

## Personality Effects on Social Relationships

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Personality influences on social relationships and vice versa were longitudinally studied. Personality affected relationships, but not vice versa. After entry to university, 132 students participated for 18 months in a study in which the Big Five factors of personality, the subfactors Sociability and Shyness, and all significant social relationships were repeatedly assessed. A subsample kept diaries of all significant social interactions. After the initial correlation between personality and relationship quality was controlled for, Extraversion and its subfactors, Agreeableness, and Conscientiousness predicted aspects of relationships such as number of peer relationships, conflict with peers, and falling in love. In contrast, relationship qualities did not predict personality traits, and changes in relationship qualities were unrelated to changes in personality traits. Consequences for dynamic-interactionistic views of personality and relationships are discussed.

Over the past 20 years, dynamic interactionism has been the main paradigm for the study of personality development. It is assumed that individuals develop in a dynamic, continuous, and reciprocal process of interaction, or *transaction*, with their environment (Caspi, in press; Magnusson, 1990; Sameroff, 1983). The present study is an attempt to apply the dynamic-interactionistic framework to the codevelopment of personality and social relationships in young adulthood. Is personality already so much crystallized at the end of adolescence that it is immune to future experiences in social relationships with parents and peers? Or do important life transitions (Elder, 1985), such as the transition into the new social world of university, change personality through new experiences with peers and the decreasing contact with one's family of origin? If students' social relationships are destabilized during such a life transition, is the reorganization of their relationships influenced by their personality? We attempted to answer these questions empirically through an intensive longitudinal study of both personality and social relationships during the transition to university.

### Personality–Relationship Transaction

In the dynamic-interactionistic paradigm, both personality and environment are assumed to be stable over short periods of time such as a few weeks. Notwithstanding this short-term stability, it is assumed that both personality and environment can change over longer periods of time such as months and years and that such change can be due to both environmental influences on personality and personality influences on the environment. The

assumption of a causal flow from personality to environment distinguishes dynamic interactionism from earlier views of personality development that considered exclusively environmental effects on personality (e.g., socialization within the family).

The dynamic-interactionistic framework can also be applied to the transaction between personality and social relationships. A dyadic social relationship is characterized at the behavioral level by a relatively stable interaction pattern and at the cognitive level by a relationship schema that consists of relationship-specific mental representations of self, other, and the interaction pattern (Baldwin, 1992). Because the personality of the other is part of one's own environment, dyadic social relationships can be viewed as products of the transaction of two individuals. From this perspective, the quality of a social relationship is a function of the personality of both participants and their interaction history (including third-party influences and chance).

Therefore, reciprocal influences are expected also between personality and social relationships. For example, sociable individuals may actively create opportunities for new relationships by spending more time with others (Diener, Larsen, & Emmons, 1984), and agreeable persons may minimize interpersonal conflict by being less aggressive or by provoking less aggression from others (Graziano, Jensen-Campbell, & Hair, 1996; Patterson, 1982). In contrast, experiences in close relationships may also influence later personality. For example, infants' experience of a sensitive parent may increase their social competence (Goldsmith & Alansky, 1987), or being married to a religious wife may increase the religiousness of the husband (Caspi, Herbener, & Ozer, 1992).

Although studies on the transaction between personality and close dyadic relationships are important, they provide only fragmentary insight into the overall scope of personality-relationship transactions. As an alternative, all significant dyadic relationships of a person can be studied at once by a social network approach. Individuals are asked to list all persons that are currently important to them and to rate the quality of their relationship with each of these persons on various dimensions (e.g., perceived support). The resulting Person  $\times$  Quality matrix of

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an individual represents the individual's ego-centered network of social relationships (e.g., Milardo, 1992).

From this matrix, various variables can be generated through aggregation across all relationships, such as the number of relationships, the mean conflict across all network members, and whether one has recently fallen in love. These variables do not describe concrete relationships; they describe the "relationship status" of the target individual (Asendorpf & van Aken, 1994). The relationship status is a function of the individual's personality and of numerous environmental influences on the dyadic relationships with network members.

Studying transactions between personality and relationship status has the advantage that personality effects on relationships and vice versa are aggregated across relationships, thus reducing the impact of chance influences on each particular relationship effect. As in all studies relying on aggregated measures, the disadvantage of this approach is that effects are less easy to interpret because they refer to many different relationships. This disadvantage can be reduced, however, by aggregating over particular kinds of relationships (e.g., studying the number of same-sex peers or the conflict with parents). Because variables of relationship status can be generated at different levels of aggregation, the network approach provides an extremely flexible tool of relationship assessment that has not been sufficiently explored by personality psychologists, with the notable exception of studies of social support (B. R. Sarason, Sarason, & Pierce, 1990). We used a social network approach to study the relationship status in the present study.

