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Family Resemblance in Food and Other Domains: The Family Paradox and the Role of Parental Congruence

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Although families are almost certainly a powerful force for conveying culture-wide preferences, family resemblance for preferences that vary within culture are surprisingly small. This study examines causes of this low correlation, especially in the domain of food preferences. A sample of 118 college students and their current and biological parents completed surveys on food and aesthetic preferences and values. Mid-parent-child correlations were low (mean $r = 0.17$) for preferences, but were much higher for values (mean $r = 0.54$). Mid-parent-child correlations were increased to a modest extent by restricting analyses to parents who were in accord (congruent) with the trait being measured. Furthermore, the children's preferences were not reliably correlated more highly with mother than with father, or with same-sex as opposed to opposite-sex parents. This study refers to the low parent-child correlations, and the lack of a mother or same-sex parent effect as the family paradox, and points to the challenge of accounting for the greater part of variance in food and other preferences.

This paper addresses the surprisingly low parent-child resemblance in preferences, particularly for food. In the domain of food, common sense suggests that culture-wide food preferences are conveyed largely by parents. Yet parent-child correlations for variations in food preference, within culture, are extremely low. Furthermore, contrary to common sense, mother's food preferences are not reliably correlated more highly with the preferences of children than are father's, and parents are not reliably more highly correlated with the food preferences of their same-sex as opposed to opposite sex child.

All of these findings, which I refer to as the family paradox, come under scrutiny in this paper, for both food and aesthetic preferences, and for values as well. One explanation for the low parent-child correlations is that parents may themselves differ on the preferences being sampled (parents would almost invariably be congruent, by definition, on culture-wide items). The "mixed message" sent to the child may obliterate any family resemblance effect.

In this study, using a sample of over 100 families, it is possible to compare parent-child resemblances for families in which parents are congruent or disparate. The purposes of the study are to add to the small literature on parent-child resemblance in preferences and values, to assess the generality of the three aspects of the family

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paradox (low parent-child correlations, absence of mother- and same-sex parent effects), to compare preference and value resemblances, and to determine whether parental congruence can increase the low correlations previously reported.

This paper reviews the three aspects of the family paradox with respect to food, in turn. Correlations between parent and child food preferences run between 0 and 0.30 in the five studies that systematically examine this issue.

Birch (1980) compared the food preferences of preschoolers in an actual food preference test to those of their parents. She computed correlations between the rank order of preference of a set of foods for the parent and child, and compared the means of a set of such correlations to the means of child vs. randomly selected parents of others from her sample ("pseudoparents"). Correlations for child-parent were only slightly higher than those for child-pseudoparent.

Pliner (1983) used a similar procedure with college students and their parents, and a long list of foods for which preferences were indicated by verbal report on a survey. Correlations for parent-child pairs for the pattern of preferences averaged about 0.25 for parent-child pairs, and were about 0.10 for pseudoparent-child pairs.

Pliner & Pelchat (1986) reported similar results. Rozin *et al.* (1984) and Logue *et al.* (1988) conducted a questionnaire study of food preferences among college and high school students and their parents. Both papers reported correlations in the 0-0.30 range for particular foods (Rozin *et al.*, 1984) or groups of foods (e.g. vegetables, junk foods; Logue *et al.*, 1988).

Given the particularly close relationship between mothers and their children in the food domain, from food preparation to feeding itself, children should be more influenced by their mother than father in the domain of food. Rozin *et al.*, (1984) reported slightly higher mother-child than father-child correlations, and Logue *et al.*, (1988) reported that most of their significant parent-child correlations occur in the mother-daughter pairing. On the other hand, Burt & Hertzler (1978), Birch (1980), Cavalli-Sforza *et al.* (1982), and Pliner (1983) found no evidence favoring the mother.

In a test of modelling theory, Pliner (1983) specifically examined whether same-sex parent-child pairs showed higher resemblance and concluded that they do. However, Pliner & Pelchat (1986) in another survey, with younger children as the targets, failed to confirm this relationship.

This set of results raises serious questions about what might determine strongly entrenched food and other preferences. The low family resemblance correlations put a limit on the role of genetic factors. In two of three twin studies these have been demonstrated to be extremely small in the domain of food (Greene *et al.*, 1975, Rozin & Millman, 1986; but see Kronl *et al.*, 1983). Other possible influences on preferences could be siblings or peers (what Cavalli-Sforza *et al.*, 1982, called horizontal transmission), or teachers or media (what they called oblique transmission).

