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19 A Cross-Cultural Behavioral Genetic Study on Parenting

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I. Introduction

Japanese parenting has received substantial attention from cross-cultural researchers, because although its economy and education are comparable to those in Western countries, its parenting styles have some distinct characteristics. Cross-cultural psychological and sociological studies comparing Japanese and Western (particularly American) parenting styles have used such contrasting descriptions as child-centered vs. parent-centered (Lebra, 1994), indirect vs. direct (Azuma, Kashiwagi, & Hess, 1981), indulgent vs. authoritative (Azuma, 1986), empathetic vs. imperative (Rothbaum, Pott, Azuma, Miyake, & Weisz, 2000), and persuasive vs. instructive (Conroy, Hess, Azuma, & Kashiwagi, 1980). However, no study has explained the reasons for the different parenting strategies in different cultures. The contrast suggests that the etiologies of parenting, as well as the observed patterns, vary in different cultures.

We conducted a cross-cultural study using a behavioral genetic approach to clarify the contributions of genetic and environmental factors to parenting in Japan and Sweden, based on the twin method, using Japanese and Swedish twins.

II. Methods

1. Participants

1.1. Japanese sample

The Japanese participants included 1,497 (980 female and 517 male) twins registered with the Keio Twin Project (Shikishima, Ando, Ono, Toda, & Yoshimura, 2006) who were recruited via invitations sent to a population-based twin residential list for the Tokyo area. All were native Japanese adolescents or adults ranging from 14–32 years old (mean = 20.3, SD = 3.9). There were 334 female monozygotic (MZf), 158 male monozygotic (MZm), 96 female dizygotic (DZf), 48 male dizygotic (DZm), and 84 opposite-sex (DZo) pairs. DZo pairs were excluded from genetic analyses.

1.2. Swedish sample

The Swedish participants were 1,733 (1,087 female and 646 male) twins registered with the Twin and Offspring Study in Sweden project who were recruited through the population-based Swedish Twin Registry (Lichtenstein, et al., 2002). The age of the participants ranged from 32–60 years (mean = 44.9, SD = 4.9). The effective number of twin pairs according to zygosity was: 245 MZf, 124 MZm, 267 DZf, and 188 DZm pairs.

2. Measurement

Parenting was assessed using the Japanese or Swedish version of the Parental Bonding Instrument (Parker, Tupling, & Brown, 1979). Offspring were asked to rate the behavior and attitudes of each parent during their childhood up to the age of 16. Participants were required to choose the most appropriate answer from the four-point Likert scale for 25 items concerning maternal parenting and 25 items concerning paternal parenting. Principal component analyses with varimax rotation on each of the 25 Japanese and Swedish items produced identical 3-factor solutions: Warmth (i.e. care), Authoritarianism (i.e. behavioral control), and Protectiveness

(i.e. psychological control). The score for each subscale was calculated by summing the total score of the items with the highest loadings.

3. Genetic analyses

The twin method allows the observed (phenotypic) variance (*P*) to be separated into genetic (*A*), shared environmental (*C*), and nonshared environmental (*E*) influences, by comparing the resemblances between identical twins and fraternal twins (Neale & Maes, 2002). The *genetic variance* reflects variation among multiple genotypes, whose influences are small and additive. The *shared environmental variance* refers to variation between, but not within, families in terms of environmental characteristics. The *nonshared environmental variance* reflects variation in environmental characteristics, even within families.

We fitted our data to two distinct models: a heterogeneity model (in which genetic and environmental variances differ between the two populations) and a homogeneity model (where the contributions are equivalent across the populations). A better model-fitting index for the heterogeneity model would imply that the etiologies of parenting were culturally specific, while no deterioration for the homogeneity model would suggest that the etiologies of parenting were cross-cultural.

III. Results

1. Mean comparison

The means and standard deviations (SD) for each of the three maternal and paternal parenting dimensions for Japan and Sweden are shown in Table 1. The scores for Warmth and Authoritarianism were very similar in Japan and Sweden, whereas large differences were found for Protectiveness scores.

