Supporting Information

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SI Materials and Methods

Research Sample. This study used data from the Fragile Families and Child Wellbeing Study (FFS) (1). The FFS is a national longitudinal birth cohort study that follows 4,898 children, 1,186 of whom were born to married parents and 3,712 of whom were born to unmarried parents. They represent children born in 20 large US cities with populations greater than 200,000 between 1998 and 2000. Baseline interviews were conducted shortly after the birth. Mothers were interviewed in the hospital, and fathers were interviewed either in the hospital or wherever they could be located. Response rates for the baseline survey among eligible mothers were 82% for married mothers and 87% for unmarried mothers. Follow-up surveys were conducted when the focal child was 1, 3, 5, and 9 y of age. Response rates for the years 1, 3, 5, and 9 surveys were 90%, 88%, 87%, and 76% for eligible mothers, respectively, who completed a baseline interview. In year 9, saliva DNA samples were collected from mothers using the Oragene• DNA sample collection kit (DNA Genotek) and retained at room temperature until DNA extraction (laboratory of D.N., Princeton University, Princeton, NJ) according to the protocol supplied by the manufacturer. Following extraction, DNA was quantified and evaluated for quality by measuring UV absorption at 260 and 280 nm. The analytic sample consisted of 2,612 mothers who (*i*) were interviewed at least once during the years 3, 5, and 9 surveys, (*ii*) provided usable saliva during the year 9 survey, and (*iii*) had valid observations on study variables.

Maternal Harsh Parenting Outcome. Maternal harsh parenting was repeatedly assessed at years 3, 5, and 9, using 10 identical items from the Parent Child Conflict Tactics Scales (2). Five items for psychological harsh parenting are:

i) shouted, yelled, or screamed at him/her;

ii) threatened to spank or hit him/her but did not actually do it;

iii) swore or cursed at him/her;

iv) called him/her dumb or lazy or some other name like that;

v) said you would send him/her away or kick him/her out of the house.

Five items for corporal punishment are:

i) spanked him/her on the bottom with your bare hand;

ii) hit him/her on the bottom with something like a belt, hairbrush, a stick or some other hard object;

iii) slapped him/her on the hand, arm or leg;

iv) pinched him/her;

v) shook him/her.

For each item, mothers were asked to respond to one of the seven categories indicating the frequency of the harsh parenting behavior during the past year: never, once, twice, 3–5 times, 6–10 times, 11–20 times, and more than 20 times. We recoded these responses to the midpoints (0, 1, 2, 4, 8, 15, and 25). We constructed a composite measure of maternal harsh parenting combining the two five-item subscales for psychological harsh parenting and corporal punishment (Cronbach's alpha = 0.75).

Macroeconomic Indicators. We merged data on two macroeconomic indicators with the FFS data. First, the city-level data on monthly unemployment rate (UR) were obtained from the Bureau of Labor Statistics' Local Area Unemployment Statistics. Second, the national data on the monthly Consumer Sentiment Index (CSI) were obtained from the Thomson Reuters/University of Michigan Surveys of Consumers. We used both the levels of, and the rate of change in, the local UR and the CSI in our analysis. The levels of macroeconomic conditions were measured at the time of interview. The rate of change in macroeconomic conditions was measured in percentage terms by computing the difference between the value at the time of interview and the 3-mo lagged value divided by the lagged value, and multiplied by 100.

Dopamine Genetic Variation. The *DRD2* gene codes for proteins controlling synaptic dopamine receptor subtype D_2 (3). We examined the *DRD2 Taq1A* polymorphism (rs1800497), a well-known single nucleotide polymorphism (SNP) (C/T) located within exon 8 of *ANKK1*, about 10,000 bp upstream of *DRD2,* that has been associated with decreased transcription of *DRD2.* The three genotypes were in Hardy–Weinberg equilibrium ($\chi^2(2)$ = 1.36, P = 0.24), and there was no significant difference in genotype frequencies by race/ethnicity (white, $\chi^2(2)$ = 2.54, P = 0.11; black, $\chi^2(2)$ = 2.56, P = 0.11; Hispanic, $\chi^2(2)$ = 0.67, P = 0.41; other, $\chi^2(2)$ = 1.82, P = 0.18). Because the T allele is associated with lower transcription of the *DRD2 Taq1A* polymorphism, we divided the sample into T allele carriers and CC allele carriers.