Cavalli-Sforza *et al.* assessed the friend-friend correlations in habits (including what I call preferences), and came up with an average correlation of 0.26, compared to 0.24 for parent-child. Thus, this may be a significant route of transmission (although it could be a component of friend selection, as well). Pliner & Pelchat (1986) reported correlations of around 0.50 for food preferences of young siblings, suggesting an even more powerful role for this route of transmission. The only remaining social alternatives for the rest of the variance (besides error) would be summed influence of all siblings, elders and acquaintances. Non-social influences would include various forms of Pavlovian conditioning, with food tastes or postingestional

events as the US, or mere exposure (although availability of food usually has strong social determinants).

This study differs from most of its predecessors because of its relatively large sample size, consideration of both preferences and values, and because a parental congruence analysis has been done to identify the role of this potentially important factor.

METHODS

The subjects for this study were the students in an introductory psychology lecture class taught by the author, and their parents. The survey on family resemblance was a class project; some of the questions were suggested by students, and all of the data were shared with the class. A 59-item questionnaire (occupying both sides of an 8 x 11 inch page) was distributed to each of the students in the class. Students filled out the questionnaire in class. They also mailed two blank copies of the questionnaire to their parents, to be returned to the instructor. For the parental "package", students were given the two questionnaires, a parental instruction page, and a stamped envelope addressed to the author, all to be placed in another stamped envelope that was also given to the student. This procedure proved to be very effective because the parents received an envelope addressed in their own child's handwriting. In addition, the author urged each student in the class to write a brief note to the parent on the blank space at the bottom of the parental instruction form. Parents of students in college know how valuable a communication from their child is, and it is presumed that this note helped increase the return rate, which was high. Parents were instructed to fill out the forms separately, without consultation, and to return them in the stamped addressed envelope.

The parental questionnaires were identical to the student questionnaire, except that they included the following two questions at the bottom: "I am the biological parent of the Penn student (child) in Psychology 1 Yes/No" and "I have lived with this student (child) continuously for his or her life, except for vacations or periods at school. Yes/No". The data for this study consist of the 118 complete sets for which both parents responded "yes" to both of these questions.

The questionnaire asked for standard demographic information. The material analysed for this study included 12 questions about food preferences (selected to yield high variability within items, and including beverages and tobacco), four about aesthetic preferences, and four about values. The questions are listed in Table 1. Preference questions employed a standard 9-point hedonic scale (9 = like extremely, 8 = like very much, 7 = like moderately, 6 = like slightly, 5 = neither like nor dislike, 4 = dislike slightly etc., with 0 = cannot answer, never tried).

For the analyses in this paper, the data for any pair in which a zero appeared were discarded. Two of the value items were bipolar scales (conservative/liberal, religious/not religious) (Table 1). Subjects rated themselves on a 9-point scale (laid out on a line with the numbers 1-9 at half-inch intervals along a line), with the guidelines illustrated for shy/outgoing (an item not included in the current analysis) 1 = extremely shy, 2 = very shy, 3 = moderately shy, 4 = slightly shy, 5 = neither more shy nor more outgoing, 6 = slightly outgoing, 7 = moderately outgoing, 8 = very outgoing and 9 = extremely outgoing. Two value questions were responded to on a standard five point scale (1 = disagree strongly, 2 = disagree somewhat, 3 = neither

TABLE 1
 Questions and correlations for different pairings (values are Pearson *r*s without decimals)

Question	Ma-Fa	Ma-Ch	Ma-Dau	Ma-Son	Fa-Ch	F-Dau	F-Son	Mid-Ch	Ma-Fa ≤ 1 (Congruent)	Ma-Fa > 2 (Discongruent)
FOOD										
Lima beans	29*	17	14	16	03	10	-09	13	13	-11
Sauteed chicken livers	20	26	26	21	-01	06	-14	17	08	-01
Cheddar cheese	11	07	01	-01	04	17	-18	07	11	21
Whole wheat bread	15	24*	34*	04	01	18	-12	16	05	27
Mashed potatoes	03	-15	-12	-20	09	16	-02	-03	05	18
Broccoli	26*	-05	-02	-04	03	-03	-09	-01	00	18
Black Olives	-05	11	05	08	11	02	27	16	30	-06
Hot sauce on foods	30*	31*	22	44*	25*	24	23	35*	35*	39*
Black coffee	36*	16	33*	-11	21	25	14	23*	31	09
Beer	13	19	07	34	39*	35*	45*	38*	59*	36*
Cigarettes	12	-13	-19	02	01	-05	08	-07	-08	-29
Medium-rare beef steak	14	31*	19	54*	15	08	28	32*	40*	15
AESTHETIC										
Classical	38*	27*	34*	16	30*	36*	23	34*	27*	58*
Jazz	33*	23*	22	29	17	16	20	25*	22	08
Rock	31*	14	18	12	09	10	09	14	14	25
Poetry	10	27*	24	23	04	04	02	20	20	23
VALUES										
Conservative/liberal	56*	65*	65*	62*	43*	50*	32	59*	72*	36
religious/not religious	35*	43*	41*	44*	47*	50*	43*	55*	63*	36
Homosexuality ^a	55*	34*	34*	33	30*	36*	23	36*	45*	12
Abortion ^b	71*	65*	65*	65*	61*	58*	66*	68*	74*	39

