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Similarity in Married Couples: A Longitudinal Study of Mental Abilities and Rigidity–Flexibility

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Longitudinal changes in couple similarity on the Primary Mental Abilities and the Test of Behavioral Rigidity were studied over 7-year intervals from 1956 to 1984 in 169 couples from the Seattle Longitudinal Study. Positive, initial intraclass spousal correlations were significant for verbal meaning, inductive reasoning, word fluency, educational aptitude, intellectual aptitude, attitudinal flexibility, psychomotor speed, and social responsibility, as well as age and education. After age and education had been controlled, significant increases in spousal similarity were found for verbal meaning and intellectual ability over 14 years and for attitudinal flexibility over 21 years. The higher functioning spouses' word fluency influenced the lower functioning spouses' verbal meaning and word fluency over time. Couples who became more similar over time involved husbands in higher occupations and wives with fewer changes in profession.

How similar are married couples on various traits and abilities, and why? This question is important to researchers in a number of areas, including sociology, personality psychology, and behavioral genetics. Early research on psychological patterning in marriage was concerned with spousal similarity (Tharp, 1963), and spousal similarity on personality measures has also been examined with regard to marital satisfaction (Cattell & Nesselroade, 1967; Russell & Wells, 1991). Researchers use the terms *assortative mating* and *assortative marriage* when investigating whether couples are similar or dissimilar. Vandenberg (1972) defined assortative mating as "any systematic departure from random mating or panmixia" (p. 128).

Reviews of the assortative marriage research have found evidence of similarity (positive assortativity) between couples on many variables, especially age, education, and intelligence (Murstein, 1980). Correlations for age can vary greatly from sample to sample. For example, Zonderman, Vandenberg, Spuhler, and Fain (1977) found an age correlation of .97 for their study of 123 couples at the University of Colorado. However, Watkins and Meredith (1981) found a correlation of only .49 for their 215 couples from the San Francisco area. Couples also appear to be very similar in educational background. Warren (1966) found that correlations between spouses for number of years of schooling ranged between .39 and .70 in age–race subsamples of a large national sample, with spousal correlations of .60 or greater in 9 of the 13 subsamples. Heath et al. (1985), using a large Norwegian data set of twins and their spouses (N = 6,148) married from 1915 to 1960, found intraclass Spearman rank correlations of .51 to .59. In a sample of twins and spouses from Virginia (N = 1,700 couples), the overall correlation was .62 (Heath, Eaves, Nance, & Corey, 1987). In terms of general intelligence, Vandenberg (1972) reviewed the early literature in the field; intraclass correlations in the studies he cited ranged from .44 to .60. Jensen (1978) reviewed the literature from 1928 to 1974 on mental ability and found a median spousal correlation of .44 across studies.

Correlations are lower for more specific cognitive variables than for general intelligence. Age-adjusted correlations on specific abilities range from only .10 to .20 (Vandenberg, 1972). The verbal factor appears to be the highest, with age-adjusted spousal correlations of .30 to .41 in more recent studies (Watkins & Meredith, 1981; Zonderman et al., 1977). Spousal correlations are lower on personality traits than on cognitive tasks, again ranging from .10 to .20 (Vandenberg, 1972).

Many disciplines have examined questions of spousal assortativity. However, this topic has been given primary attention by behavioral geneticists because of the implications for the genetic makeup of offspring (Buss, 1984b). Assortative mating may result in underestimates of the heritability of various traits by increasing the additive genetic variance shared by fraternal twins, whereas the variance for identical twins remains constant

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(Plomin, DeFries, & McClearn, 1980). Conversely, assortative mating may overestimate heritability as obtained from parent–offspring correlations; a correlation between one parent and a child includes not only that parent–child genetic similarity but also some part of the genetic similarity between the child and the other parent. To avoid the latter problem, behavioral geneticists have used "midparent scores" (the average parental score) instead of estimates from just one parent (Plomin, DeFries, & McClearn, 1980). Assortative mating can also affect the distribution of traits in a population (Jensen, 1978).

Much of the research done by behavioral geneticists on assortative marriage has focused on cognitive abilities and personality variables. Their inquiries into why spouses are similar on many traits and abilities and why spouses who are married longer appear even more similar have led to four possible explanations (Price & Vandenberg, 1980): (a) couples who marry are alike initially, and this fact accounts for all of the spouse similarity, (b) couples' levels of functioning on abilities converge as a result of shared living conditions or reciprocal influence, (c) couples who are dissimilar are more likely to divorce or separate, and (d) couples are similar in age, so ability similarity may be a product of age similarity. Several studies have examined these explanations of assortative marriage for cognitive abilities (Buss, 1984a; Price & Vandenberg, 1980; Watkins & Meredith, 1981; Zonderman et al., 1977). This body of research supports explanations of initial assortment. Effects of age similarity have been shown not to explain the initial assortment or increased assortment for cognitive abilities and personality (Mascie-Taylor & Vandenberg, 1988; Neale & McArdle, 1990; Phillips, Fulker, Carey, & Nagoshi, 1988). Evidence for assortativity resulting from convergence of phenotypes has not been found (Guttman & Zohar, 1987; Watkins & Meredith, 1981). Further research into other covariates that might explain couple similarity on cognitive and personality measures has shown that assortment on these measures appears to be independent of initial spousal similarity in education, social class, propinquity, and size of family of origin (Mascie-Taylor & Vandenberg, 1988; Phillips et al., 1988), although assortment on education may explain much of the assortment on IQ (Neale & McArdle, 1990).

Research in this area has one major drawback: All of it has been done cross sectionally. Yet researchers attempt to draw inferences about the influence of cohort effects using only one cohort and attempt to draw inferences about the change in correlations over time at only one point in time. For example, Watkins and Meredith (1981) compared new marriages and long-standing marriages examined in other studies and concluded that the degree of resemblance in couples does not change over time. However, if their comparisons with the other two studies they cited are examined, significant differences are found on some abilities (the newlyweds differed from one of the two other groups but not both). A striking example of this difference is the visual memory factor, on which the newlywed sample differed significantly from the Colorado sample cited (correlation of .07 vs. .35) but not from the Hawaii sample (correlation of .07 vs. .00).

Aside from problematic differences in the samples used for comparison, cross-sectional designs confound cohort effects with age (and length of marriage). In a literature review of correlations between spouses on different abilities, Jensen (1978) found a mean correlation of .42 for all tests (with a range of .30 to .60). However, Johnson, Ahern, and Cole (1980) noted that the spousal correlations cited by Jensen varied substantially. By examining the studies chronologically, they determined that spousal correlations decreased over time. Studies from 1928 to 1946 had a mean spousal correlation of .47, whereas more recent studies (1962–1979) found a mean correlation of .29. Johnson et al. (1980) postulated that a decrease in the use of intelligence measurements involving verbal ability, changes in test reliability, or changes in assortative marriage could have caused this decline.