In addition to the *DRD2 Taq1A* polymorphism, we also examined two SNPs from *DRD4* (rs1800955) and *DAT1* (rs40184) available in the FFS data. Although variants affecting both genes have been linked to reactive aggression alongside *DRD2*, the functionality of the first two SNPs has been relatively understudied compared with the exon 3 variable number tandem repeat (VNTR) of *DRD4* and the 3′ UTR VNTR of *DAT1* (4-6). The *DRD4* gene codes synaptic dopamine receptor subtype D_4, and rs1800955 (-521C/T) was evaluated. The three genotypes were in Hardy–Weinberg equilibrium ($\chi^2(2)$ = 0.15, P = 0.70), and there was no significant difference in genotype frequencies by race/ethnicity (white, $\chi^2(2)$ = 0.67, P = 0.41; black, $\chi^2(2)$ = 0.00, P = 0.96; Hispanic, $\chi^2(2)$ = 0.29, P = 0.59; other, $\chi^2(2)$ = 0.20, P = 0.65). Any genotype containing T was considered a "risk" or "sensitive" genotype.

The *DAT1* gene codes for the dopamine active transporter (SLC6A3), which pumps dopamine from the synapse to the cytosol. rs40184 is a C/T polymorphism in intron 14, and its three genotypes were in Hardy–Weinberg equilibrium (χ2(2) = 3.15, P = 0.08). There was no significant difference in genotype frequencies by race/ethnicity (white, $\chi^2(2)$ = 0.05, P = 0.83; black, $\chi^2(2)$ = 0.01, P = 0.91; Hispanic, $\chi^2(2)$ = 1.57, P = 0.21; other, $\chi^2(2)$ = 1.17, P = 0.28). Any genotype containing C was considered a risk or sensitive genotype.

DNA Extraction and Genotyping. Genotypes for *DRD2 Taq1A* were determined by two different methods, which provided identical results. For the first 3,159 DNA samples, PCR was performed with the following primers: forward, 5′-CCT TCC TGA GTG TCA TCA AC-3′; reverse, 5′- ACG GCT CCT TGC CCT CTA G-3′. PCR was carried out on a PTC-225 DNA engine (MJ Research), using the following cycling conditions: 5-min denaturing step at 95 °C, followed by 30 cycles of 94 °C for 30 s, 60 °C for 30 s, and 72 °C for 60 s, and a final extension phase of 72 °C for 5 min. Reactions were performed in 10× PCR Buffer (Denville Scientific), containing 15 mM $MgCl_2$, 500 ng of genomic DNA, 5 pmol of each primer, 0.3 mM dNTPs, and 1 U of Taq polymerase

(Denville Scientific). PCR products were cut with TaqI (NEB; cat. no. R0149), product size 236 bp cut into 124-bp and 112-bp fragments (in homozygote site present) and separated on a 3.0% HiRes agarose gel (ISCBioExpress; cat. no. E3115) supplemented with ethidium bromide (0.03%) and visualized by UV illumination. For the remaining 2,659 DNA samples, SNP rs1800497 (the *DRD2 Taq1A* polymorphism) was genotyped as described by TaqMan SNP Genotyping Assays Protocol (Applied Biosystems). TaqMan PCR (denaturation: 95 °C, 10 min; annealing: 95 °C, 15 s; extension: 60 °C, 60 s; for 40 cycles) was performed on genomic DNA from working aliquots using TaqMan Genotyping Master Mix and SNP Genotyping Assays from Applied Biosystems (assay no. C__7486676).

DRD4 SNP rs1800955 was genotyped as described by TaqMan SNP Genotyping Assays Protocol (Applied Biosystems). TaqMan PCR (denaturation: 95 °C, 10 min; annealing: 95 °C, 15 s; extension: 60 °C, 60s; for 40 cycles) was performed on genomic DNA from working aliquots using TaqMan Genotyping Master Mix and SNP Genotyping Assays from Applied Biosystems (assay no. C__7470700_30). Data were analyzed using Sequence Detection Systems v.2.3 for 7900HT RT-PCR Machine by Applied Biosystems.

DAT1 SNP rs40184 was genotyped as described by TaqMan SNP Genotyping Assays Protocol (Applied Biosystems). TaqMan PCR (denaturation: 95 °C, 10 min; annealing: 95 °C, 15 s; extension: 60 °C, 60 s; for 40 cycles) was performed on genomic DNA from working aliquots using TaqMan Genotyping Master Mix and SNP Genotyping Assays from Applied Biosystems (assay no. C__2960969_10). Data were analyzed using Sequence Detection Systems v.2.3 for 7900HT RT-PCR Machine by Applied Biosystems.

Control Variables. Our models controlled for key sociodemographic characteristics of mothers and children that have been documented to affect harsh parenting (7). Mothers' characteristics included age (in years), race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, or other racial/ethnic groups), immigration status (born in the United States or immigrant), educational attainment at birth (less than high school, high school, some college, or college or more), poverty status at birth (below or equal to 100% of the federal poverty level, between 100% and 200%, or above or equal to 200%), and family structure at birth (married, cohabiting, or single). Children's characteristics included sex (male or female) and child age (in months greater or less than 3, 5, or 9 at the time of interview).