All items but last two (homosexuality and abortion) rated on 9-point scales.

^aHomosexuality is immoral^c (rated on 5-point agreement scale).

^bAbortion is immoral and should be illegal^c (rated on 5-point agreement scale).

^cThis high correlation is not significant because it is based on only nine subjects. Almost all parents were congruent for liking classical music. No other *n* in the congruent/discongruent comparisons is below 18.

* *p* < 0.01, one-tailed.

agree nor disagree, 4 = agree somewhat and 5 = agree strongly). The specific questions, dealing with homosexuality and abortion, are listed in the footnote to Table 1.

The course registration numbered 250, and 205 students returned forms on the day that they were distributed. From these forms, 118 complete family sets, including both biological/current parents, were assembled. Of the 87 students not included in this final sample, 12 were eliminated because at least one of their parents was not the biological parent, while the remaining 75 were incomplete; usually forms from one or both parents were missing, or, less commonly, one of the forms was not completed correctly. If this was true for any family member, that family was eliminated from the analysis on the relevant question. The sample that resulted has two possible sources of bias, first because it was selected from students at a private eastern university, and second because the return rate of 58% (for completed families) may itself represent a non-random selection of the total student body.

There were at least 100 complete sets of family data (out of a possible 118 sets) for all questions except two. The exceptions were liver (*n* = 73) and cigarettes (*n* = 87), both resulting from a substantial number of "never tried" responses. If any family member wrote zero, the family was eliminated for that particular item.

The mean age of the students was 18.6 years (*SD* = 1.0) for the 72 daughters and 18.7 years (*SD* = 1.0) for the 46 sons. The mean age of the mothers was 46.0 years (*SD* = 3.7) and the fathers 48.92 years (*SD* = 4.9). In terms of religion of the students (children), 43% were Jewish, 28% Catholic, 14% Protestant and 15% other. Ninety per cent of the students were white.

Congruence was defined as a parental difference of one or zero on the scale in question. Discongruence was defined as a parental difference greater than two. Therefore, parent pairs with a scale difference of two were eliminated from the analysis.

RESULTS

We employ the Pearson *r* as a measure of the covariation between any two family entities. This paper considers the results in terms of a series of questions about family resemblances. The questions are, in order, the relation between spouse and parent-child resemblance and the extent to which resemblance is a function of category of question, the effect of parental congruence, the effect of sex of parent, and the effect of same vs. opposite sex parent.

All of the correlational data for each question are presented in Table 1, which also constitutes a list of the questions. There are no appropriate inferential statistics to deal with sets of correlations when these come from non-independent samples (same subjects, and questions that correlate with one another, such as preference for beer and cigarettes, or attitudes to abortion and homosexuality). This study presents the combined data without statistical tests, though the significance of individual *r* values is evaluated. Given the multiple measures of resemblance I adopt *p* < 0.01 (one tailed) as the criterion of significance.

Spouse vs. Parent-Child Comparisons and Question Category Effects

As can be seen in the data displayed in Table 2, spouse resemblance (*r* = 0.27 over all questions) is of the same order as mid-parent-child resemblance (*r* = 0.25) (the

TABLE 2

Comparison of mother-father and mid-parent-child scores
(values are Pearson r values without decimals)

Category (No. items)	Pearson r		No. MaFa > MidP*
	Ma-Fa	MidP-Ch	
Food (12)	17	16	7/12
Aesthetic (4)	28	21	3/4
Values (4)	54	54	2/4
All (20)	27	25	12/20

*Number of mother-father correlations larger than mid-parent-child correlations, or number of mother-father differences smaller than mid-parent-child differences.

mid-parent value is the average of the mother and father values). Eleven out of 20 spouse correlations and ten out of 20 mid-parent-child correlations are significant. There are no significant differences in correlation between spouse and mid-parent-child. For 12 of the 20 measures, the spouse correlation was higher than the mid-parent-child.