Watkins and Meredith (1981) dismissed cohort effects in their cross-sectional study by simply noting that most of the couples in their comparison studies were married after World War II. Although Johnson et al. (1980) found a significant shift in assortativity after 1946, that does not necessarily mean that correlations have remained constant since then. Mare (1991) examined large U.S. population studies and found that the educational association for spouses increased from the 1930s through the 1970s and was then stable or decreased slightly in the 1980s, which might suggest similar changes in cognitive abilities.

Furthermore, the cohort trends Johnson et al. (1980) reported in intelligence do not differentiate among cognitive abilities. Because different abilities have different cohort trends in individuals (Schaie, 1983), it would be reasonable to suspect that spousal correlation trends for these abilities may be affected by cohort differences as well. Such cohort effects may make cross-sectional data problematic for the assessment of time-related changes (Schaie, 1965). Behavioral geneticists have become concerned with cohort changes only recently and have not fully studied this phenomenon and its implications for their research (Coon, Carey, & Fulker, 1990; Schaie, Plomin, Willis, Gruber-Baldini, & Dutta, 1992).

Although we are aware of no previous longitudinal investigations of cognitive ability in married couples, one study has examined the similarities between members of a longitudinal data set and their spouses; that is, the spouses were tested only once (at a latter testing point, in 1969 to 1972), but their data were compared with the longitudinal data for the study members. Eichorn, Hunt, and Honzik (1981) found that, in the adult longitudinal samples from the Institute of Human Development, the concurrent correlations between 184 sample members and their spouses were identical for both education and IQ (.50 for men and .40 for women). However, "instances of considerable differences in IQ were noted" (Eichorn et al., 1981, p. 105). Although the Institute of Human Development data suggest that spouses influence each other on IQ, it is not possible to determine whether changes occurred from initial levels of similarity for both spouses. In addition, these data consist of only one measure of overall intelligence (the Wechsler Adult Intelligence Scale; Wechsler, 1955) and no specific information is given for cognitive abilities.

The only longitudinal study of personality (specifically values and attitudes toward marriage) of which we are aware found no increase over time in similarity on these measures in a sample of couples from the Kelly Longitudinal Study (Caspi, Herbener, & Ozer, 1992). However, results suggested that the shared environment of the couples played a major influence in maintaining

the degree of similarity in the 165 couples studied over 20 years (from the 1930s to the 1950s). To our knowledge, similar research has not been conducted on cognitive abilities or on other personality measures.

In addition to the methodological concerns of the lack of longitudinal research on assortative marriage, the study of spousal similarity over time has theoretical implications. A number of researchers have pointed out how assortative marriage is a wonderful example of person–environment interaction or "niche picking" (Buss, 1984b; Caspi & Herbener, 1990; Plomin, DeFries, & Loehlin, 1977; Scarr & McCartney, 1983). Niche picking occurs when people select environments that are consistent with prior genetic or environmental traits or abilities and reinforces earlier tendencies in development. Caspi and Herbener (1990) have theorized that assortative marriage may be one way in which environments are chosen that help to maintain the stability observed in personality in adulthood.

Although the stability of personality in adulthood is fascinating, substantial stability (at least until after age 60 and in the absence of disease) has also been observed in cognitive abilities (Schaie, 1983). Furthermore, shared environment, the effect whereby environment of family of origin influences family members to become more similar, has been demonstrated only for cognitive ability measures in childhood (Plomin, 1986; some effect of shared environment in personality has been indicated in adulthood [see Kaprio, Koskenvuo, & Rose, 1990]). All other measures have failed to show a shared environment effect, such that the primary effect of family environment in childhood makes siblings more dissimilar than expected (nonshared environment; Plomin, 1986). The shared environment effect for cognitive abilities appears to decline after adolescence (Plomin, 1986; this hypothesis is also being examined with the Seattle Longitudinal Study data set [see Schaie et al., 1992, 1993]). However, whereas behavioral geneticists have focused their attention on childhood family of origin to measure environment, adults may experience different family environmental effects. Marriage (usually) involves genetically unrelated individuals who live together and may be as valid a method to study the effects of environment on development as adoption or twin studies, once the effects of initial assortment plus any convergence resulting from other extraneous influences can be taken into account (e.g., aging changes). A similar argument has been put forth by Caspi and Herbener (Caspi & Herbener, 1990; Caspi et al., 1992) in the realm of personality; because the evidence for shared environment is greater and the initial observed spousal similarity is higher for cognitive abilities than personality, however, cognitive abilities may provide an even stronger test of shared environmental effects. The family of origin shared environmental effect on cognition in adulthood may be mediated by the selection of an adulthood family through marriage or other relationships.

Nonfamilial environmental effects on cognitive aging have been demonstrated in a number of studies; work environment, life-style, and leisure activities have been shown to differentiate those who remain stable or decline on cognitive abilities over time (Gribbin, Schaie, & Parham, 1978; Perlmutter & Nyquist, 1988; Schaie, 1990; Schaie & O'Hanlon, 1990). A finding of couples becoming more similar over time would be striking, considering that research shows increased variance with age and also considering the role that prevalent chronic diseases in elderly people may play in cognitive aging (Gruber-Baldini, 1991; Hertzog, Schaie, & Gribbin, 1978; Schaie, 1983). The role of the family environment has not often been studied in adulthood, although research on work complexity suggests transference from work to family in type of leisure activities (Miller & Kohn, 1983). Indeed, shared leisure activities and other lifestyle influences may underlie the process by which partners influence each other's intellectual abilities. Shared time or some sort of shared identity may be important to married couples, unlike children in a family, in which sibling rivalry may interfere. Findings that marital satisfaction is related to similarity, at least for personality, may suggest the importance of this process in a marriage (Cattell & Nesselroade, 1967; Russell & Wells, 1991).

A spouse's influence on his or her partner may vary by ability. Cognitive abilities have different rates of change with age (Schaie, 1983). Other environmental effects have been found to vary by age and ability; the effects of leisure activities on cognition are strongest for older people on crystallized intelligence tasks (Perlmutter & Nyquist, 1988; Schaie & O'Hanlon, 1990). Research also suggests that shared family effects in childhood are greater for verbal abilities than other cognitive abilities (Plomin, 1986; Schaie et al., 1992). If shared environmental effects in childhood vary by ability, the effects of a shared environment in marriage may also vary across abilities.