Extensions. We extended our analysis in nine ways. First, to address heterogeneous effects by genotype, we reestimated our G × E model using two SNPs (rs1800955 and rs40814) from the *DRD4* and *DAT1*genes (Table S3). Figs. S1 and S2 show no cross-over effect by these two dopamine markers, suggesting that they did not moderate the effect of macroeconomic conditions on harsh parenting. Although these two SNPs are located in the dopaminergic system, as is *DRD2 Taq1A*, their interactions with macroeconomic conditions as an environmental stressor did not operate in the same fashion with respect to maternal harsh parenting.

Second, we explored heterogeneity of response by education, race/ethnicity, family structure, and child sex. For the first three characteristics, there was some evidence for heterogeneous responses to deteriorations in macroeconomic conditions, with greater responsiveness for groups that were more likely to actually experience unemployment (Table S4). With respect to educational attainment, declining macroeconomic conditions increased harsh parenting for mothers with high school or some college education. Those with a college degree were the least likely to experience unemployment. High school dropouts were less likely than the other groups to be in the labor force and in that sense less likely to experience unemployment. The results for race/ethnicity suggested that declining macroeconomic conditions increased harsh parenting for blacks and Hispanics, but have no effect for whites and other racial/ethnic groups. With respect to family structure, declining macroeconomic conditions increased harsh parenting for cohabiting or single mothers. Single mothers also decreased harsh parenting as macroeconomic conditions improved. Finally, the results for child sex show that declining macroeconomic conditions increased harsh parenting for both girls and boys, with their effect slightly stronger for boys.

Third, the absence of a positive association between the level of the local UR and harsh parenting was surprising. Thus, we extensively examined plausible alternative specifications to see whether the level of the local UR had a significant positive effect, as we expected (Table S5). We estimated separate models for children aged 3, 5 and 9, an individual fixed effects model, models without including measures of CSI, models without measures of changes in UR, and models without wave- and city-fixed effects. Only in models based on data from year 3 did we find a statistically significant positive effect for the level of UR. We found no such relationship when the child was 5 or 9 y old and found that the bivariate relationship between the level of UR and harsh parenting in year 3 was actually negative. Limiting the data to one wave, while controlling for city, season, and age of child in months, substantially reduced the independent variation in the level of UR and clouded interpretation of the coefficient. In sum, our results showed that the level effect of UR was not robust to model specifications, suggesting that the level UR coefficient not be given much weight.

Fourth, we further investigated whether the level effects of UR and CSI in the unexpected direction were driven by their functional forms (Table S6). When specified as linear, the level effects of both UR and CSI were significant but not in the expected direction. However, when specified as nonlinear, the level coefficients tended to either lose their significance or become inconsistent. Therefore, the level coefficients were indeed sensitive to alternative functional forms.

Fifth, we examined whether the coefficients for percent changes in UR and CSI were confounded with the coefficients for their level indicators (Table S7). Excluding the level measures of UR and CSI led to a slight reduction in effect size, but the results were substantively similar to our main results.

Sixth, we examined whether family income loss at the individual level was associated with increases in harsh parenting and whether controlling for the actual experience of income loss affected our main results (Table S8). Family income change was measured by comparing poverty ratios between years 1 and 3, years 3 and 5, and years 5 and 9 and then categorized as income gain (reference), 0–10% loss, 10–35% loss, and at least 35% loss. We found that income loss at the individual level was associated with increases in harsh parenting, especially for the T allele carriers, but larger income losses were associated with smaller increases in harsh parenting. We also found that our main findings held even after accounting for individual-level income loss.

Seventh, we examined whether our results were strengthened by using employment-population ratios (EPR) rather than unemployment rates (Table S9). To compute the local EPR, we merged data from the Quarterly Workforce Indicators, the 2000 Census, and the American Community Survey with the FFS data. We tried a number of different employment rates by race/ethnicity, education, and sex. The female education-specific employment rate provided the best fit and is reported in Table S9. We constructed measures for both the level and percent change in EPR as we did for UR. The results were substantively similar to those using UR but weaker in terms of statistical significance. We speculate that the unemployment rate is more salient than the EPR because the parents in our sample are young and unlikely to withdraw from the workforce.

Eighth, we examined whether our results were sensitive to our treatment of mothers who changed residence (Table S10). Because residential mobility may be endogenous to the local UR, we linked the local UR at time of interview to the baseline city, even for mothers who moved. Although using baseline UR avoids endogeneity, it could introduce measurement error that may bias our UR results toward zero. To address this concern, we reestimated our models by (*i*) using the local UR measures based on the year-specific city of residence while controlling for cross-city moves and (*ii*) using the local UR measures based on the baseline city of residence while excluding cross-city movers. The results did not alter our main findings.