The pattern of data, analysed in terms of correlations, indicates modest relations with a range of -0.5 to 0.38 for preferences. For values, (political, religious and moral attitudes), correlations are much higher, with a range of 0.35 to 0.71 (mean 0.54 for both spouses and mid-parent-child) (Table 1).

In the domain of preferences, the highest correlations are for musical tastes and two types of strong food: hot sauce and black coffee.

Effects of Parental Congruence

There is a small effect of congruence in increasing correlation between mid-parent and child (Table 3). The overall correlation for congruent parents with child was 0.28 as opposed to 0.18 for non-congruent parents. Overall, for 12 of 20 measures, the

TABLE 3

Comparison of congruent and incongruent parent mid-parent-child resemblance
(values are Pearson r values without decimals)

Category (No. items)	Parental congruence		
	≤ 1	> 2	No. ≤ 1 $> 2^*$
Food (12)	18	11	7/12
Aesthetic (4)	21	28	1/4
Values (4)	64	31	4/4
All (20)	28	18	12/20

*Number of cases in which more congruent parents show higher correlation.

congruent parents were more highly correlated with their children than the incongruent parents. The preponderance of exceptions were in the aesthetic domain.

In the food domain, the corresponding values are 0.18 and 0.11 . Overall, eight congruent and two incongruent individual r values were significant (Table 1). (However, note that both groups have reduced n s because they represent a split of the sample, with differences of two eliminated from either category. Because of spouse resemblance, the incongruent parent sample is smaller, and hence requires a higher r to reach significance). With the reduced n , no congruent/incongruent correlation difference reached significance.

Substantially higher correlations (0.20 or more difference in the direction favoring congruence) are observed for lima beans, black olives, black coffee, beer and steak among foods, and on all four value questions. (There is a difference of more than 0.20 for classical music in the direction opposite to that predicted. However, this results from a high incongruent parent correlation (0.58) based on only nine subjects, by far the smallest sample in the congruence-incongruence comparisons).

There is a very large effect of parental congruence for values, with a correlation of 0.64 for congruent parents, and 0.31 for incongruent parents. It appears that congruent parents produce a modest effect in increasing family resemblance. However, the effect is sporadic. Thus, in almost half of the cases, the congruent parents were not more correlated or more similar (Table 3). However, in most of those cases where there was an effect in the predicted direction, it was substantial in size.

Mother vs. father effects

The results are consistent with the ambiguity in the literature on superiority of mother effects (Table 4). There is a slight effect favoring the mother; 12.5 (one tie) out of 20 (n.s.) effects are greater for mother- than for father-child. Similarly, mother correlations average 0.22 as opposed to 0.19 for father correlations. Ten mother and seven father individual correlations reach significance. Notably, in the area of food, where there have been conflicting reports, the effect is almost non-existent (0.12 mother vs. 0.11 father). Items on which there is a difference of at least 0.20 in correlation are liver, wholewheat bread, poetry, and politics, favoring the mother, and mashed potatoes and beer favoring the father (Table 1). The only significant difference in correlations is for conservative/liberal, favoring the mother. The overall conclusion is that mother effects are almost the same as father effects.

TABLE 4

Comparison of mother and father effects on children
(values are Pearson r values without decimals).

Category (No. items)	Parental congruence		No. MaCh > FaCh
	Ma-Ch	Fa-Ch	
Food (12)	12	11	6.5/12
Aesthetic (4)	23	15	3/4
Values (4)	52	45	3/4
All (20)	22	19	12.5/20

TABLE 5
Comparison of same vs. opposite sex parents
(values are Pearson *r* values without decimals)

Category (No. items)	Mother-Child			Father-Child		
	Ma-Dau	Ma-Son	No. MaD > MaS	Fa-Dau	Fa-Son	No. FaS > FaD
Food (12)	11	12	6/12	13	07	4/12
Aesthetics (4)	24	20	3/4	16	14	1/4
Values (4)	51	51	2.5/4	48	41	1/4
All (20)	22	21	11.5/20	21	15	6/20

Same-sex parent effects

Mother-daughter resemblance is about the same as mother-son resemblance (Table 5). For fathers (Table 5), there is a tendency towards greater similarity to daughters (opposite-sex pairing), especially for food and values. No son vs. daughter correlation differences reach significance. Seven mother-daughter, five mother-son, six father-daughter and three father-son correlations reach significance (note the lower *n* for son comparisons). The results support weakly a greater effect of parents on daughters than on sons.