The need for longitudinal investigation of spousal similarity is apparent. The current study addressed the issues of marital assortativity on cognitive abilities and rigidity–flexibility using a subsample from the SLS. The SLS was not designed to be a study of marital assortativity; the inclusion of couples occurred by happenstance. The SLS is primarily a study of adult psychometric intelligence. As such, measures involve cognitive abilities and rigidity–flexibility (a personality measure hypothesized to affect cognitive functioning; Schaie, 1983). The advantage of the use of this archival sample is that measures of multiple cognitive abilities in couples studied longitudinally are available immediately. However, because this sample was not designed specifically to answer questions about marital assortativity, there are some disadvantages. Chiefly, the couples' first measurement may occur at any point in their marital relationship. Thus, we had no true measure of initial assortment; we were able to control only for the observed similarity in the couples' first measurement point in the SLS (which may be as newlyweds or may be 50 years into their marriage). Thus, the terms *initial* and *earlier* in this article refer to the couples' first measurement in the SLS. Measurement points were the SLS's 7-year intervals and were not organized around the cycle of a marriage. Another disadvantage is that other variables that might be of interest to those studying couples are not always available (e.g., measures on family of origin, marital satisfaction, and marital attitudes). Keeping these limitations in mind, however, the SLS can provide much-needed longitudinal data on marital assortativity.

Specifically, this study examined four questions: (a) to what degree are couples' scores on cognitive and rigidity–flexibility measures similar, and does spousal similarity vary across abilities? (b) does convergence of phenotypes occur over the years of a marriage in the SLS, or do earlier levels of couple similarity remain stable? (c) is the level of similarity observed cross sec-

tionally attributable to spousal similarity on background variables such as age or education, and do these variables influence changes in the degree of similarity over time? and (d) if convergence occurs, is it a product of both spouses changing (e.g., regression to the couple's mean), or is one spouse more likely to move closer to the other's level of functioning over time?

Method

Participants

This study included 169 married couples drawn from the SLS, a longitudinal-sequential study of psychometric intelligence in adulthood. The SLS has been described in detail elsewhere (Schaie, 1983); a brief summary of the parent sample is presented here.

The SLS has collected data on more than 4,000 participants between 22 and 90 years of age. Participants were selected randomly from within gender and age-cohort groups from the membership of a large health maintenance organization in the Seattle, Washington, area. At each time of measurement, 25 male and 25 female participants per year of birth were asked to participate in the study. Some refused; those who accepted were tested. Data were collected in 1956, 1963, 1970, 1977, and 1984. In each of these years, new participants were recruited over the original age range (22–70 years) plus an additional 7-year interval to match the ages reached by the original sample.

The participants in the present study were couples who participated in the SLS together. The inclusion of both partners was a random event; couples were not specifically recruited as such. Couples were identified through shared health maintenance organization insurance numbers and verified at each time of measurement by examining a self-report question on "spouse's year of birth" and comparing it with the actual year of birth of the supposed spouse. Any discrepancy in birth years (more than 2 years) or any change in reported marital status resulted in the elimination of data from that couple for that specific time point. Only couples who participated in the study (and remained married to each other) for at least two times of measurement (a 7-year interval) were included.

A 7-year interval was used as the unit of analysis in this study because the couples have been married for different lengths of time. Of the 169 couples, data were available over 7 years for 150 couples, over 14 years for 106 couples, and over 21 years for 66 couples. Data were also available over 28 years for 22 couples; however, these data were not included in our analysis because of the small sample size. In the 14-year data set, 87 couples provided data at all three points of measurement; 19 couples "missed" the middle testing point. In the 21-year data set, 56 of the 66 couples provided data at all four points of measurement. Thus, these 7-year subsamples were "embedded"; they were not independent samples.

A further breakdown of the couples in each data set and the points at which they entered the SLS are presented in Table 1. The first wave of the SLS (1956) contributed 65 couples, the second wave (1963) contributed 93 couples, and the third wave (1970) contributed 11 couples. The number of couples in each sample differed for two reasons. First, the SLS differed in sample recruitment and retention by sample. There were 500 participants recruited for the entire SLS sample in 1956, 996 in 1963, and 705 in 1970 from which to obtain couples (Schaie, 1983). Second, the use of sampling without replacement in the SLS up until 1970 probably decreased the number of potential couples in 1970, because one or both spouses had a higher probability of having been previously contacted about participation. Table 1 also lists the initial age ranges of the couples in each data set, broken down by time of entry into the study.

At the initial point of measurement, participants ranged from 22 to 79 years of age and had been married between 1 and 54 years. Participants in the three groups had similar educational, economic, and occupational backgrounds. The average age at initial testing were 46.1 for men and 43.8 for women. Spouses differed in age by an average of 2.1 years (with men being older), and age differences ranged from the wife being older by 23 years to the husband being older by 16 years. The couples had an average of 2.5 children at the initial testing point (SD = 1.5, range = 0–9). Mean occupational levels were 6.5 (SD = 1.7) for men and 6.0 (SD = 1.5) for women on a 10-point scale ranging from *unskilled laborer* (1) to *professionals* (10; 6 = *clerical and sales* and 7 = *proprietor/manager*). Mean educational levels in years were 13.2 for women and 13.9 for men (range = 6–20 years). No pronounced differences were observed between the men and women in the sample.

Measures

The measures analyzed in this study included the Thurstone Primary Mental Abilities Test (PMA; L. L. Thurstone & Thurstone, 1949), the Test of Behavioral Rigidity (TBR; Schaie & Parham, 1975), and a personal data form given to participants throughout the SLS. These are the only measures in the SLS given at all measurement points.

The 1948 version of the PMA used in this study includes the following subtests: Verbal Meaning, a test of recognition vocabulary; Spatial Orientation, a test measuring object rotation in two dimensions; Inductive Reasoning, a test that involves the identification of patterns in a letter series; Number, a test of addition skills; and Word Fluency, a test of one's ability to retrieve words from long-term storage based on a lexical rule. In addition to the five ability tests, two composite indexes were obtained from the PMA. The first was a measure of intellectual ability yielded by a weighted linear combination of the subtest scores [Verbal Meaning + Spatial Orientation + (2 × Inductive Reasoning) + (2 × Number) + Word Fluency]. This measure is similar to a conventional deviation IQ. The second composite index was a measure of educational aptitude predictive of performance in educational settings (T. G. Thurstone, 1958). This composite was obtained by summing the Verbal Meaning score multiplied by 2 and the Inductive Reasoning score.

The TBR was designed to measure the ability of an individual to adjust to the stress imposed by constant environmental change (Schaie & Parham, 1975). The TBR assesses three dimensions: motor–cognitive flexibility, attitudinal flexibility, and psychomotor speed. Motor–cognitive flexibility refers to the ability to shift from one task to another. Attitudinal flexibility is the ability to perceive and adjust to new and unfamiliar patterns and interpersonal situations. Psychomotor speed reflects the rate of emission of familiar cognitive responses. In addition to the three TBR rigidity–flexibility factor scores, a social responsibility score can be obtained. Social responsibility is conceived as one's sense of commitment, dependability, integrity, trustworthiness, and obligation to a group (Gough, McCloskey, & Meehl, 1952; Schaie, 1959).

Various demographic and other information was obtained from a personal data form filled out by the participants. The form surveys background characteristics such as age; education; occupation; number of children; number of changes in jobs, professions, and place of employment in the last 5 years; life satisfaction; and job satisfaction. It has been administered to all participants since the inception of the SLS (see Schaie, 1983, for more information).