Ninth and lastly, we examined psychological harsh parenting and corporal punishment separately (Table S11). We found that deteriorating macroeconomic conditions increased both psychological harsh parenting and corporal punishment for mothers carrying a T allele of *DRD2 Taq1A*, but not for those carrying the CC allele. The effect of improving macroeconomic conditions decreased both types of harsh parenting for the T allele carriers but not for the CC allele carriers. Therefore, these results are consistent with those using the composite measure of maternal harsh parenting.

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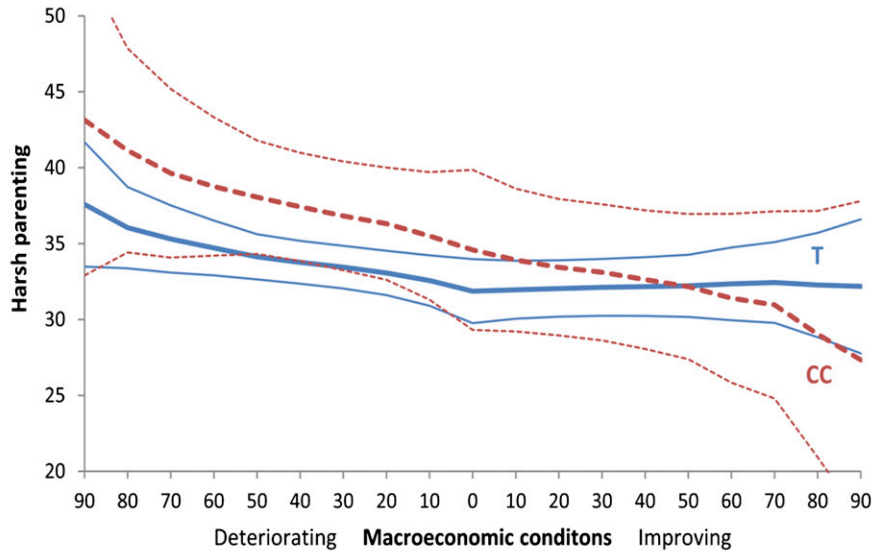

Fig. S1. Harsh parenting responses to deteriorating and improving macroeconomic conditions (measured as percentile changes) by *DRD4* (rs1800955).

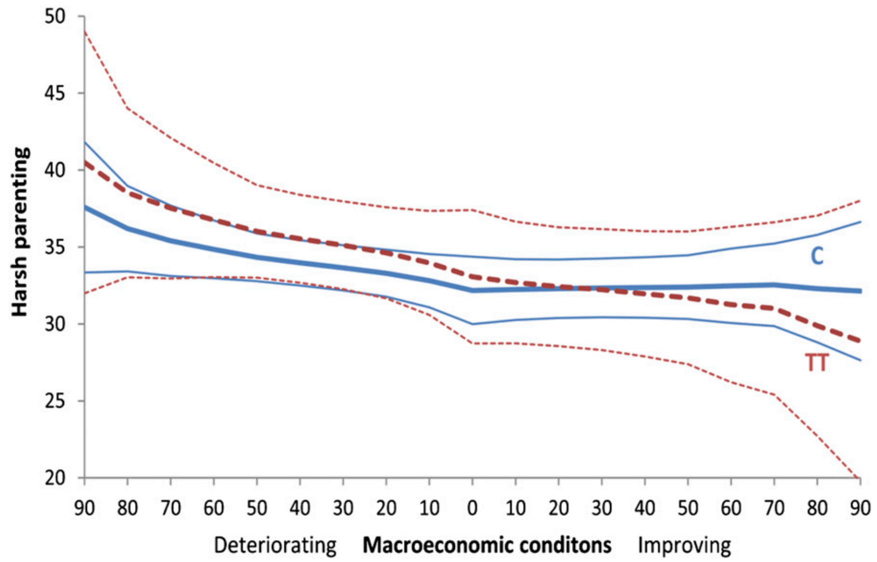

Fig. S2. Harsh parenting responses to deteriorating and improving macroeconomic conditions (measured as percentile changes) by *DAT1* (rs40184).

Table S1. Descriptive statistics

Variable	Mean/%	SD	Min.	Max.
Harsh parenting	33.95	32.17	0	201
Improving local UR	2.09	4.20	0	23.08
Deteriorating local UR	8.21	9.12	0	53.45
Deteriorating CSI	3.41	5.16	0	23.11
Improving CSI	4.39	6.95	0	34.71
Current level of local UR	6.30	2.02	3.00	16.70
Current level of CSI	80.86	12.91	55.30	103.80
DRD2 Taq1A				
TT	10.71			
TC	43.18			
CC	46.12			
Age at birth, y	25.05	5.93	14	47
Race/ethnicity				
White	21.69			
Black	48.83			
Hispanic	26.40			
Other	3.08			
Immigrant	13.80			
Educational attainment at birth				
Less than high school	31.84			
High school	31.47			
Some college	26.11			
College or more	10.58			
Poverty status at birth				
Below 100%	34.27			
100–199%	26.26			
Above or equal to 200%	39.46			
Marital status at birth				
Married	24.26			
Cohabiting	36.49			
Single	39.25			
Male child	51.85			
Child age, mo	1.64	3.64	−4	24
N	6,492			