DISCUSSION

With the exception of values, almost all family correlations are low. Therefore, the various pairings used in this analysis do not account for most of the variance in preferences. The first conclusion, supporting Cavalli-Sforza *et al.* (1982), is that family resemblance, with a presumably very small genetic component, accounts for a good deal of variation in values. It is conceivable that the much higher value correlations result, in part, from higher variability in the value measures. There is somewhat higher variability in these items (standard deviation averages 53% of the mean), compared to aesthetics (26%) and food (44%), but the food-value difference in variation is not that great.

Starting with the mid-parent-child correlation as a base, the only sub-analysis in this study that notably increased this correlation for any of the categories was parental congruence. No other subdivision, same-sex or separating mother and father effects increased this value. Congruence of parents did so, modestly, in all but the aesthetic case. (A 0.58 correlation between mid-parent and child incongruent classical music preferences, based on a small *n*, dominated the summary figures on aesthetics.) The good news is that the paper identifies a factor that has some effect, and reduces part of the family paradox to a small extent. The bad news is that the other possible factors (parental differences, same-sex differences) remain very small, so that most of the family paradox remains to be explained.

Mother-father correlations are slightly higher than the other correlations. Our values for mother-father effects are generally in line with those in the literature (Price & Vandenberg, 1980; Cavalli-Sforza *et al.*, 1982; Rozin *et al.*, 1984). Spouse resemblance results from assortative mating and common marital environment. Price and Vandenberg showed that for most measures, but not for food use (as opposed to preference, which was not measured), assortative mating accounts for almost the entire effect. It is of interest that in this study, spouse and mid-parent-child food preference correlations are almost identical, and, in terms of experience, both groups share between 15-25 years of common environment.

The positive results on congruence represent a first analysis of the sort, and so do not bear comparison to other studies. Although correlation differences are not significant, this is partly because of the small *n* in the incongruent group in many cases. Correlation differences greater than 0.3 occur for black olives, and three of the four value measures (it is rather rare to find parents disparate in values). Only one measure, classical music preference (with a very small incongruent *n*), shows an effect greater than 0.3 units in the opposite direction.

The mother vs. father results are in agreement with the results of Cavalli-Sforza *et al.* (1982) for values, and the prior literature on food preferences. The minimal (if any) effect this study shows stands right in the center of the distribution of previous results. This particular arm of the paradox may be accounted for, in part, by the fact that although mothers more often choose and prepare the foods eaten by the family, their shopping and preparation is more influenced by their husband's food preferences than their own (Burt & Hertzler, 1978; Weidner *et al.*, 1985). (For the case of aesthetic and moral preferences, there is less reason to expect a mother effect, since the special, traditional relationship of mothers to food does not hold in the morals or aesthetic domain.)

The same-sex effect adds more evidence to the lack of same-sex modelling as a mechanism in the acquisition of preference. The data weakly support the finding by Logue *et al.* (1988) that daughters are more susceptible to family influence than are sons. The most striking finding here is the slight but consistent tendency of daughters to resemble their fathers more than sons resemble their fathers.

We are left with the family paradox substantially intact, and hence the question of the sources of variance in preferences. Genetic factors and family influence account for a very small part. One possibility is that family resemblance is greater than has appeared in this or previous studies. Preschoolers and college students, the two sources of "children" are not representative of stable adult preference patterns. Perhaps a study done comparing 30 year olds and their 50-year-old parents would show higher values. However, it seems unlikely that there would be major changes in correlations with this improved study design. Error, unreliability or low variance in liking scores might have reduced the correlations. However, the high value correlations in this same sample and the substantial variability in food liking scores argues against such an interpretation.

The most promising loci for sources of variance are peers and siblings (for which there is positive evidence; Cavalli-Sforza *et al.*, 1982; Pliner & Pelchat, 1986), teachers and media (for which there is little direct evidence), and individual idiosyncratic experience, for example, those that account for taste aversions. Given the centrality of food in daily life, and the importance of food habits for health, further clarification of these issues seems warranted. If one is looking for variance to explain, the domain of preferences still offers a fertile field.

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