RECIPROCAL INTERACTION AND SIMILARITY OF PERSONALITY ATTRIBUTES

Virginia Blankenship
Oakland University
Steven M. Hnat, Thomas G. Hess, & Donald R. Brown
University of Michigan

In a study of the relationship between similarity of personality and interaction choices, 336 students gave up to ten choices within fifty person classes. Personality variables were measured two years before sociometric choices (before acquaintance) and at the time of the choices. Reciprocal interaction pairs were more similar on a derived authoritarianism scale of the Omnibus Personality Inventory (OPI) than no-choice pairs at the time of the choices, but not more similar before they became acquainted. Religious items accounted for the increased similarity. A Guttman scale of religious items was identified and scores were related to sociometric spaces generated with Guttman-Lingoes smallest space analysis. Church affiliation did not explain reciprocal interaction choices, but church attendance was weakly related to choices, with reciprocal pairs being more similar than no-choice pairs on frequency of attendance. Reciprocal interaction pairs which persisted to the fourth year were more similar on intellectualism than persistent no-choice pairs and more similar than reciprocal interaction pairs which did not persist. These findings suggest that similarity leads to interaction and that interaction leads to increased similarity.

Similarity of personality variables among members of friendship dyads has been the focus of long term attention from psychological researchers (see reviews by Richardson, 1939; Lott & Lott, 1965; and Duck, 1977). Although this work had established that friends tend to resemble one another on many measures, the question of whether similarity causes friendship or friendship causes similarity had still not been answered when Newcomb (1961) addressed that issue. He observed two sets of seventeen students as they became acquainted as housemates at the University of Michigan, and noted that '. . . as individuals acquired more information about each others' attitudes, their high attraction preferences tended to change in favor of individuals with whom they were more closely in agreement ' (p. 254). This judgement has endured for some twenty-five years as the similarity-attraction issue has been repeatedly investigated.

The present study challenges that judgement. It addresses the issue by analysing personality data collected before acquaintance and two years after acquaintance in relation to friendship choices made two and four years after acquaintance. The data were collected in a research project to evaluate the effectiveness of a six-year Medical School programme at the University of Michigan designed to integrate the humanities and the sciences within medical training. The availability of this unique data set allowed empirical study of the similarity-friendship-similarity issue. Further, it was the intent of this study to evaluate the application of multi-dimensional spatial analysis to the study of cohesive groups.

Many measures of personality have been used in the study of acquaintance, ranging as widely as intelligence (Bonney, 1946), the Edwards Personal Preference Scale (Izard, 1960), the Allport-Vernon Study of Values (Schellenberg, 1957) and personal constructs (Duck & Spencer, 1972; Neimeyer & Neimeyer, 1983) and often including measures of sociodemographic variables such as religious beliefs (Kandel, 1978). Duck (1977) has argued that the choice of personality measure has *theoretical* importance to the study of acquaintance and Duck & Craig (1978) have demonstrated that the measures on which friends are similar change during the course of acquaintance. As is often the case in analysing data sets that were originally collected for other purposes, however, we had to choose from the available personality measures. Responses to a short form of the Omnibus Personality Inventory (OPI) were available for our subjects, having been collected while the subjects

were in high school (before acquaintance) and at the time of the first interaction choices. The decision to use the OPI data does reflect a bias toward the similarity/dissimilarity forces of friendship choice (as distinct from the study of complementarity) and it constrains our consideration to attitudes and dispositions as distinct from needs and values. We chose to work within those constraints.

The study of personality similarity and friendship has focused for the most part on comparisons between reciprocated friendship pairs and nominal pairs within the same or another sample, with analysis focusing on the resultant sociometric matrices (see McCarthy, 1981). Sociometric matrices, usually constructed with 0 (zero) and 1 (one) entries to indicate no-choice and choice, are very sparse informationally, however, and analyses of sociometric matrices have been limited to the identification of cliques (Newcomb, 1961). Lankford (1974) compared the various clique-identification methods and concluded that factor analysis was the best method for identifying the strongest cliques.