Table S2. The association between macroeconomic conditions and harsh parenting

Variable	*b*	95% CI
Improving local UR	0.03	[−0.20, 0.25]
Deteriorating local UR	0.16**	[0.05, 0.27]
Deteriorating CSI	0.13	[−0.10, 0.35]
Improving CSI	−0.05	[−0.19, 0.08]
Current level of local UR	−0.70*	[−1.34, -0.06]
Current level of CSI	0.18*	[0.00, 0.36]
Age at birth	−0.53***	[−0.70, -0.35]
Race/ethnicity		
White (ref.)		
Black	5.43**	[2.31, 8.54]
Hispanic	−4.68**	[−8.19, -1.17]
Other	7.38*	[0.99, 13.77]
Immigrant	−8.53***	[−11.65, -5.41]
Educational attainment at birth		
Less than high school	1.93	[−2.43, 6.30]
High school	4.42*	[0.37, 8.47]
Some college	3.64	[−0.22, 7.51]
College or more (ref.)		
Poverty status at birth		
Below 100%	−2.36	[−5.14, 0.42]
100–199%	−0.28	[−3.00, 2.43]
Above or equal to 200% (ref.)		
Marital status at birth		
Married (ref.)		
Cohabiting	−1.37	[−4.35, 1.61]
Single	−0.81	[−4.00, 2.38]
Male child	5.25***	[3.31, 7.18]
Child age	0.31	[0.00, 0.62]
Wave dummies?	Yes	
Season dummies?	Yes	
City dummies?	Yes	
N	6,492	

****P* < 0.001, ***P* < 0.01, **P* < 0.05 (two-tail tests).

Table S3. G × E interaction effects on harsh parenting of macroeconomic conditions and three dopamine SNPs

	DRD2		*DRD4*		*DAT1*	
Variable	T (*b*/95% CI)	CC (*b*/95% CI)	T (*b*/95% CI)	CC (*b*/95% CI)	C (*b*/95% CI)	TT (*b*/95% CI)
% change in local UR						
Improving	−0.21/[−0.51, 0.09]	0.25/[−0.09, 0.60]	0.08/[−0.17, 0.33]	−0.23/[−0.81, 0.36]	0.06/[−0.19, 0.32]	−0.13/[−0.65, 0.40]
Deteriorating	0.23**/[0.07, 0.38]	0.08/[−0.07, 0.24]	0.14*/[0.02, 0.26]	0.33*/[0.01, 0.66]	0.16*/[0.03, 0.29]	0.19/[−0.06, 0.43]
% change in CSI						
Deteriorating	0.40*/[0.09, 0.72]	−0.18/[−0.50, 0.14]	0.16/[−0.09, 0.40]	0.04/[−0.56, 0.64]	0.10/[−0.14, 0.35]	0.19/[−0.35, 0.73]
Improving	−0.05/[−0.24, 0.13]	−0.05/[−0.24, 0.15]	−0.04/[−0.19, 0.11]	−0.18/[−0.51, 0.15]	−0.04/[−0.19, 0.11]	−0.11/[−0.42, 0.20]
Level of local UR	−0.57/[−1.43, 0.28]	−0.75/[−1.71, 0.21]	−0.49/[−1.20, 0.23]	−1.94**/[−3.41, −0.48]	−0.77*/[−1.47, −0.07]	−0.51/[−2.05, 1.02]
Level of CSI	0.31*/[0.07, 0.55]	0.02/[−0.24, 0.28]	0.18/[−0.02, 0.37]	0.28/[−0.16, 0.73]	0.17/[−0.03, 0.37]	0.22/[−0.19, 0.62]
Wave dummies?	Yes	Yes	Yes	Yes	Yes	Yes
City dummies?	Yes	Yes	Yes	Yes	Yes	Yes
Season dummies?	Yes	Yes	Yes	Yes	Yes	Yes
Covariates?	Yes	Yes	Yes	Yes	Yes	Yes
N	3,498	2,994	5,471	1,019	5,180	1,319