### The Empirical Study of Personality-Relationship Transactions

Although dynamic-interactionistic views on personality development have been well accepted for more than a decade (e.g., Patterson, 1982; Sameroff, 1983), empirical evidence on the relative strength of personality effects on relationships and vice versa is surprisingly limited. In synchronic correlations between personality and relationships, both effects are hopelessly confounded; thus, only longitudinal studies can try to disentangle them.

Although there exist now numerous longitudinal studies on personality, some of which include assessments of relationships, most are severely limited because the relationship status was measured only once (mostly at the first assessment). For example, many studies related early attachment to mother or the sociometric status in the peer group to later developmental outcomes. Several of these studies were based on the assumption that correlations between early relationship status and later personality can be interpreted in terms of relationship effects on personality. This assumption can be misleading, however, because the early relationship status may be simply a correlate of a stable personality trait. For example, a correlation between early peer rejection and later aggressiveness may be caused by stable aggressiveness along with early rejection of aggressive children by their peers.

To avoid such a misinterpretation, researchers might be tempted to assess instead both the relationship status and the personality at Time 1 and 2 and to contrast the cross-lagged correlations between early relationship status and later personal-

ity and between early personality and later relationship status. As Rogosa (1980) pointed out, the direct comparison of cross-lagged correlations can be erroneous if the stability of personality is different from the stability of the relationships. What should be interpreted are path coefficients that control indirect effects of stable correlates of the predictors. This approach is used in path analysis (e.g., Kessler & Greenberg, 1981) as well as in structural equation modeling (e.g., LISREL, EQS). However, it should be noted that causal interpretations of such paths can also be misleading if unmeasured personality or environmental variables influence both the personality and the relationship variables in the path model.

Such cross-time paths from personality to relationships and vice versa describe only one type of causal effect between personality and relationships, however. A second type of effect occurs after Time 1, inducing a correlation between relationship and personality *change*. For example, the death of one's spouse after Time 1 may lead at Time 2 to lower emotional support (change of relationship status) and consequently to lower chronic self-esteem (personality change), or a therapeutic intervention after Time 1 may decrease one's shyness (personality change) and consequently increase one's emotional support (change of relationship status).

If personality and relationship change are measured by difference scores, the correlation between these change scores may seriously underestimate this type of causal effects. As Rogosa, Brandt, and Zimowski (1982) pointed out, the best solution to this problem is to measure change using more than two assessments. For each person, a growth curve is fitted to many assessments. Parameters of the curve, for example, the slope of the regression line that describes linear change, are more reliable than differences between the last and the first assessment because their estimations are based on more than two assessments.

Therefore, it is desirable to assess both personality and relationship status more than twice in studies of personality-relationship transaction. Effects of personality on relationships and vice versa can then be studied by (a) paths from early personality to later relationships, (b) paths from early relationships to later personality, and (c) correlations between growth curve parameters of personality change and relationship change. The present study followed this strategy.

Few, if any, longitudinal studies of personality exist that compared the relative strength of personality effects on relationships and vice versa on the basis of path analyses or the analysis of correlated change. Despite this meager empirical basis, there is general consensus in the current literature that relationship influences on personality are rare in middle adulthood because adults' personality is extremely stable after 30 years of age, at least in Western cultures (e.g., McCrae & Costa, 1990). In contrast, it is also generally accepted that personality is somewhat less stable during the decade between 18 and 30 years of age when most people experience important life transitions, such as leaving one's family of origin, entering college and the job market, marrying, and becoming a parent (Haan, Millsap, & Hartka, 1986; McCrae & Costa, 1990), and this lower stability is often interpreted as reflecting stronger environmental influences.

### Design of the Present Study

The aim of the present study was to compare the relative strength of the effects of personality on relationship status and

vice versa in young students after their transition to university. We followed such a sample from their entry to university for 18 months, with repeated assessments of personality and relationship status. All participants encountered the new social world of university at the beginning of the study, thus providing them plenty of opportunity to avoid or create new peer relationships and to continue or to discontinue their old relationships with peers, parents, and siblings. Therefore, we expected that the participants' relationship status would change more than their personality.