Two reasons led us to decide that clique analysis was not the preferred method for our data. First, preliminary analysis yielded very few and very weak cliques within our data. Second, our data were collected from seven classes of fifty students who matriculated together and who lived and studied together. We feel that the entire class is a meaningful grouping and that subdividing the class into weakly associated cliques would do our data an injustice. Smallest space analysis (SSA) (Guttman, 1968) requires only ordinal properties of the data matrix and decreases the dimensionality of the data matrix while maintaining the monotonicity condition. The stress coefficient is a measure of the ability of a solution of k dimensions to faithfully represent the ordinal relationships within the data. The resulting dimensional loadings (coordinates) for each subject locate that person in the sociometric space close to other subjects chosen by him/her as friends and close to other subjects who have chosen her/him as a friend. Conjoint measurement analysis (CM-V) can be used to perform a non-metric multiple regression analysis (Lingoes, 1973) of personality scale scores (the criterion) with the SSA-generated dimensional loadings as predictors. In that way regions of similar personality scores can be identified within the sociometric space representing the entire class.

This study is not designed to test alternative theories which explain increased similarity between people who report interaction

with each other. It presents an extensive body of carefully collected data which allow us to address the question of whether similarity precedes interaction or whether similarity between interacting pairs increases during the course of their acquaintance. Because interaction choices were gathered at two points in time, after two years and after four years in the programme, we can investigate the way similarity changes over the course of long term relationships. To that end the following hypotheses will be tested.

1. Individuals who choose each other as friends (reciprocated choice pairs) will be more similar on the four derived Omnibus Personality Inventory scales (anxiety, intellectualism, authoritarianism, and sociability) than will be individuals who do not choose each other as friends (no-choice pairs).

2. The sociometric 3-dimensional spaces determined by smallest space analysis of interaction choices will contain regions related to subjects' scores on the OPI scales.

3. Reciprocated interaction pairs which persist to the fourth year will contain individuals more similar on the OPI scale than no-choice pairs which persist, and reciprocated interaction pairs which persist will be more similar than reciprocated interaction pairs which do not persist.

Method

Subjects
Subjects were 336 students (214 males, 122 females) enrolled in the integrated (Inte-) and flexible (-flex) Inteflex 6-year medical school programme at the University of Michigan designed to integrate the humanities and the sciences within medical training. They constitute seven classes which originally contained fifty students each, and the classes are identified by the years (1973-9) of matriculation. Students applied to the programme while in high school (Time 1). Only those subjects who were interviewed at the end of the second year in the Inteflex program and/or were chosen as persons most interacted with by those interviewed serve as subjects in this study.

Interaction choices
Interaction choices were obtained in the midst of personal interviews conducted at the end of the second (Time 2) and fourth years (Time 3) of the Inteflex programme. Subjects were first asked to indicate on a scale from 1 to 6 to what extent they interacted with other students in the programme. Then they were asked to provide the names of those students with whom they interacted the most. Most interactions were characterized as social (going out or partying) or academic related (studying together). While the question that was asked concerned frequency of interaction,

interviewers elaborated the question by asking subjects to name their friends in the programme. We feel that the nature of the reported interactions, partying and studying together, warrants our characterization of these choices as friendship choices within these highly cohesive and thoroughly acquainted classes of fifty students who had lived and attended classes together for two and four years prior to the interviews. Wheeler & Nezlek (1977) found that their operational definition of best friend as person most interacted with matched their subjects' definition 50 out of 54 times. Up to ten responses were coded for the second year interviews, and up to six responses were coded for the fourth year interviews. In both cases these were the maximum number of responses given by any subject.

Interaction choices from the second year were used to form sociometric matrices, one for each of the seven classes. Subjects were represented by both columns and rows. If a row subject (*i*) reported interacting with a column subject (*j*), a '1' (one) was entered in the *i,j* cell. If no choice was made of *j* by *i*, the *i,j* cell was assigned a '0' (zero). The diagonal, representing interaction with oneself, was left empty. A subject qualified for inclusion in the matrix if he/she had made at least one interaction choice within the class or had been chosen by at least one person in the class. On the basis of these criteria, the following matrix sizes resulted:

Class	Size of Matrix
1973	43
1974	51
1975	46
1976	45
1977	48
1978	53
1979	50

Classes sizes greater than fifty resulted from the addition of students from previous classes who had slipped back one year or more in the programme.