Data Analyses

Analyses used spousal intraclass correlations of four types: (a) raw uncorrected correlations, (b) correlations controlling for age, (c) correlations controlling for education, and (d) correlations controlling for both age and education. Age and education were chosen as covariates because they are possible confounds of effects over time from the literature in that they have the largest correlations with cognitive abilities. Intraclass spousal correlations controlling for length of marriage were also computed. Because length of marriage correlated highly with age

Table 1
Breakdown of Data Sets by Sample, Age, and Education

Variable	Data set			
	All couples (N = 169)	7-year (n = 150)	14-year (n = 106)	21-year (n = 66)
Sample size				
1956	65	65	35	27
1963 (tested in 1970)	74	74	45	29
1963 (not tested in 1970)	19		19	10
1970	11	11	7	
Age of husband (years)[a]				
M	46.1	46.1	45.1	44.2
SD	10.2	10.5	8.7	8.3
Range	25–70	25–70	27–65	27–65
Age of wife (years)[a]				
M	43.8	43.8	42.6	40.9
SD	10.8	11.0	9.4	8.1
Range	22–71	22–71	23–71	23–56
Education of husband (years)				
M	13.9	13.8	14.4	14.2
SD	3.1	3.1	2.7	2.6
Range	6–20	6–20	8–20	8–20
Education of wife (years)				
M	13.3	13.3	13.5	13.5
SD	2.4	2.4	2.3	2.1
Range	6–20	7–19	6–20	9–18

[a] Age at initial testing.

(r = .88, $p < .001$), controlling for it had no effect once age was controlled; thus, these results are not presented. Other variables related to assortment, such as propinquity and family size, were not available in the SLS data but have been shown to be of lesser effect than age and education (Mascie-Taylor & Vandenberg, 1988).

Advances in structural equations modeling (especially using LISREL; Jöreskog & Sörbom, 1986) have been widely embraced in the study of assortative marriage and behavior genetics (Chipeur, Rovine, & Plomin, 1990; Coon et al., 1990; Neale & McArdle, 1990). Unfortunately, because of the limited sample size available, especially over the 14-year (n = 106) and 21-year (n = 66) data sets, this analytic method was not feasible in the current study. Increases over time in correlations were analyzed with Hotelling's (1940) dependent t test.[1] To investigate reciprocity of directional influence over time, we computed cross-lag panel correlations, corrected for stationarity and reliability (Kenny, 1975), for each of the longitudinal data sets.

Results

Intraclass Spousal Correlations

Results are presented separately for the 7-, 14-, and 21-year data sets on all of the PMA and TBR variables. Intraclass spousal correlations for age and education are also given, as are partial intraclass correlations controlling for these two variables.

7-year data set. Intraclass spousal correlations for the 150 couples in the 7-year data set are presented in Table 2. Statistically significant initial spousal correlations were found for verbal meaning, inductive reasoning, word fluency, intellectual ability, educational aptitude, attitudinal flexibility, psychomotor speed, and social responsibility. Correlations were also significant for age and education. When age and education were controlled, initial correlations ceased to be significant for intellectual ability, attitudinal flexibility, and psychomotor speed.

Correlations between spouses in the 7-year data set increased over the 7-year period for all variables except social responsibility, which remained stable. Especially noteworthy is the fact that the correlations on spatial orientation and motor–cognitive flexibility failed to reach significance initially but became significant after 7 years, so that the number variable remained the only one that failed to show a significant spousal correlation at the later point. The increases from the initial to the 7-year point were statistically significant for inductive reasoning, $t(147) = 3.04$, $p < .01$; word fluency, $t(147) = 2.08$, $p < .05$; intellectual ability, $t(147) = 2.83$, $p < .01$; and educational aptitude, $t(147) = 2.89$, $p < .01$. However, none of these changes in correlation remained significant after age or both age and education had been controlled.

Controlling for age appeared to diminish the changes in intraclass correlations across time more, whereas controlling for education simply deflated the magnitude of the correlations without affecting the changes in similarities across time. Particularly noteworthy are the correlations for verbal meaning and social responsibility. When age was controlled, the increase in spousal correlations on verbal meaning disappeared; indeed, a slight decrease was revealed. However, when only education was controlled, the increase in correlations for verbal meaning re-

[1] The significance of the changes in correlation was computed with Hotelling's (1940) dependent t test because the correlations came from the same sample: $t = (R_2 - R_1) * [(n - 3)(1 + Stab_{12})/2 * (1 - R_1^2 - R_2^2 - Stab_{12}^2 + 2 * R_1 * R_2 * Stab_{12})]^{1/2}$

Table 2
Intraclass Spouse Correlations in the 7-Year Data Set

	Correlation							
	Raw (n = 150)		Controlling for age (n = 141)		Controlling for education (n = 141)		Controlling for both age and education (n = 136)	
Variable	Initial	7 years	Initial	7 years	Initial	7 years	Initial	7 years
Verbal meaning	.42***	.49***	.41***	.40***	.21**	.37****	.20*	.26***
Spatial orientation	.06	.15*	.01	.07	.03	.13	−.01	.06
Inductive reasoning	.37***	.50****	.28***	.34***	.27***	.43****	.17*	.26***
Number	−.01	.03	−.04	−.06	−.03	−.03	−.07	−.11
Word fluency	.23**	.34****	.20**	.29***	.20**	.29***	.19*	.25***
Intellectual ability	.25***	.36****	.19*	.21**	.12	.27****	.05	.10
Educational aptitude	.41***	.54****	.38***	.42***	.19*	.42****	.14*	.27***
Motor–cognitive flexibility	.11	.29***	.08	.23**	.11	.23**	.07	.18*
Attitudinal flexibility	.25***	.32***	.19*	.26***	.19*	.29***	.13	.17*
Psychomotor speed	.28***	.32***	.23**	.29***	.09	.22**	.08	.16*
Social responsibility	.27***	.27***	.26***	.28***	.21**	.15*	.18*	.14*
Age	.93***				.93***			
Education	.53***		.57***					

[a] Significant change ($p < .05$) from initial to 7-year point.
* $p < .05$. ** $p < .01$. *** $p < .001$.

mained significant, $t(138) = 2.54$, $p < .05$, across the 7-year period. Conversely, correlations for social responsibility across time appeared to decrease, albeit not significantly, when education was controlled but not when age was controlled.

When education was controlled, significant changes across time remained for verbal meaning, $t(138) = 2.54$, $p < .05$; inductive reasoning, $t(138) = 3.34$, $p < .001$; intellectual ability, $t(138) = 3.54$, $p < .001$; and educational aptitude, $t(138) = 4.17$, $p < .001$. None of these changes remained significant after age had been controlled or after both age and education had been controlled.