Because of this asymmetry, we expected that the students' personality would be more stable than their relationship status and that relationship effects on personality would mainly concern effects occurring after entry to university, that is, after the first assessment of the study. Therefore, it was particularly important to measure relationship change reliably on the basis of many measurement points. For personality, we expected less change. Consequently, we assessed relationships more often (seven assessments with 3-month retest intervals) than personality (four assessments with 6-month retest intervals).

We chose the Big Five factors of personality as the main personality traits. Our choice was not guided by an assumption that these five factors sufficiently describe personality differences (see Block, 1995, for a critical evaluation of the Big Five approach). We thought, however, that all factors might be relevant for relationship change, and we had to restrict the traits to a reasonable number. In addition, we assessed two subfactors of Extraversion: Shyness and Sociability. Although Shyness correlates negatively with Sociability, there is evidence for a discriminant validity of these two subfactors of Extraversion (Asendorpf & Meier, 1993; Bruch, Gorsky, Collins, & Berger, 1989; Cheek & Buss, 1981). Sociability is more related to the selection of social situations (e.g., "I prefer a party to reading a book"), whereas Shyness is more related to uneasiness in unfamiliar or socially evaluative situations (e.g., "I feel inhibited in the presence of strangers" or "I feel uneasy in the focus of others' attention"). Consequently, Neuroticism is more closely related to Shyness than to Unsociability (Asendorpf, 1989b; Briggs, 1988). We expected that both subfactors of Extraversion would be relevant to the development of social relationships in the new social setting of the university.

As already indicated, relationship status was assessed mainly by a social network approach. A problem of this method is that relationships are judged in retrospect. Retrospective judgments of relationships are subject to biases such as poor memory for interactions that occurred more than a few days ago (Kashy & Kenny, 1990) and overemphasis on emotionally positive or negative interactions (Reis & Wheeler, 1991). In addition, one's current mood influences one's judgment of past interactions (Forgas & Bower, 1987). Therefore, we assessed relationships two additional times by a 3-week diary procedure similar to the Rochester Interaction Record (RIR; Reis & Wheeler, 1991). Because the judgmental interval is much shorter in a diary (1–2 days), retrospective biases are less pronounced, and because judgments on many days are aggregated, effects of nonstable mood differences are minimal. We did not want to rely fully on a diary approach, because more than two diary phases seemed practically impossible, in turn making it difficult to study relationship changes with high reliability.

## Hypotheses

Although we are aware of no studies of personality effects on social relationships, or vice versa, that used our rigorous tests for causal influences, findings about synchronic correlations between the Big Five and relationship status provided tentative hypotheses. We expected influences between Extraversion, particularly the subfactors Sociability and Shyness, and the number of social relationships, particularly with peers (I. G. Sarason, Levine, Basham & Sarason, 1983; B. R. Sarason, Shearin, Pierce, & Sarason, 1987; Stokes, 1985), rate of social interaction (Diener et al., 1984), and the perceived available support from relationships (Sarason et al., 1983); between Neuroticism and the negative quality of relationships (Henderson, Byrne, & Duncan-Jones, 1981; I. G. Sarason et al., 1983); and between Agreeableness and low frequency and intensity of interpersonal conflict (Graziano et al., 1996). No hypotheses could be derived for Conscientiousness from the literature, but we speculated that it might be related to the longevity of peer relationships. Openness to Experience is related to the openness of peers in one's network (McCrae, 1996), but because we were not aware of this relation when we began the study, we did not include ratings of the network members' personality, attitudes, or values that would have enabled us to study effects of Openness on the openness of network members and vice versa.

## Method

### Participants

When students of Humboldt University, Berlin, enrolled a few weeks before their first term opened in October, they were asked to participate in a longitudinal study on social relationships. They were promised to be entered in a lottery with an average prize of approximately \$25 after 1 year of participation, approximately \$35 at the end of the study, and personal feedback on their individual results. Only students below 23 years of age were included. During the second week of their first term, 173 women (age 18–22 years,  $M = 20.0$ ) and 64 men (age 18–22 years,  $M = 20.4$ ) participated in the first session. They represented 28% of the female, but only 12% of the male, first-year students below 23 years of age. Thus, the self-selection for the study was strong, particularly for the males.

### Assessments

The initial sample was invited to participate in group assessments every 3 months close to the opening or ending of a term. In addition, the participants of the first assessment were asked to participate also in an optional diary study consisting of two 3-week phases in their first and second term; personal feedback on the individual results in this part of the study was also promised. A total of 119 students participated in the first phase, and 102 in the second phase. The phases began 1 month after the first and third assessments.