Fourth year interaction choices were available for four classes, 1974–7. Only those subjects who made interaction choices in the fourth year interviews and who had been included in the second year matrices were included in the fourth year matrices since the focus was on the comparison across time of reciprocated interactions. Matrices were constructed in the same way as the second year matrices, with '0' and '1' entries. Matrix sizes for the fourth year choices were:

Class	Size of Matrix
1974	38
1975	40
1976	33
1977	37

Analyses of second year matrices

Asymmetrical solutions. A Guttman-Lingoes smallest space analysis rectangular-5 (SSAR-V) was performed on the asymmetrical matrices with 0–1 coding, where 0 indicated no interaction choice and 1 indicated the choice of the *j* (column) subject by the *i* (row) subject. The SSAR-V solution represents each subject by two points in space (Lingoes, 1973, pp. 84–7) — one point as chooser (i.e., close to those subjects he/she reported to have interacted with the most) and one point as chosen (i.e., close to those subjects who had reported interacting most with him/her). Between-subject distances are the result of a combination of the distances between subjects in the chooser- and chosen-spaces.

The Guttman-Lingoes series includes a programme, SYM (Lingoes, 1973, p. 106), which reconciles the two spaces by summing across the number (k) of dimensions of the SSAR-V solution the product of the difference between two subjects (I and J) as choosers (X) times the difference between the two subjects as chosens (Y):

$$DIST(J,I) = DIST(J,I) + (X(I,K) - X(J,K)) * (Y(I,K) - Y(J,K))$$

(Lingoes, 1973, p. 106)

The SYM distances were compared to Euclidean distances computed by an algorithm that calculated the square-root of the sum of squared distances between points in the chooser space, and separately in the chosen space. The final Euclidean distance between two subjects was the arithmetic average of these two distances. Correlations between the SYM distances and Euclidean distances derived from the three-dimensional SSAR-V solutions ranged from 0.92 to 0.96 for the seven classes.

Symmetrical solutions. By adding the i,j and j,i cells of the asymmetrical sociometric matrices, symmetrical lower-half matrices were formed with 0-1-2 entries. In the 0-1-2 matrices, '0' represented no interaction choice between i and j, '1' represented that i chose j or that j chose i but not both, and '2' represented reciprocal interaction choices between i and j. The lower half 0-1-2 matrix for each class was input to the Guttman-Lingoes smallest space analysis-1 (SSA-1). Three-dimensional solutions were generated, and distances between subjects were calculated using the Euclidean algorithm. The 0-1-2 matrices were also input to M-D-SCAL (Kruskal & Carmone, 1969). Three-dimensional solutions were generated, and Euclidean distances were calculated between subjects.

Validity check. When inter-individual distances are distinguished as no-choice, non-reciprocated choice, and reciprocated choice, a validity check of the ability of a multi-dimensional spatial analysis to produce distances faithful to choice categories is possible. A valid analysis should produce smallest distances between subjects who are reciprocal choices and largest distances between subjects who do not choose each other. The eta-squared measure of association between SYM distances (SSAR-V solution) and choice categories ranged from 0.016 to 0.053 for the seven classes. Eta-squared values for the Euclidean distances (SSAR-V) ranged from 0.015 to 0.048. Eta-squared values for the SSA-1 Euclidean distances ranged from 0.121 to 0.276. Eta-squared values for the M-D-SCAL Euclidean distances ranged from 0.050 to 0.151. Based on these values we decided to focus our further analyses on the distances and dimensions generated by the SSA-1 solutions of the 0-1-2 matrices.

Personality measures. A short form of the Omnibus Personality Inventory, OPI, (Center for the Study of Higher Education, 1962) was filled out by the Inteflex students before they entered the programme (Time 1) and at the end of the second year in the programme (Time 2), near the time of the second year interviews. To assess hypotheses relating interaction choices to differences between subjects on the OPI derived scales (Kulik & Revelle, 1969), it was necessary to calculate the $n(n-1)/2$ absolute value differences between subjects on the 2 sets (Time 1 and Time 2) of four personality scales (intellectualism, anxiety, authoritarianism, and sociability). Time 1 OPI scale scores were missing for 1 subject in each of the 1973, 1974, and 1975 classes, 2 subjects in the 1978 class, and 3 subjects in the 1979 class. Time 2 OPI scale scores were missing for 1 subject in the 1973, 1975, and 1978 classes, 2 subjects in the 1974 class, and 3 subjects in the 1979 class. For Time 1 scale differences could be calculated between 7,550 of 7,934 pairings, and for Time 2 scale differences could be calculated between 7,552 of 7,934 pairings in the seven classes.