14-year data set. Table 3 presents the intraclass spousal correlations for the PMA and the TBR for the 106 couples in the 14-year data set. Again, initial spousal correlations were statistically significant for verbal meaning, inductive reasoning, word fluency, intellectual ability, educational aptitude, psychomotor speed, social responsibility, age, and education. Only attitudinal flexibility and psychomotor speed failed to reach significance at the initial point when age and education were controlled statistically. Initial correlations for attitudinal flexibility were not statistically significant, but they became significant at the 14-year point.

Comparisons of changes over time showed that, except for psychomotor speed and social responsibility, all spousal correlations at the 14-year period were larger than observed initially. When corrected for age and education, motor–cognitive flexibility and social responsibility did not increase over time.

The increase in intraclass spousal correlations over the 14-year period was significant for inductive reasoning, $t(103) = 1.98$, $p < .05$, and educational aptitude, $t(103) = 2.14$, $p < .05$. When education was controlled, the change in correlations was significant for verbal meaning, inductive reasoning, intellectual ability, educational aptitude, and psychomotor speed. However, none of these increases remained significant when age was controlled. When both age and education were partialled out, the change in spousal correlations was statistically significant for verbal meaning, $t(97) = 2.41$, $p < .05$, and intellectual ability, $t(97) = 3.12$, $p < .01$.

21-year data set. Table 4 shows the spousal correlations for the 66 couples in the 21-year data set. Initial correlations were significant for verbal meaning, inductive reasoning, word fluency, intellectual ability, educational aptitude, and psychomotor speed, as well as for age and education. When age and education were controlled, initial correlations remained significant for verbal meaning, word fluency, educational aptitude, and psychomotor speed.

For all variables except verbal meaning, correlations were larger at the 21-year point than they were initially, whether controlled for age or controlled for education. The correlations for verbal meaning decreased slightly when controlled for age. In addition, only the number variable failed to reach significance after 21 years.

The change in correlations was significant over the entire 21-year period only for attitudinal flexibility, $t(63) = 2.16$, $p < .05$. When education was controlled, correlations over the 21-year period were statistically significant for inductive reasoning, $t(59) = 2.36$, $p < .05$; intellectual ability, $t(59) = 3.29$, $p < .001$; and educational aptitude, $t(59) = 2.36$, $p < .05$. Only attitudinal flexibility was significant when controlled for age, $t(59) = 2.24$, $p < .05$, and it remained significant when controlled for both age and education, $t(59) = 2.13$, $p < .05$.

Across all data sets, initial correlations for spouses were significant for verbal meaning, word fluency, and educational aptitude when age and education were controlled. The increase in similarity between spouses remained significant for verbal meaning and intellectual ability in the 14-year data set and for attitudinal flexibility in the 21-year data set.

Table 3
Intraclass Spouse Correlations in the 14-Year Data Set

	Correlaton							
	Raw (n = 106)		Controlling for age (n = 100)		Controlling for education (n = 100)		Controlling for both age and education (n = 100)	
Variable	Initial	14 years	Initial	14 years	Initial	14 years	Initial	14 years
Verbal meaning	.42***	.50***	.38***	.43***	.24**	.47****	.19*	.36****
Spatial orientation	.06	.19*	.09	.10	.04	.17*	.09	.09
Inductive reasoning	.32***	.42****	.23	.28**	.29**	.41****	.19*	.24**
Number	.10	.16*	.08	.13	.07	.16	.05	.13
Word fluency	.28**	.37***	.26**	.35***	.28**	.37***	.26**	.36***
Intellectual ability	.34***	.44***	.28**	.34***	.27**	.41****	.21*	.30****
Educational aptitude	.42***	.53****	.36***	.43***	.26**	.51****	.17*	.37***
Motor–cognitive flexibility	.09	.15	.09	.05	.10	.09	.08	−.02
Attitudinal flexibility	.09	.24**	.06	.22*	.04	.16	.02	.17
Psychomotor speed	.30***	.37***	.29**	.35***	.18*	.34****	.16	.31***
Social responsibility	.32***	.32***	.31***	.30***	.21*	.20*	.20*	.18*
Age	.90***				.91***			
Education	.55***		.54***					

[a] Significant change ($p < .05$) from initial to 14-year point.
*$p < .05$. **$p < .01$. ***$p < .001$.

Cross-Lag Panel Correlations: Husband–Wife Influences

Cross-lag panel correlations, corrected for stationarity and reliability (Kenny, 1975), were computed for each of the longitudinal data sets. Cross lags were examined to determine whether husbands or wives had more influence on their spouses' later test scores. Only the three PMA subtests with significant spousal correlations—Verbal Meaning, Inductive Reasoning, and Word Fluency—were included in the analyses. Cross-lag computations were done separately for the three main TBR dimensions: motor–cognitive flexibility, attitudinal flexibility, and psychomotor speed. Only the first and last points of any data set were included in these analyses, so as to obtain the largest sample to test the null hypothesis of no cross-lag difference between spouses. Raw spousal intraclass correlations were initially analyzed for each data set, followed by age-corrected correlations and, finally, age- and education-corrected correlations.

7-year data set. Results for the 7-year data set using raw spousal intraclass correlations showed that husbands' initial

Table 4
Intraclass Spouse Correlations in the 21-Year Data Set

	Correlations							
	Raw (n = 66)		Controlling for age (n = 62)		Controlling for education (n = 62)		Controlling for both age and education (n = 62)	
Variable	Initial	21 years	Initial	21 years	Initial	21 years	Initial	21 years
Verbal meaning	.44***	.48***	.43***	.41***	.25**	.39***	.26*	.29*
Spatial orientation	.16	.24*	.16	.17	.14	.23*	.16	.16
Inductive reasoning	.34**	.46***	.28*	.32**	.23*	.40****	.18	.24*
Number	.12	.16	.09	.11	.08	.14	.06	.11
Word fluency	.24*	.35**	.23*	.32**	.25*	.36**	.30**	.38***
Intellectual ability	.44***	.45***	.26*	.35**	.18	.41****	.19	.31**
Educational aptitude	.44***	.52***	.42***	.42***	.23*	.43****	.23*	.31**
Motor–cognitive flexibility	.06	.25*	.07	.17	.07	.25*	.10	.15
Attitudinal flexibility	.06	.29***	.07	.31***	.05	.26*	.08	.32***
Psychomotor speed	.36**	.46***	.33**	.39***	.25*	.43***	.23*	.38***
Social responsibility	.17	.22*	.09	.16	.11	.16	.03	.09
Age	.84***				.84***			
Education	.51***		.51***					

[a] Significant change ($p < .05$) from initial to 21-year point.
*$p < .05$. **$p < .01$. ***$p < .001$.

scores on the Inductive Reasoning subtest had an effect on their wives' later Inductive Reasoning scores (cross-lag difference of .16, $p < .01$) and Verbal Meaning scores (cross-lag difference of .11, $p < .05$). There were no significant cross-spousal correlations for the TBR variables.