2. Genetic analyses

As shown in Table 2, the heterogeneity model provided a better fit than the

Table 1. Means and standard deviations

		Japan		Sweden		
	Dimension	M	*SD*	M	*SD*	*ES*
Maternal	Warmth	39.28	6.37	38.06	6.39	0.19
	Authoritarianism	11.55	3.80	12.36	3.18	0.23
	Protectiviveness	14.06	4.08	10.66	3.50	0.82
Paternal	Warmth	35.33	7.65	36.37	6.69	0.15
	Authoritarianism	11.18	3.72	12.19	3.23	0.29
	Protectiviveness	13.24	3.61	10.11	3.21	0.84

Table 2. Model fitting of heterogeneity and homogeneity models

Dimension	Model	-2LL	*df*	AIC	$\Delta\chi 2$	Δdf	*p*
Maternal							
Warmth	Heterogeneity	19142.73	2983	13176.73			
	Homogeneity	191.53	2986	13181.44	10.71	3	.01
Authoritarianism	Heterogeneity	15525.08	2983	9559.08			
	Homogeneity	15570.60	2986	9598.65	45.57	3	.00
Protectiveness	Heterogeneity	16073.19	2982	10109.19			
	Homogeneity	16103.16	2985	10133.20	29.97	3	.00
Paternal							
Warmth	Heterogeneity	19275.29	2931	13413.29			
	Homogeneity	19300.51	2934	13432.51	25.22	3	.00
Authoritarianism	Heterogeneity	15304.36	2940	9424.36			
	Homogeneity	15332.01	2943	9446.01	27.65	3	.00
Protectiveness	Heterogeneity	15251.10	2940	9371.10			
	Homogeneity	15266.97	2943	9380.97	15.88	3	.00

A smaller value for AIC indicates a better fit to data.

homogeneity model for all dimensions, indicating that the genetic and environmental structures of the parenting dimensions differed between the two samples. The Japanese and Swedish *ACE* contributions were therefore estimated separately.

Variance components of *ACE* for maternal and paternal Warmth dimensions are shown in Figure 1. The genetic component (*A*) was larger for the Japanese sample than for the Swedish sample, especially for

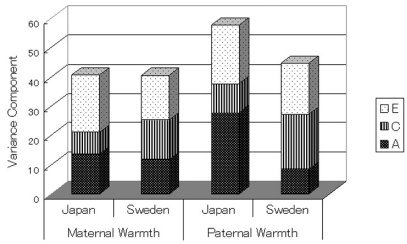

Figure 1. ACE variance components for Warmth

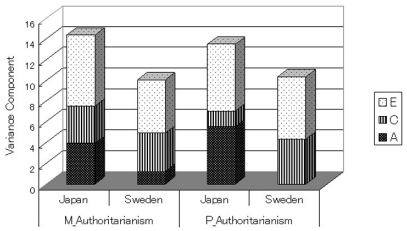

Figure 2. ACE variance components for Authoritarianism

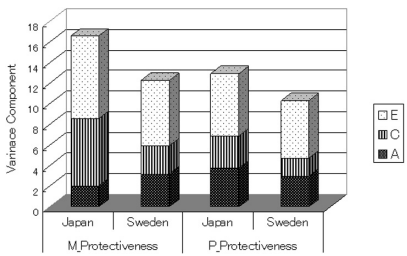

Figure 3. ACE variance components for Protectiveness

paternal Warmth. By contrast, shared environmental variance (*C*) was much larger for Swedes than for Japanese.

A similar pattern was observed for Authoritarianism (Figure 2). In Japan, the genetic component (*A*) was substantial, while in Sweden it was negligible or even absent for paternal Authoritarianism, and a substantial shared environmental component (*C*) was present instead.

The pattern for Protectiveness differed from those for the other two dimensions (Figure 3) in having a larger shared environmental component (*C*) for maternal Protectiveness in the Japanese sample.

IV. Discussion

In contrast to the phenotypic structure, the genetic and environmental structures of Japanese and Swedish parenting were quite different. Our results suggest that parenting in Japan is influenced more by the child's

genetics. In Sweden, however, the role of shared environmental factors replaced that of genetic factors.

The genetic influence on Japanese parenting can be explained in two ways: Parents are responsive to children's genetics, or the child's genetic makeup influences their recollections of parenting. In the former case, parents would adjust their behavior towards their children depending on the child's behavior, resulting in child-centered, empathetic, or indulgent practices, which are often described as a typical Japanese parenting style. At the same time, if Japanese parenting practices are indirect or less instructive, their evaluation by the receiver could be more subjective, relying more on genetically influenced individual sensitivity.