Results

Hypothesis 1

Analyses of variance were run on the absolute value differences between individuals on the OPI derived scales (anxiety, intellectualism, authoritarianism, and sociability) with type of friendship choice as the independent variable. Time 1 data revealed three significant differences (p <0.05) in the seven classes; differences on intellectualism were found in the 1979 class and differences on authoritarianism were found in the 1973 and 1976 classes. Mean differences were consistent with the hypothesis that the smallest differences would exist between reciprocated interaction pairs and largest differences would exist between no choice pairs.

Time 2 data revealed five significant differences (classes 1973, 1975, 1976, 1977, and 1979) on the authoritarianism scale. Table 1 lists the mean differences, and all five are consistent with the hypothesis that the smallest mean differences would be between reciprocated interaction pairs and the largest differences would be between no-choice pairs. It should be emphasized that Table 1 represents 7 replications using independent samples. Taking advantage of multiple tests of numerous dependent variables using the same independent categories is not a feature of this data set.

Data from the seven classes were combined by standardizing the authoritarianism scale score differences within classes (Time 2). An analysis of variance of the combined data yielded highly significant results, $F(2,7549) = 15.90$, p <0.0001, with the reciprocated interaction pairs ($n = 316$) having a mean standardized scale difference of -0.25, the non-reciprocated pairs ($n = 512$) having a mean standardized scale difference of -0.13, and the no-choice pairs ($n = 6715$) having a mean standardized scale difference of 0.02.

Hypothesis 2

Correlations were computed between each individual's position in the three dimensional space generated by the SSA-1 solution and each individual's scale score on the OPI at Time 1 and Time 2. Test-retest reliabilities on the OPI scales averaged 0.70 over the seven classes on the anxiety scale, 0.65 on the intellectualism scale, 0.82 on the authoritarianism scale, and 0.68 on the sociability scale.

Correlations of IrI >0.20 were obtained between 9 scales and the

TABLE 1
Mean absolute value differences between
Reciprocated (R), Non-Reciprocated (N-R),
and No-Choice (N-C) pairs
on OPI scales (Time 2)

	Class	N	Auth.	Soc.	Intell.	Anx.
1973						
	R	44	5.02	6.13	4.45	7.04
	N–R	75	6.81	5.48	5.64	6.39
	N–C	742	7.51	5.67	5.33	6.00
			$p < .01$			
1974						
	R	62	5.35	3.97	5.02	6.58
	N–R	84	5.46	4.25	5.42	6.30
	N–C	1030	5.60	4.23	5.46	6.37
1975						
	R	49	3.55	5.78	5.10	4.67
	N–R	81	4.41	5.62	4.77	5.12
	N–C	860	5.14	6.54	6.34	5.95
			$p = 0.005$		$p < 0.005$	
1976						
	R	34	4.82	4.53	6.17	5.21
	N–R	63	5.22	5.41	6.22	5.95
	N–C	893	6.83	5.77	5.98	5.29
			$p = 0.005$			
1977						
	R	39	3.79	5.69	4.18	6.36
	N–R	83	4.18	5.51	5.53	4.82
	N–C	1006	5.21	5.99	4.61	6.12
			$p < 0.005$			
1978						
	R	52	5.79	4.81	4.73	6.90
	N–R	71	6.59	5.35	5.83	6.32
	N–C	1203	6.01	5.28	5.55	6.27
1979						
	R	36	5.06	5.53	4.67	5.25
	N–R	64	5.11	6.20	5.55	5.95
	N–C	981	6.24	5.92	5.61	5.55
			$p < 0.05$			