Cross-lag correlations, involving partial correlations that controlled for the effects of age, education, and both age and education, were then run. The influence of husbands' initial Inductive Reasoning scores on wives' later Verbal Meaning scores was no longer significant when age or education was controlled. When education was controlled, wives' earlier Word Fluency scores affected husbands' later Verbal Meaning scores (cross-lag difference of .12, $p < .05$), but this effect did not remain significant when age was controlled. However, husbands' Inductive Reasoning scores still significantly affected wives' later Inductive Reasoning scores when age, education, or both were controlled.

14-year data set. Raw spousal intraclass correlations for the 14-year data set revealed three significant cross-spousal cross-lag differences. Husbands' initial Word Fluency scores significantly affected wives' Word Fluency scores 14 years later (cross-lag difference of .16, $p < .05$). In the opposite direction, wives' initial Verbal Meaning scores influenced husbands' Verbal Meaning scores 14 years later (difference of .14, $p < .05$), and wives' motor–cognitive flexibility influenced husbands' later motor–cognitive flexibility (difference of .24, $p < .05$).

The influence of husbands' Word Fluency scores on wives' Word Fluency scores was not significant when controlled for age, but it remained significant when controlled for education. The influence of wives' motor–cognitive flexibility on husbands' later motor–cognitive flexibility was not significant when either age alone or education was controlled but was significant when both age and education were controlled. However, the influence of wives' Verbal Meaning scores on husbands' Verbal Meaning scores after 14 years remained significant even when age or education effects or both were taken into account. When both age and education were controlled, wives' Verbal Meaning scores also predicted husbands' later Inductive Reasoning scores.

In addition, when age effects were taken into account, wives' attitudinal flexibility was seen to affect husbands' attitudinal flexibility at the 14-year point (cross-lag difference of .17, $p < .05$). This effect did not remain significant when education was controlled.

21-year data set. Perhaps because of the smaller sample size in this data set, only one significant cross-spousal cross lag occurred. Husbands' later scores on psychomotor speed were influenced by their wives' initial psychomotor speed scores (cross-lag difference of .25, $p < .05$). However, this influence did not remain significant when the effects of age or of education were controlled. When both age and education were controlled, wives' Inductive Reasoning scores significantly affected husbands' later Word Fluency scores (cross-lag difference of .26, $p < .05$). The direction of effects was such that wives and husbands affected each other in opposite directions: Wives had a positive influence on their husbands' later scores (higher functioning wives brought their husbands' scores up), whereas husbands had a negative influence on their wives' later scores (higher functioning husbands brought their wives' scores down).

Cross Lags Based on Initial Status

In addition to the cross lags based on gender, cross-lag panel correlations controlling for reliability and stationarity were run; these cross lags categorized the spouses according to whose initial scores were higher. The PMA Verbal Meaning, Inductive Reasoning, and Word Fluency scores were summed; couples were classified on the basis of who was higher on the sum of the three variables. The TBR motor–cognitive flexibility, attitudinal flexibility, and psychomotor speed measures were also summed. Couples were placed into one of three categories for both the PMA and TBR variables: (a) wives significantly higher at initial testing, (b) no significant differences between spouses at initial testing, or (c) husbands significantly higher at initial testing. The no-significant-difference group included all couples whose scores did not differ more than one standard error of measurement, positively or negatively.

For the entire sample ($N = 169$), husbands in 64 couples had higher Verbal Meaning, Inductive Reasoning, and Word Fluency scores; in 99 couples, wives had higher scores on these variables; and, in 6 couples, there were no significant differences. Seventy-eight husbands had higher scores on the sum of the TBR, 80 wives had higher scores, and 11 couples were even. In the 7-year data set, 79% of 150 couples remained in their initial classification (e.g., wives were significantly higher) over 7 years on the PMA variables, $\chi^2(4, N = 150) = 79.10$, $p < .001$, and 66.4% remained in their classification on the TBR variables. On the PMA, 75.5% of 104 couples remained in their initial category 14 years later; on the TBR, this figure was 65.4%.

Spouses who did not differ significantly at the initial point of measurement were not included in the analyses. Intraclass correlations were run between the "high" and "low" spouses and entered into cross-lag analyses. Correlations were also controlled for age or education, or both.

7-year data set. Results from the cross-lag analyses for the 7-year data set, based on initial status, indicated that the higher functioning spouses' Word Fluency scores affected the lower functioning spouses' Word Fluency scores 7 years later (cross-lag difference of .18, $p < .01$) and remained significant when controlled for age, education, or both. When both age and education were controlled, the lower functioning spouses' Verbal Meaning scores influenced the higher functioning spouses' Inductive Reasoning scores. The higher functioning spouses' Word Fluency scores affected the lower functioning spouses' Verbal Meaning scores 7 years later. The direction of effect for all significant cross lags was positive, indicating that earlier scores were all positively correlated with later scores. Also, the more rigid spouses' attitudinal flexibility scores affected the more flexible spouses' motor–cognitive flexibility scores 7 years later (cross-lag difference of .26, $p < .05$) and remained significant when age, education, or both were controlled.

14-year data set. The cross-lag results for the 14-year data set revealed a number of significant effects. The lower spouses' Verbal Meaning and Inductive Reasoning scores were found to affect the higher spouses' later Verbal Meaning and Inductive Reasoning scores (Verbal Meaning to Verbal Meaning cross-lag

difference of .15, $p < .05$; Verbal Meaning to Inductive Reasoning cross-lag difference of .13, $p < .05$; Inductive Reasoning to Verbal Meaning cross-lag difference of .18, $p < .05$; and Inductive Reasoning to Inductive Reasoning cross-lag difference of .17, $p < .05$). These effects remained significant when controlled for age or for education but failed to reach significance when both age and education were controlled. The more rigid spouses' motor–cognitive flexibility scores influenced the more flexible spouses' attitudinal flexibility scores 14 years later and remained statistically significant when age, education, or both were controlled statistically. Again, all significant cross lags were positive.

In addition, two cross-lag effects found in the 7-year data also appeared at the 14-year interval when age and education were controlled. The higher functioning spouses' Word Fluency scores influenced the lower functioning spouses' Verbal Meaning scores 14 years later, and the higher functioning spouses' Word Fluency scores influenced the lower functioning spouses' later Word Fluency scores. These were the only consistent findings between the 7-year and 14-year data sets; however, these cross lags did not reach significance when either age or education was controlled.

21-year data set. No significant cross-lag effects based on the spouses' original levels were found in the 21-year data set.

Differences in Patterns of Similarity Across Couples Over Time

Variables that differentiated patterns in the changes in magnitude of couple similarity across time were investigated with analyses of variance (ANOVAs). Separate ANOVAs were run for all of the demographic–personal variables available (age; education; occupation; number of children; number of changes in jobs, professions, and place of employment in the last 5 years; life satisfaction; and job satisfaction). The linear combination of the absolute differences between spouses in verbal meaning, inductive reasoning, and word fluency were used for the overall PMA measure, and motor–cognitive flexibility, attitudinal flexibility, and perceptual speed were similarly used for the TBR measure. Couples were categorized according to whether they became more similar or more different over the initial 7-year interval on these variables. The standard error about zero changes over time was used to categorize couples for whom the relationship remained stable over time.

