQs. The effect of this will likely have been to inflate the IQs in the lower IQ regions and hence reduce the range of the regional IQs. However, the effect of this seems to be quite small. The range of the regional IQs in the present study is from 101 (Qinghai) to 108 (Jiangsu and Shanghai), a 7 point difference. This is slightly greater than the 6.1 IQ points range between the 13 regions of the British Isles reported by Lynn (1979) for a more ethnically homogeneous population, but is less than the 10.1 IQ point range between the states in the United States from 94.2 (Mississippi) to 104.3 (Massachusetts) calculated by McDaniel (2006) for a more ethnically heterogeneous population. Thus, the range of the regional IQs in China found in the present data is intermediate between those in the British Isles and the United States and suggests that it is not seriously distorted.

References

Ceci, S. J. (1991). How much does schooling influence general intelligence and its components? A reassessment of the evidence. *Developmental Psychology*, *27*, 703–722.

Chen, J. -Y., & Liang, Z. (2011). Pecuniary externalities, technological externalities and unbalanced regional distribution of FDI. *Journal of International Trade*, *9*, 104–114.

Cheng, Z. -H., Zhou, S. -J., Gong, Y. -X., Wang, H. -P., Cai, T. -S., & Peng, Q. -C. (1995). A comparative study on intelligence among children of Miao, Tujia, and Han in west Guangxi, China. *Chinese Journal of Clinical Psychology*, *3*, 16–19 (in Chinese).

Davenport, K. S., & Remmers, H. H. (1950). Factors in state characteristics related to average A-12 V-12 scores. *Journal of Educational Psychology*, *41*, 110–115.

Fan, C. -C., & Sun, M. -J. (2008). Regional inequality in China, 1978–2006. *Eurasian Geography and Economics*, *49*, 1–20.

Feng, T., Zhao, H. -Y., & Du, M. -M. (2008). An empirical analysis of FDI regional agglomeration and disparities in China. *China Economic Quarterly*, *7*, 565–586.

Lee, B. -S., Peng, J. -G., Li, G. -Z., & He, J. (2012). Regional economic disparity, financial disparity, and national economic growth: Evidence from China. *Review of Development Economics*, *16*, 342–358.

Liu, X. -Y., & Yin, X. -M. (2010). Spatial externalities and regional income inequality: Evidence from China's prefecture-level data. *Frontiers of Economics in China*, *5*, 325–338.

Lu, S., Fu, M., Kong, M., & Wang, Z. (1995). A cross-cultural study of intellectual and non-intellectual factors influencing mathematic ability in Tibetan and Han students. *Education Research*, *12*, 70–74 (in Chinese).

Lynn, R. (1979). The social ecology of intelligence in the British Isles. *The British Journal of Social and Clinical Psychology*, *18*, 1–12.

Lynn, R. (1980). The social ecology of intelligence in France. *The British Journal of Social and Clinical Psychology*, *19*, 325–331.

Lynn, R. (2007). The IQ of Mongolians. *Mankind Quarterly*, *48*, 91–97.

Lynn, R. (2008). The IQ and math ability of Tibetans and Han Chinese. *Mankind Quarterly*, *48*, 505–510.

Lynn, R. (2010). In Italy, north–south differences in IQ predict differences in income, education, infant mortality, stature, and literacy. *Intelligence*, *38*, 93–100.

Lynn, R. (2012). North-south differences in Spain in IQ, educational attainment, per capita income, literacy, life expectancy and employment. *Mankind Quarterly*, *52*, 265–291.

McDaniel, M. A. (2006). State preferences for the ACT versus SAT complicates inferences about SAT-derived state IQ estimates: A comment on Kanazawa. *Intelligence*, *34*, 601–606.

Na, D., & O, E. L. (1994). The results of 5–14 year old Mongolian children's Raven's tests in Xinjiang. *Journal of Inner Mongolia Medicine*, *1*, 37–38 (in Chinese).

Rindermann, H., Woodley, M. A., & Stratford, J. (2012). Haplogroups as evolutionary markers of cognitive ability. *Intelligence*, *40*, 362–375.

Roivainen, E. (2012). Economic, educational and IQ gains in eastern Germany 1990–2006. *Intelligence*, *40*, 571–575.

Templer, D. I. (2012). Biological correlates northern–southern Italy differences in IQ. *Intelligence*, *40*, 511–517.

Wang, J., Wang, Y. -H., Liu, X. -D., Ma, X. -C., & Liu, G. -R. (1995). A comparative study of intelligence between children of Hezhen and Han in Heilongjiang, China. *Chinese Journal of Child Health Care*, *3*, 60–62 (in Chinese).

Wen, B., Li, H., Lu, D., Song, X., Zhang, F., He, Y., & Jin, L. (2004). Genetic evidence supports demic diffusion of Han culture. *Nature*, *431*, 302–305.

Yang, Y. -P., & Gong, Y. -X. (1994). A comparative study on intelligence between Mongol and Han children aged 5 to 6 years old in Inner Mongolia, China. *Chinese Journal of Clinical Psychology*, *2*, 81–85 (in Chinese).

Yang, J. -S., Yuan, X. -X., & Liang, G. (1995). A comparative study on intelligence between 7–16 year old children of Li and Han in Hainan, China. *Journal of Hainan Normal University*, *2*, 28–33 (in Chinese).

Yao, L. -M., & Wang, L. -Y. (2011). Comparison of internationalization promotion patterns of region economic growth in China. *International Journal of Business and Social Science*, *2*, 100–110.

Yu, S. (2008). A comparative study on intelligence among 12 to 16 years old teenagers of Han, Mongol, Daur, and Ewenki in Inner Mongolia, China. *Inner Mongolia Social Sciences*, *29*, 124–127 (in Chinese).

Zhao, M. -J., Tong, C. -J., & Wan, M. -P. (1988). A comparative study of intelligence development among Tibetan, Hui, Dongxiang and Han children aged from 9 to 15. *Chinese Journal of Psychological Science*, *3*, 3–10.