three dimensions out of 124 possible correlations (4 scales × 2 administration times × 3 dimensions) in the 1973 class, 6 scales in the 1974 class, 6 scales in the 1975 class, 5 scales in the 1976 class, 5 scales in the 1977 class, 6 scales in the 1978 class, and 6 scales in the 1979 class. Of these 43 correlations between scales and dimensions, 9 were between the anxiety scale and one of the dimensions, 6 were

between intellectualism and one of the dimensions, 16 were between authoritarianism and one of the dimensions, and 12 were between sociability and one of the dimensions. Only authoritarianism correlated $|r| > 0.20$ with at least one dimension in all seven of the classes. The highest of these correlations was 0.59 (43 df, $p < 0.001$) between authoritarianism and the first dimension of the sociometric space generated by the interaction choices in the 1975 class.

Because of this very impressive relationship, the individual item responses comprising the authoritarianism scale of the 1975 class were correlated with the sociometric dimensions to discover the particular items which account for this high correlation. Of 25 correlations between individual authoritarianism items and the first dimension of the sociometric space, 12 were $|r| > 0.30$. Closer examination of these correlations revealed that 11 of the 12 highly related items have content directly reflecting religious attitudes, including 'I believe in a life hereafter' ($r = -0.62$) and 'I believe in the worth of humanity but not in God' ($r = 0.34$).

The nature of these items suggested a Guttman-type scale expressing increasingly firm belief in God. In order to investigate the relationship of the authoritarianism scale to the seven sociometric spaces (one of each class), it was necessary to determine if the religious items constituted a Guttman scale. Correlations were computed among the 14 religious items of the authoritarianism scale using all responses available from the 1973 through 1979 classes ($n = 339$). A missing correlation programme was used (MCORR in the MIDAS, Michigan Interactive Data Analysis System) which uses complete data for each pair of items. This results in variable subjects sizes for the 91 correlations ($(14 \times 13)/2$). In our correlations, ns varied from 301 to 336 with an average n of 323.6. Three of the 14 items were reflected to produce a lower half matrix with no negative entries.

This lower half matrix, representing the correlations among the fourteen religious items, was input to SSA-1, and a 2-dimensional solution was generated (Kruskal's stress $= 0.14$). The plot of the dimensional coordinates (see Figure 1) was visually examined for evidence of a simplex (Lingoes & Borg, 1977), which suggests the presence of a Guttman scale. Eight items can be seen to form a non-recursive line. Except for very minor abbreviations, the correlation matrix of the eight items (see Table 2) contains highest loadings close to the diagonal with decreasing correlations downward in

FIGURE 1

Smallest space analysis (SSA-1) of the correlations among 14 religious items of
the OPI. Dashed line represents the simplex indicating a Guttman Scale among 8
items (see Table 2)
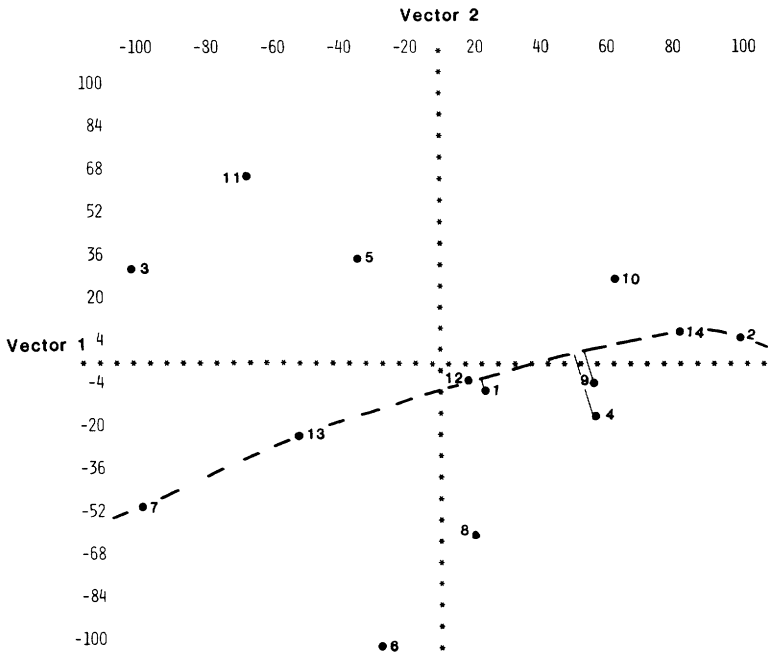
each column and leftward in each row. This pattern of correlations
statistically confirms the geometric evidence of a simplex.