Of the 150 couples in the 7-year data set, 65 became reliably more similar, 74 became more different, and 11 did not reliably change in the magnitude of differences between scores over time for the PMA. On the TBR, 72 couples became more similar, 60 became more different, and 18 did not significantly change.

A one-way ANOVA of the couples who became more similar, those who did not change, and those who became more different over 7 years revealed significant differences in family income level at the initial testing on the PMA variables. Couples who became more similar on the PMA had husbands with higher initial occupational levels, $F(2, 147) = 3.43$, $p < .05$. Couples who did not change significantly over time had husbands with fewer changes of professions, $F(2, 142) = 3.86$, $p < .05$, than those couples who changed over time (either to become more similar or dissimilar) on the PMA. Couples who became more dissimilar over time on the TBR had wives with more changes of profession at the initial testing point, $F(2, 139) = 3.13$, $p < .05$.

Discussion

Overview of Findings

Initial spousal intraclass Pearson product–moment correlations for the PMA and TBR were found to be significant for a number of variables across all data sets. All significant spousal correlations were positive. Verbal meaning, inductive reasoning, and word fluency, as well as the composite index of educational aptitude and the social responsibility scale, were all initially significant, even after the effects of age, education, and both age and education had been controlled. Couples were also found to be highly similar in age and education. The magnitude of the initial correlations was about as expected from the literature reviewed earlier, except for the correlations involving the spatial orientation and number variables, which were slightly lower than expected for the whole data set. However, the correlations on these two variables were within the expected range for the more limited sample of the 21-year data set.

Changes in spousal correlations over 7-, 14-, and 21-year intervals were statistically significant for a number of variables. Controlling for education did not appear to diminish the magnitude of changes over time, but it did somewhat diminish the level of couple correlations. However, controlling for age greatly affected the changes in spousal correlations over time. After age had been controlled, only the 21-year change for attitudinal flexibility remained statistically significant. However, when both age and education were controlled, a number of changes that failed to reach significance when age alone was controlled were significant. In the 14-year data set, the change in spousal correlations was significant for verbal meaning and intellectual ability when both age and educational similarities were controlled. The 21-year change in attitudinal flexibility also remained significant when both age and education were controlled. It should be noted that, because of the large number of correlations being computed, the significant findings might be "spurious." However, the predominant trend for all of the cognitive correlations was for increases over time (the only exception being verbal meaning in the 21-year data set when controlled for age alone).

Results from cross-lag panel correlations suggested that the question of which spouse has more influence on the other may be ability and time specific. When age or education effects or both were taken into account, husbands' earlier Inductive Reasoning scores positively influenced their wives' Inductive Reasoning scores 7 years later, whereas wives' Verbal Meaning scores influenced their husbands' Verbal Meaning scores 14 years later.

When couples were divided according to which spouse had the higher initial score, the higher spouses' Word Fluency scores affected the lower spouses' Word Fluency scores 7 years later, and the lower spouses' attitudinal flexibility influenced the higher spouses' motor–cognitive flexibility 7 years later. Over 14 years, the lower spouses' Verbal Meaning and Inductive Reasoning scores influenced the higher spouses' later Verbal Meaning

and Inductive Reasoning scores; these effects did not remain significant when age and education were controlled. When both age and education were controlled, the higher functioning spouses' Word Fluency scores had an effect on the lower functioning spouses' Word Fluency and Verbal Meaning scores over 7 and 14 years.

When couples were examined on the basis of whether they became more similar, became more different, or did not significantly change in difference over the initial 7-year interval, it was found that couples who became more similar on the PMA had husbands with higher occupational levels. Couples who did not change significantly were found to have husbands with fewer changes of profession, and couples who became more dissimilar had husbands who changed profession more frequently. Couples who became more dissimilar on the TBR were higher on wife changes of profession than couples who did not change or who became more similar.

Possible Explanations of Spousal Similarity

Results from this study address the four possible explanations (mentioned earlier) of observed similarity between spouses proposed by Price and Vandenberg (1980): (a) couples who marry are alike initially, and this fact accounts for all spousal similarity, (b) spouses' level of ability functioning converges because of shared living conditions or reciprocal influence, (c) couples who are dissimilar are more likely to divorce or separate, and (d) couples are similar in age, so ability similarity may be a product of age similarity. Results from this study lend support to each of these four possibilities.

Although many of the variables investigated showed significant levels of similarity at the initial testing, it cannot be concluded that the continuing similarity between spouses results solely from the initial levels of similarity. Couples in the SLS were not newlyweds at the initial point of measurement, and their level of similarity may already have increased in magnitude. Furthermore, increases in spousal correlations over time were found for a number of the variables, suggesting that some of the observed correlations could be a result of increasing similarity independent of initial assortment.

Many of the increases in spousal similarity over time may be the result of age similarity between the spouses. When age was controlled, many of the increases in similarity failed to reach significance; the increase in similarity did remain for attitudinal flexibility even when age was controlled. However, most of the spousal correlations on the other ability and rigidity–flexibility variables did increase somewhat after age had been controlled, albeit not significantly.

Educational background had also been previously found to be an important variable in explaining spousal similarity. Eaves, Heath, and Martin (1984) suggested that similar educational backgrounds may be the major factor underlying spousal similarity. Although controlling for education did slightly depress the magnitude of the spousal correlations in our study, correlations for many abilities still remained significant. Furthermore, controlling for education did not affect the magnitude of the change in spousal correlations over time, perhaps because (at least in this sample) educational level does not change much over time in adults.

Although the spousal correlations for age and education were quite high, age and education did not seem to be closely interrelated. Controlling age correlations for educational similarities produced little changes in the degree of spousal similarity for age, and vice versa. The lack of correlation between age and education may explain why the correlations across 14 years were significant for verbal meaning and intellectual ability when both age and education were controlled, even though these correlations failed to reach significance when age alone was controlled. Controlling for education appears to lower the degree of initial spousal similarity on abilities, whereas age has more effect on the changes over time.

We could not directly test whether couples who are dissimilar are more likely to divorce or separate, but we were able to investigate patterns in selective attrition. Although there were no statistically significant differences between couples in the shorter and longer data sets, some slight differences were noted. Couples could have left the study as a result of disinterest, health, death, or divorce. Couples in the 14- and 21-year data sets were slightly less similar on the attitudinal flexibility measure. Many of the cognitive spousal correlations were slightly higher for the 14- and 21-year data sets, but this could have resulted from chance, from the more limited age ranges in these data sets, or from cohort effects.

Implications for the Study of Behavioral Genetics

The findings from this study have a number of implications for the field of behavioral genetics. Specifically, findings address topics of shared environment, genotype–environment correlations, and methodological approaches to assortative marriage.