***P* < 0.01, **P* < 0.05 (two-tail tests).

Table S4. Differential effects of macroeconomic changes on harsh parenting

	Deteriorating		Improving	
Variable	Local UR (*b*/95% CI)	CSI (*b*/95% CI)	Local UR (*b*/95% CI)	CSI (*b*/95% CI)
Educational attainment				
Less than high school	0.07/[−0.11, 0.26]	−0.10/[−0.49, 0.29]	0.04/[−0.37, 0.44]	−0.18/[−0.39, 0.03]
High school	0.29/[0.11, 0.47]	0.32/[−0.03, 0.68]	0.22/[−0.15, 0.59]	0.07/[−0.17, 0.31]
Some college	0.22/[0.00, 0.45]	0.20/[−0.20, 0.61]	−0.12/[−0.52, 0.27]	−0.18/[−0.41, 0.04]
College or more	−0.03/[−0.28, 0.22]	−0.07/[−0.63, 0.49]	−0.29/[−0.94, 0.37]	0.20/[−0.08, 0.49]
Race/ethnicity				
White	0.18/[−0.04, 0.41]	−0.21/[−0.64, 0.23]	−0.02/[−0.42, 0.38]	−0.05/[−0.30, 0.19]
Black	0.15/[0.00, 0.31]	0.27/[−0.04, 0.58]	0.11/[−0.22, 0.44]	−0.12/[−0.31, 0.08]
Hispanic	0.13/[−0.05, 0.31]	0.07/[−0.30, 0.44]	−0.06/[−0.44, 0.32]	0.03/[−0.18, 0.23]
Other	0.33/[−0.29, 0.95]	−0.54/[−1.87, 0.80]	0.38/[−1.01, 1.78]	0.25/[−0.30, 0.80]
Family structure				
Married	0.16/[−0.05, 0.36]	−0.05/[−0.50, 0.39]	0.01/[−0.42, 0.43]	0.09/[−0.16, 0.34]
Cohabiting	0.22/[0.05, 0.39]	0.16/[−0.20, 0.51]	0.16/[−0.18, 0.51]	0.03/[−0.17, 0.24]
Single	0.10/[−0.08, 0.27]	0.18/[−0.14, 0.50]	−0.10/[−0.45, 0.25]	−0.22/[−0.41, −0.03]
Child sex				
Girl	0.16/[0.00, 0.31]	0.08/[−0.22, 0.38]	0.02/[−0.28, 0.31]	−0.04/[−0.22, 0.13]
Boy	0.16/[0.02, 0.31]	0.16/[−0.14, 0.46]	0.04/[−0.28, 0.35]	−0.07/[−0.25, 0.11]

Table S5. Level coefficient of the local UR from alternative model specifications

Specification	*b*	95% CI
Year 3 only	6.92*	[0.74, 13.09]
Year 5 only	−1.04	[−9.82, 7.75]
Year 9 only	−0.66	[−3.20, 1.87]
Individual fixed-effects model	−0.69*	[−1.33, −0.05]
Dropping measures of CSI	−2.62***	[−3.17, −2.06]
Dropping measures of changes in local UR	−2.97***	[−3.44, −2.51]
Dropping wave- and city-fixed effects	0.09	[−0.41, 0.58]

***$P < 0.001$, *$P < 0.05$ (two-tail tests).

Table S6. Level coefficients of the local UR and the CSI using alternative functional forms

	(1)		(2)		(3)		(4)	
Variable	*b*	95% CI	*b*	95% CI	*b*	95% CI	*b*	95% CI
% change in local UR								
Improving	0.03	[−0.20, 0.25]	0.05	[−0.18, 0.29]	0.02	[−0.21, 0.25]	0.08	[−0.15, 0.32]
Deteriorating	0.16**	[0.05, 0.27]	0.15*	[0.03, 0.27]	0.16**	[0.05, 0.27]	0.14*	[0.03, 0.24]
% change in CSI								
Deteriorating	0.13	[−0.10, 0.35]	0.14	[−0.09, 0.37]	0.11	[−0.12, 0.34]	0.17	[−0.04, 0.38]
Improving	−0.05	[−0.19, 0.08]	−0.04	[−0.18, 0.10]	−0.06	[−0.19, 0.08]	−0.04	[−0.18, 0.10]
Level of local UR								
Linear	−0.70*	[−1.34, −0.06]	—	—	—	—	—	—
Nonlinear 1								
Local UR	—	—	−0.34	[−2.77, 2.08]	—	—	—	—
Local UR squared	—	—	−0.02	[−0.17, 0.13]	—	—	—	—
Nonlinear 2								
Local UR (logged)	—	—	—	—	−4.47*	[−8.94, −0.01]	—	—
Nonlinear 3								
First quartile (ref.)	—	—	—	—	—	—	—	—
Second quartile	—	—	—	—	—	—	0.87	[−1.85, 3.58]
Third quartile	—	—	—	—	—	—	−0.06	[−2.88, 2.76]
Fourth quartile	—	—	—	—	—	—	−0.25	[−3.70, 3.21]
Level of CSI								
Linear	0.18*	[0.00, 0.36]	—	—	—	—	—	—
Nonlinear 1	—	—	—	—	—	—	—	—
CSI	—	—	−0.34	[−1.59, 0.91]	—	—	—	—
CSI squared	—	—	0.00	[0.00, 0.01]	—	—	—	—
Nonlinear 2								
CSI (logged)	—	—	—	—	11.80	[−1.56, 25.15]	—	—
Nonlinear 3	—	—	—	—	—	—	—	—
First quartile (ref.)	—	—	—	—	—	—	—	—
Second quartile	—	—	—	—	—	—	1.06	[−1.54, 3.67]
Third quartile	—	—	—	—	—	—	4.03	[−0.14, 8.21]
Fourth quartile	—	—	—	—	—	—	6.19*	[1.39, 11.00]