Subjects' responses on the eight items of the Guttman scale were
combined so that each individual had a religious index ranging
from 0 to 8. Conjoint measurement-5 (CM-5, Lingoes, 1973) was
used to calculate the nature of the relationship between the three
dimensions of the sociometric space for each class (predictors) and
the religious index (criterion). Table 3 lists the multiple R^2 for each
class. The 1975 and 1977 classes contained regions related to the
religious index, particularly, the first dimension of the 1975
sociometric space ($\beta = 0.49$) and the third dimension of the 1977
sociometric space ($\beta = -0.41$). Monotonic transformations of the
dimensions did not result in higher relationships.

TABLE 2
OPI authoritarianism scale items constituting a Guttman Scale

Item number	Content
2	I believe there is a God.
14	(Reflected) I believe in the worth of humanity but not in God.
9	God hears our prayers.
4	I believe in a life hereafter.
1	I pray several times a week.
12	I go to church or temple almost every week.
13	(Reflected) We cannot know for sure whether or not there is a God.
7	When science contradicts religion it is because of scientific hypotheses that have not been and cannot be tested.

	2	14 (R)	9	4	1	12	13 (R)	7
2	--							
(R) 14	0.85	--						
9	0.65	0.72	--					
4	0.59	0.57	0.70	--				
1	0.48	0.52	0.66	0.67	--			
12	0.42	0.46	0.61	0.60	0.73	--		
(R) 13	0.17	0.21	0.36	0.38	0.46	0.43	--	
7	0.17	0.16	0.24	0.23	0.28	0.32	0.30	--
	2	14 (R)	9	4	1	12	13 (R)	7

ITEMS

TABLE 3
Relationship between the sociometric spaces and religious Guttman-scale index using CM-5

Class	n	Multiple R^2	F	df
1973	41	0.15	2.04	(3,35)
1974	49	0.11	1,75	(3,43)
1975	44	0.26	4.52**	(3,38)
1976	44	0.06	0.88	(3,38)
1977	43	0.25	4.19*	(3,37)
1978	52	0.01	0.11	(3,46)
1979	45	0.10	1.47	(3,39)

*$p < 0.05$
**$p < 0.01$

Hypothesis 3
Fourth year interaction data were available for 2677 pairs in the 1974-7 classes. Table 4 shows the cross tabulation of no-choice, non-reciprocated, and reciprocated choice pairs at two years and four years. At the end of the fourth year, 40 of 112 second year reciprocated interaction pairs had maintained their relationships. Of 2362 no-choice pairs in the second year sample, 2195 had persisted as no-choice pairs at the end of four years.

TABLE 4
Number of interaction pairs by category for classes 1974-7

		4-year choices	
	None	**Non-Recip.**	**Recip.**
2-year choices:			
None:	2195	126	41
Non-Recip.:	109	43	51
Recip.:	43	29	40

OPI Time 1 data (absolute value differences between scale scores) were available for 2640 pairs, and OPI Time 2 data were available for 2604 pairs. Planned comparisons between the two most extreme groups (consistent no-choice pairs versus consistent reciprocated choice pairs) revealed highly significant difference on intellectualism Time 1, $F(1,2631) = 9.48$, $p < 0.005$. The mean standardized difference between persistent reciprocal interaction pairs was -0.48 ($n = 38$). The mean standardized difference between persistent no-choice pairs was 0.019 ($n = 2169$), indicating that persistent interaction pairs were significantly more similar on intellectualism before they entered the Inteflex programme. The difference between persistent no-choice pairs and persistent reciprocated choice pairs approached significance on sociability Time 1, $F(1,2631) = 3.40$, $p < 0.07$. The mean standardized difference for interaction pairs was smaller than for no-choice pairs, indicating that established interaction pairs are slightly more similar on sociability than consistent no-choice pairs.