Shared environment is a term used by behavioral geneticists to denote anything that makes two individuals reared in the same family more similar after genetic similarity has been controlled (Plomin et al., 1980). Shared environmental influence has been found to be relatively unimportant in explaining the variance for many variables (e.g., environmental influence tends to make siblings more dissimilar). However, prior studies have also found that as much as 30% of the variance on cognitive measures may be due to shared rearing environment. Yet studies of older siblings, adolescents, and adults have shown decreased importance for shared environment (Plomin, 1986).

It could be argued that these researchers studied an inappropriate or at least not the current environment, because the childhood family was the focus of comparison. In adolescence, and certainly in adulthood, people may not be greatly influenced by parents or siblings, especially if they no longer live in that family. Studies of married couples over time present an excellent opportunity to investigate the impact of a different type of "shared environment" in adulthood, because couples are (usually) genetically unrelated individuals who live together (a similar argument was put forth in Caspi et al., 1992). The increases in spousal similarity reported here suggest that couples do become more similar as a result of sharing the same environment, even though the effect of shared environment may be somewhat limited.

Because marriage is normally a mutual selection by partners, it may be considered one way in which individuals shape their environments (Buss, 1984b; Plomin et al., 1977; Scarr &

McCartney, 1983), and assortative marriage appears to be an instance in which individuals choose compatible spouses–environments. The findings that spousal correlations increase and that certain spouses may have greater impact suggest that the spouse one chooses might have a long-term impact on one's cognitive functioning and flexibility.

Changes in spousal correlations over time may also have methodological implications for behavioral geneticists. The degree of assortative marriage is often used as a control in models of sibling resemblance, because parental spousal similarity may lead to an overestimation of sibling similarities (Plomin et al., 1980). However, many measures of parental spousal similarity are taken after the birth of a child and, thus, after couples have been married for a number of years ("realized assortment"; see Rowe & Plomin, 1981). This procedure may lead to an underestimation of the effects of shared environment if the effects of sharing the same environment occur rapidly and are similar across age spans. The question is whether the greater similarity experienced by spouses may be influenced (or caused) by the same factors that would bring about shared rearing environment effects in children. Essentially, spouses may have already become increasingly similar to each other before the birth of a child (a form of shared environment), and controlling for this similarity may actually partial out effects of shared rearing environment. This is not to say that behavioral geneticists should not attempt to control for the initial levels of similarity between spouses in their models; however, attempts should also be made to control for the increases in spousal correlations that might occur over time. Extraneous factors that may make couples more similar, independent of shared environment, must also be taken into account. Our study attempted to control for the effects of aging, but other factors that we did not anticipate might also be important.

Implications for the Study of Individual Differences

The finding that spousal correlations on cognitive and rigidity–flexibility measures increase over time has implications for the investigation of individual differences in level and change with age. It may be that having a higher functioning spouse helps individuals maintain their level of functioning later into life, whereas a lower functioning spouse may speed their decline. It has already been shown that health and job complexity variables may have an impact on the maintenance of cognitive abilities (Schaie, 1983); perhaps "family complexity" (spousal level) might also be an important predictor variable.

Our results suggest that the higher functioning spouse does not always have the greatest impact. Yet all of the cross-lag influences were positive. Many of the cross lags examined in this study failed to differ significantly, which might be an indication of substantial reciprocal influences among spouses. In general, neither men nor women appeared to have a greater impact on their spouses, although husbands and wives did have an impact on different abilities in their spouse. Although such findings must be replicated, it might be useful to further investigate the effect that substantial cognitive decline in one spouse (e.g., one with Alzheimer's disease) might have on the other spouse.

Furthermore, our results revealed that the couples who became more similar over time were those in which husbands had higher occupations and wives fewer changes in professions. Because all of our couples married before 1970 and were studied through 1984, this effect may not be generalizable to current marriage cohorts. It is unclear what effect dual-career marriages might have on the level of spousal similarity over time; the effect of different work environments may decrease the impact of a shared family environment.

Limitations of the Study

Although this study provides the first longitudinal data on changes in spousal similarity for cognitive and rigidity–flexibility measures, it is not without problems. First, the SLS was not specifically designed to be a study of married couples, and couples are therefore studied at various points in their marriage. It may be that spousal similarity increases very rapidly directly after marriage and that the increases taper off later in marriage. Thus, by not studying newlyweds, this study may have failed to measure the full extent of change that occurs with marriage. Also, the 7-year interval of the SLS might not be small enough to detect rapid changes in spousal similarity.

Second, all couples in the SLS entered the study in 1970 or earlier. Given the problem of cohort effects, findings for these couples may not be generalizable to couples currently getting married. More women were full-time homemakers in the earlier marriage cohorts, and divorce was less prominent. In fact, a long-term study of marriage might now become increasingly difficult to carry out, given current rates of divorce.

Third, because only those couples who were in the SLS over 7 years were included, a selective sample was used for these analyses. Couples who remain in longitudinal studies tend to come from more affluent backgrounds than those in cross-sectional studies (Schaie, 1983). Adding the criterion that both spouses must remain in the study certainly increases the selectivity of the sample.

Directions for Future Research

The findings from this study do question the results of earlier investigations and argue the need for more longitudinal research on assortative marriage. Future longitudinal work should attempt to study couples as early in their relationships as possible; future studies could involve cohabiting couples or at least start with the newlywed phase of marriage. Following couples from earlier in the relationship might yield evidence of even larger increases in spousal similarity. Also, by holding the length of the relationship constant, it might be easier to explore the role that age (and similarity in age) has in a relationship. In the SLS sample, age and length of marriage were confounded.

Future longitudinal research should also involve multiple markers of cognitive abilities so that generalizations can be made on the construct level. Many of the studies reviewed earlier (e.g., Watkins & Meredith, 1981; Zonderman et al., 1977) used factor-analytic techniques to measure initial similarity; similar analyses could be done longitudinally. Our results suggest that the level of similarity (and the pattern of change in similarity over time) might vary for different abilities, with higher similarity for verbal and reasoning factors than for spatial and numerical factors.

Another area for future research is the personal and demographic correlates of change in spousal similarity across time. The addition of more personal measures, including marital satisfaction measures, more detailed parental background information, and information on activities shared by spouses might add to the understanding of changes in the magnitude of spousal similarity and the process by which spouses can influence each other. Interesting aspects of spousal similarity that have not been explored are spouses' perceptions of the similarities and differences between them and their perceptions of how and why the similarity has changed.

A replication of the SLS findings with a more recent marriage cohort would also be useful. A current investigation might be able to examine the relationship between divorce and spousal similarity, because the current high rate of divorce offers a large possible subsample. This also means that any current study of marriages that remain intact would have to include many more couples than might have been needed in the past.

In conclusion, the current study calls into question the assumptions in prior cross-sectional research on spousal similarity. Future longitudinal research into this issue would be beneficial for many fields, including behavioral genetics, individual differences, adult development and aging, and marriage and family development.

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