—, indicates that variables corresponding to those dashes are not estimated in the specified models.
$^{**}P < 0.01$, $^{*}P < 0.05$ (two-tail tests).

Table S7. Change rate coefficients without controls for levels of the local UR and the CSI

Variable	All (*b*/95% CI)	T (*b*/95% CI)	CC (*b*/95% CI)
% change in local UR			
Improving	0.07/[−0.16, 0.29]	−0.19/[−0.49, 0.11]	0.31/[−0.02, 0.64]
Deteriorating	0.12*/[0.02, 0.22]	0.16*/[0.02, 0.30]	0.07/[−0.08, 0.21]
% change in CSI			
Deteriorating	0.04/[−0.13, 0.22]	0.22/[−0.03, 0.46]	−0.15/[−0.39, 0.10]
Improving	−0.04/[−0.17, 0.09]	−0.03/[−0.21, 0.15]	−0.05/[−0.24, 0.15]
Wave dummies?	Yes	Yes	Yes
Season dummies?	Yes	Yes	Yes
City dummies?	Yes	Yes	Yes
Covariates?	Yes	Yes	Yes
N	6,492	3,498	2,994

$^{*}P < 0.05$ (two-tail tests).

Table S8. The effect of income change on harsh parenting

Variable	All (*b*/95% CI)	T (*b*/95% CI)	CC (*b*/95% CI)
% change in local UR			
Improving	0.04/[−0.19, 0.28]	−0.22/[−0.53, 0.09]	0.32/[−0.03, 0.67]
Deteriorating	0.22***/[0.10, 0.33]	0.27**/[0.12, 0.43]	0.15/[−0.02, 0.31]
% change in CSI			
Deteriorating	0.18/[−0.05, 0.41]	0.45**/[0.13, 0.77]	−0.11/[−0.44, 0.22]
Improving	−0.05/[−0.19, 0.09]	−0.05/[−0.24, 0.14]	−0.03/[−0.23, 0.18]
Level of local UR	−0.61/[−1.27, 0.05]	−0.57/[−1.45, 0.31]	−0.51/[−1.53, 0.50]
Level of CSI	0.22*/[0.04, 0.40]	0.36**/[0.12, 0.60]	0.05/[−0.21, 0.32]
Income gain (ref.)			
Income loss: 0–10%	0.59/[−2.35, 3.52]	1.90/[−1.82, 5.63]	−0.91/[−5.60, 3.77]
Income loss: 10–35%	0.20/[−2.31, 2.81]	0.53/[−2.76, 4.51]	−0.14/[−3.99, 3.13]
Income loss: ≥ 35%	−0.05/[−1.64, 1.60]	1.14/[−1.37, 3.15]	−1.52/[−3.48, 1.20]
Wave dummies?	Yes	Yes	Yes
Season dummies?	Yes	Yes	Yes
City dummies?	Yes	Yes	Yes
Covariates?	Yes	Yes	Yes
N	6,113	3,309	2,804

***$P < 0.001$, **$P < 0.01$, *$P < 0.05$ (two-tail tests).

Table S9. The association among macroeconomic conditions, the *DRD2 Taq1A* polymorphism, and harsh parenting, using the local employment-population ratios (EPR)

Variable	All (*b*/95% CI)	T (*b*/95% CI)	CC (*b*/95% CI)
% change in local EPR			
Improving	−0.08/[−0.46, 0.30]	−0.20/[−0.69, 0.29]	−0.01/[−0.61, 0.59]
Deteriorating	0.11/[−0.28, 0.50]	0.25/[−0.30, 0.79]	−0.06/[−0.62, 0.49]
% change in CSI			
Deteriorating	0.09/[−0.11, 0.30]	0.30*/[0.02, 0.59]	−0.14/[−0.44, 0.16]
Improving	−0.09/[−0.22, 0.05]	−0.04/[−0.23, 0.15]	−0.12/[−0.32, 0.08]
Level of local EPR	0.01/[−0.10, 0.12]	−0.02/[−0.17, 0.12]	0.04/[−0.13, 0.20]
Level of CSI	0.12/[−0.04, 0.28]	0.21/[−0.01, 0.43]	0.02/[−0.21, 0.25]
Wave dummies?	Yes	Yes	Yes
Season dummies?	Yes	Yes	Yes
City dummies?	Yes	Yes	Yes
Covariates?	Yes	Yes	Yes
N	6,375	3,445	2,930

*$P < 0.05$ (two-tail tests).