Comparisons between reciprocated interaction pairs at two years which persisted to four years ($n = 40$) versus those which did not (no choice at four years, $n = 43$) revealed significant differences at Time 1 on intellectualism, $F(1,2631) = 6.64$, $p < 0.001$, and at Time 2 on intellectualism, $F(1,2595) = 6.05$, $p < 0.025$. Standardized mean differences were smaller for the persisting

reciprocal interaction pairs, indicating more similarity for this group in intellectualism before entering the programme and at the end of the second year. No comparisons among the four versus two year interaction pairs revealed significant differences in authoritarianism.

Further analyses

Both the analysis of variance of absolute value differences between authoritarianism scale scores and the non-metric regression analysis using the sociometric space coordinates as predictors and the religious Guttman-scale as the criterion led us to believe that people who report interacting with each other are more similar in their religious attitudes than people who do not report interacting together. Additional information (church affiliation and reported church attendance) were available for these subjects, and we decided to analyse these data for evidence of increased similarity between interaction pairs. The two items, 'What is your religious preference' and 'How often have you attended religious services in the past year or so?' were included in Part 2 of the College Student Questionnaire (ETS, 1965) which had been filled out by the subjects in their second year in the programme. Religious affiliation data were available for both halves of 304 reciprocated interaction pairs in the 1973–9 classes, and church attendance data were available for 307 reciprocated interaction pairs. Three response categories for the religious affiliation item, Orthodox Jewish, Conservative Jewish, and Reform Jewish, were combined because of the infrequency with which these categories were endorsed. That left five categories, Protestant, Catholic, Jewish, Other, and No Formal Religion. Observed frequencies for religious affiliation among reciprocal interaction pairs and expected frequencies based on a pro-rating of the religious affiliations of no-choice pairs revealed a greater than expected frequency with which reciprocal pairs were both Jewish (34 expected versus 66 observed). No other differences were worthy of note.

The results for frequency of church attendance are given in Table 5. Because the scale is ordinal, with values from 1 (does not attend church at all) to 6 (attends church more than once a week), the diagonal cells and cells directly above and below the diagonal indicate similar church attendance. The ∇p measure (Hildebrand, Laing, & Rosenthal, 1977) reveals (296–234)/296 or 21% reduction in error of prediction of church attendance for the reciprocal

interaction pairs. While this is not an overwhelming reduction, it does indicate that reciprocal interaction pairs are more similar on church attendance than no-choice pairs.

TABLE 5
Observed (above) and expected* (below) frequencies of church
attendance for reciprocated interaction pairs, classes 1973–9

Ordinal value for chooser	Ordinal value for chosen					
	1	2	3	4	5	6
1	50	49	16	5	30	5
	(50)	(47)	(16)	(9)	(36)	(9)
2	49	70	34	11	29	5
	(47)	(54)	(23)	(12)	(37)	(8)
3	16	34	6	7	9	6
	(16)	(23)	(8)	(5)	(16)	(3)
4	5	11	7	2	5	1
	(9)	(12)	(5)	(2)	(8)	(2)
5	30	29	9	5	36	9
	(36)	(37)	(16)	(8)	(24)	(6)
6	5	5	6	1	9	8
	(9)	(8)	(3)	(2)	(6)	(2)

* Expected frequencies based on a pro-rating of no-choice pair data.

Conclusions

Our data indicate that the similarity between reciprocal interaction pairs was not as strong before entering the Inteflex programme as it was after two years of acquaintance. The nature of the similarity (religious attitudes) had been found previously by Richardson (1940) and by Newcomb (1961). The increased similarity following acquaintance was not the cause of choice, as Newcomb had found (Newcomb 1961, p. 254), but rather choice and increased similarity co-occurred. Reciprocal interaction pairs were not as similar before they met (Time 1) as they became after two years of acquaintance

and at the time of mutual choice (Time 2). The OPI items which accounted for the similarity were shown to form a Guttman scale of increasingly firm belief in God. These items have the characteristic of being non-verifiable (e.g., 'God hears our prayers.'), a property found by Byrne, et al. (1966) to account for similarity effects in their bogus stranger paradigm and by Lea & Duck (1982) in a real-life study of mutual friends.