On the other hand, shared environmental effects on Swedish parenting suggest that children brought up in the same family should receive the same parenting, irrespective of the children's characteristics, and that parenting would therefore be a parent-centered, coherent, systematic, goal-oriented practice.

This study showed that cultural differences included genetic and environmental structural components. We hypothesize that the underlying cultural differences reflect the different extents to which genetics and environment are expressed in each culture.

It is notable that estimates of the genetic and environmental effects on personality and IQ have been shown to be similar in Japan and Sweden: The relative proportions of genetics and nonshared environment for harm avoidance were 41% vs. 59% in Japan (Ando et al., 2004), and 42% vs. 58% in Sweden (Yuh et al., 2008); for general intelligence they were 83% vs. 17% in Japan (Shikishima, et al., in press), and 82% vs. 18% in Sweden (Plomin, Pedersen, Lichtenstein, & McClearn, 1993). Further research is needed to clarify the genetic and environmental structures of those traits that could be affected by cultural factors, as well as those that are not, and to determine which cultural features can modulate these traits.

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References

Ando, J., Suzuki, A., Yamagata, S., Kijima, N., Maekawa, H., Ono, Y., & Jang, K.L. (2004). Genetic and environmental structure of Cloninger's temperament and character dimensions. *Journal of Personality Disorders*, 18, 379-393.

Azuma, H. (1986). Why study child development in Japan? In H. Stevenson, H. Azuma, & K. Hakuta (Eds.), *Child development and education in Japan* (pp. 3-12). New York: Freeman.

Azuma, H., Kashiwagi, K., & Hess, R. (1981). *The influence of attitude and behavior upon the child's intellectual development*. Tokyo: University of Tokyo Press.

Conroy, M., Hess, R. D., Azuma, H., & Kashiwagi, K. (1980). Maternal strategies for regulating children's behavior: Japanese and American families. *Journal of Cross-Cultural Psychology*, 11, 153-172.

Lebra, T. S. (1994). Mother and child in Japanese socialization: A Japan-U.S. comparison. In P. M. Greenfield & R. R. Cocking (Eds.), *Cross-cultural roots of minority child development* (pp. 259-274). Hillsdale, NJ: Erlbaum.

Lichtenstein, P., De Faire, U., Floderus, B., Svartengren, M., Svedberg, P., & Pedersen, N. L. (2002). The Swedish Twin Registry: A unique resource for clinical, epidemiological and genetic studies. *Journal of Internal Medicine*, 252, 184-205.

Neale, M. C. & Maes, H. H. M. (2002). *Methodology for genetic studies of twins and families.* Dordrecht: Kluwer Academic Publishers.

Parker, G., Tupling, H. & Brown, L. B. (1979). A Parental Bonding Instrument. *British Journal of Medical Psychology*, 52, 1-10.

Plomin, R., Pedersen, N. L., Lichtenstein, P., & McClearn, G. E. (1993). Variability and stability in cognitive abilities are largely genetic later in life. *Behavior Genetics*, 24, 207-215.

Rothbaum, F., Pott, M., Azuma, H., Miyake, K., & Weisz, J. (2000). The development of close relationships in Japan and the United States: Paths of symbiotic harmony and generative tension. *Child Development*, 71, 1121-1142.

Shikishima, C., Ando, J., Ono, Y., Toda, T., & Yoshimura, K. (2006). Registry of adolescent and young adult twins in the Tokyo area. *Twin Research and Human Genetics*, 9, 811-816.

Shikishima, C., Hiraishi, K., Yamagata, S., Sugimoto, Y., Takemura, R., Ozaki, K., Okada, M., Toda, Y., & Ando, J. (in press). Is *g* an entity? A Japanese twin study using syllogisms and intelligence tests. *Intelligence*.

Yuh, J., Neiderhiser, J. M., Spotts, E. L., Pedersen, N. L., Lichtenstein, P., Hansson, K., Cederblad, M., Elthammer, O., & Reiss, D. (2008). The role of temperament and social support in depressive symptoms: A twin study of mid-aged women. *Journal of Affective Disorders*, 106, 99-105.