Table S10. The association among macroeconomic conditions, the *DRD2 Taq1A* polymorphism, and harsh parenting, estimated from alternative treatments of cross-city movers

Variable	All (*b*/95% CI)	T (*b*/95% CI)	CC (*b*/95% CI)
Local UR based on year-specific city of residence + controlling for movers			
% change in local UR			
Improving	0.08/[−0.15, 0.30]	−0.22/[−0.51, 0.08]	0.36*/[0.02, 0.70]
Deteriorating	0.17**/[0.06, 0.28]	0.25**/[0.10, 0.40]	0.09/[−0.07, 0.25]
% change in CSI			
Deteriorating	0.08/[−0.15, 0.31]	0.36*/[0.05, 0.68]	−0.24/[−0.57, 0.10]
Improving	−0.07/[−0.21, 0.07]	−0.10/[−0.29, 0.10]	−0.07/[−0.28, 0.15]
Level of local UR	−0.74*/[−1.34, −0.14]	−0.53/[−1.36, 0.30]	−0.80/[−1.70, 0.09]
Level of CSI	0.19*/[0.01, 0.37]	0.33*/[0.08, 0.57]	0.05/[−0.21, 0.31]
Movers	−2.72/[−6.16, 0.71]	−0.49/[−5.13, 4.16]	−5.04/[−10.18, 0.10]
N	6,263	3,385	2,878
Local UR based on baseline city of residence + excluding movers			
% change in local UR			
Improving	0.10/[−0.14, 0.34]	−0.21/[−0.52, 0.10]	0.41*/[0.05, 0.78]
Deteriorating	0.17**/[0.05, 0.29]	0.25**/[0.08, 0.41]	0.07/[−0.10, 0.24]
% change in CSI			
Deteriorating	0.10/[−0.13, 0.34]	0.35*/[0.02, 0.67]	−0.15/[−0.50, 0.20]
Improving	−0.05/[−0.19, 0.10]	−0.07/[−0.26, 0.13]	−0.02/[−0.23, 0.20]
Level of local UR	−0.76*/[−1.45, −0.07]	−0.85/[−1.75, 0.05]	−0.54/[−1.60, 0.51]
Level of CSI	0.20*/[0.01, 0.39]	0.30*/[0.05, 0.56]	0.07/[−0.21, 0.34]
N	5,781	3,143	2,638
Wave dummies?	Yes	Yes	Yes
Season dummies?	Yes	Yes	Yes
City dummies?	Yes	Yes	Yes
Covariates?	Yes	Yes	Yes

$^{**}P < 0.01$, $^{*}P < 0.05$ (two-tail tests).

Table S11. G × E interaction effects on psychological harsh parenting and corporal punishment of macroeconomic conditions and the *DRD2 Taq1A* polymorphism

	Psychological harsh parenting		Corporal punishment	
Variable	T (*b*/95% CI)	CC (*b*/95% CI)	T (*b*/95% CI)	CC (*b*/95% CI)
% change in local UR				
Improving	−0.09/[−0.28, 0.11]	0.16/[−0.05, 0.37]	−0.12/[−0.27, 0.03]	0.10/[−0.08, 0.27]
Deteriorating	0.14**/[0.05, 0.24]	0.04/[−0.07, 0.14]	0.08*/[0.01, 0.16]	0.05/[−0.03, 0.12]
% change in CSI				
Deteriorating	0.17/[−0.03, 0.37]	−0.13/[−0.35, 0.08]	0.24**/[0.08, 0.39]	−0.05/[−0.20, 0.10]
Improving	−0.03/[−0.15, 0.08]	−0.03/[−0.16, 0.11]	−0.02/[−0.11, 0.07]	−0.02/[−0.11, 0.07]
Level of local UR	−0.41/[−0.98, 0.15]	−0.26/[−0.92, 0.40]	−0.16/[−0.56, 0.24]	−0.49*/[−0.93, −0.04]
Level of CSI	0.12/[−0.03, 0.28]	−0.07/[−0.24, 0.10]	0.19**/[0.07, 0.31]	0.09/[−0.03, 0.21]
Wave dummies?	Yes	Yes	Yes	Yes
City dummies?	Yes	Yes	Yes	Yes
Season dummies?	Yes	Yes	Yes	Yes
Covariates?	Yes	Yes	Yes	Yes
N	3,498	2,994	3,498	2,994

$^{**}P < 0.01$, $^{*}P < 0.05$ (two-tail tests).