Religious affiliation was for the most part not involved in interpersonal attraction, but frequency of church attendance was weakly related. Behavioural theories of attraction have been largely untested. Within the context of our study, we propose that students who attend church frequently are attracted to other students who attend church frequently because of the restrictions church attendance places on other social activities. Further, you will notice in Table 5 that it is not just frequent church attenders who are over-represented in the reciprocal dyads, but also students who chose ordinal values 2 and 3 (i.e., 'only on important religious holidays' and 'about once a month). These infrequent church attenders may structure their free time around other interests (e.g., athletics, discussion groups, partying) that increase their interaction time. The subsets of students who spend their time playing tennis or partying would be different from the subset who attend church several times a week. The leisure time interactions of these various subsets would rarely overlap. Because all students within the programme have identical career goals of becoming physicians, the effect of similar major scholastic interest was controlled in this study. Likewise, because students for the most part lived in the same dormitory the first year and attended most of their classes together the first two years, propinquity is diminished in importance as a determinant of differential attraction. While these controlled factors limit the generalizability of our data, the fact that the findings are in agreement with numerous other studies using various groups of subjects argues that the phenomenon is widespread.

The change in the basis of similarity for reciprocal interaction dyads persisting to the fouth year (Time 3) from religious items to intellectual items may be a reflection of the phenomenon demonstrated by Duck (1973b) and Duck & Craig (1978). They found that subjects were more similar on personality variables early in their acquaintance. While the religious items on the OPI tap belief systems, the intellectual items tap likes and dislikes, what

subjects enjoy or don't enjoy doing. These preferences are more related to personal constructs, dimensions on which one categorizes oneself and people one knows. The psychological constructs Duck (1973a) listed (e.g., ambitious, self-opinionated, interesting and mature) would be more reflected in intellectualism items such as 'I enjoy reading essays on serious or philosophical subjects' than in the religious items such as 'I believe in a life hereafter.'

Increased similarity on intellectualism measured before acquaintance for persisting reciprocal pairs versus non-persisting pairs (reciprocal choices at two years but no choice at four years) argues that pre-existing similarity was an important factor leading to attraction. Relationships which persisted to four years, after the fifty-person classes had been assimilated into the larger medical school and interactions were no longer structured around common living quarters, must have been strong indeed. (This is reflected in the overall decrease in number of Inteflex students nominated as interaction partners at four years.) Our findings support the bogus stranger results that similarity leads to liking (Byrne, 1969). We feel, however, that our results go beyond a simple similarity-liking linkage to the more complex similarity-liking-similarity sequence. We favour a filtering interpretation (Duck, 1973a,b; 1977) which allows for differing bases for attraction during long term acquaintance. La Gaipa's (1979) caution that time-related changes are also age-related changes is particularly applicable here. Our subjects, first contacted in high school, were approximately 22 years old at the time of their fourth year choices. The years from 18 to 22 are noted for fast personal and social development. The change to intellectual bases for interpersonal attraction may reflect age-related change as well as time-related change.

The Guttman-Lingoes nonmetric series was found to be useful in generating inter-individual distances from sparse sociometric matrices, and the distances generated by SSA-1 were more faithful to the original interaction categories than the distances generated by M-D-SCAL. The Guttman-Lingoes programmes provide a representation of the classes in a minimum of dimensions (in our case three), and these dimensions can be correlated with personality variables (or any other data of interest which characterize the individuals in the group) for efficient identification of relationships between personality variables and interaction choices. This methodology is restricted to cohesive groups, such as fraternities and sororities, since the sociometric space generated must represent

some psychological reality. We believe that within these restricted applications, the Guttman-Lingoes programmes are the method of choice.

This data set was unique in that personality measures were collected before acquaintance and two years after acquaintance (at the time of the first interaction choices) and the interaction choices were longitudinal, occurring two and four years after acquaintance. Such long time spans are rare in interpersonal research (cf., Duck & Craig, 1978). The limitations imposed from working with a data set collected for other purposes were far outweighed by the advantages of addressing the similarity-acquaintance-similarity issue and following up our findings by analysing related items in the extensive data set. We feel that we have strong evidence that similarity and acquaintance affect each other and that differing personality dimensions are important during the course of long-term acquaintance.

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