### Procedures and Measures

*The Big Five and subfactors.* The Big Five factors of personality were assessed every 6 months by the German version of the NEO-FFI, by Costa and McCrae (1989; Borkenau & Ostendorf, 1993). In addition, the subfactors Shyness and Sociability were assessed by five-item scales. The shyness scale consisted of four items reported by Asendorpf (1987)

with the additional item "I feel uneasy at parties and in large groups." The Sociability scale consisted of five items that referred to a preference for being with people (e.g., "I find people more stimulating than everything else"). All items were randomly mixed and presented in a 5-point agreement format ranging from 1 (*not at all*) to 5 (*completely*).

**Relationship questionnaire.** In the first assessment, participants were asked to list all persons that were currently personally important to them. To minimize errors of omission, we asked them to check the following categories of relationships: (step)mother, (step)father, siblings, grandparents, other relatives; (former) partner (married, engaged, or serious relationship); other people in their (former) home, neighbors; former friends from school, military, and so forth; student friends; coworkers at jobs; members of clubs or organizations; and other friends or acquaintances. All listed persons were identified by their initials, relationship category, sex, age, and relationship duration. Also, the quality of the participant's relationship with each person during the last 3 months was rated on eight Likert-type scales. For the present study, four scales produced significant findings: contact frequency (6-point scale ranging from 1 = *less than once a month* to 6 = *daily*); perceived available support (5-point scale, "If I have problems, I would turn to this person to talk about my problems," ranging from 1 = *never* to 6 = *always*); conflict (5-point scale ranging from 1 = *never* to 5 = *nearly at every encounter*); and falling in love (5-point scale ranging from 1 = *not at all* to 5 = *very much so*). Because the distribution of falling in love across all participants and relationships was bimodal at all seven assessments, a new variable, in love, was created that distinguished only between not strongly in love (scale points 1–3) and strongly in love (scale points 4–5). Rated were also satisfaction with contact, importance of relationship, closeness of relationship, and frequency of intercourse during the last month, but these variables did not produce significant findings.

In the following six assessments, the participants received an outprint of their last questionnaire, excluding the eight ratings of relationship quality. They were asked to delete those persons that they did not consider important any more, to check the data of the remaining persons for correctness, and to add new persons that were currently important to them. Subsequently, they rated the revised list of persons on the eight scales for relationship quality since the last assessment.

**Diary.** The participants were introduced to the procedure in small groups. They were asked to maintain a diary for 21 days, to skip unusual days (e.g., due to major illness), and to make up for such days by adding more days to the diary phase. They received "interaction sheets" and 21 envelopes with postage and were asked to record all social interactions of a day at the end of that day or, at the latest, the next morning and to mail a day's record the next morning. Thus, the delay between the date of a record and the date of the postmark on the envelope was at least 1 day (and on weekends a day longer). The mean delay between recording date and postmark was 1.99 days in the first and 1.92 days in the second phase. Because participants reported that they sometimes mailed completed sheets a day too late, the real delay in reporting was only approximately half a day on average.

Interactions were defined by the criteria of the Rochester Interaction Record (RIR; Reis & Wheeler, 1991). In contrast to standard RIR instructions, participants were asked to report not only interactions lasting for at least 10 min but also shorter interactions if these were emotionally arousing (e.g., an angry phone call). We felt that it was necessary to include such interactions because of their high significance for the social relationships.

The interaction sheet of a day was divided into rows and columns; rows represented interactions, and columns, variables. Participants reported the beginning and end of the interaction; identified the interaction partner by initials, location, and type of interaction by various codes; and rated the interaction on nine Likert-type scales. For the present study, the interaction types romantic interaction and family interaction

(interactions involving a parent or a sibling) and the rating of conflict (5-point scale ranging from 1 = *no conflict* to 5 = *very strong conflict*) are relevant. Participants were instructed to decompose group interactions into up to five major dyadic interactions with group members and to record each such interaction separately. In addition, participants were instructed to keep a "partner sheet," on which they recorded all interaction partners of the diary phase. They reported initials, age, sex, relationship duration, and type of partner (as in the relationship questionnaire). This procedure made it possible to obtain detailed information on the interaction partners without forcing the participants to provide this information more than once during the diary phase.

Participants were not paid for the diary. To keep their motivation at a high level, we created a hotline they could call if they had problems with the procedure, told them that forgetting to record a day once was just human (but contacted them immediately if their data did not arrive for two days in a row), and sent them a letter reinsuring their participation in the middle of each phase. More than 90% of the participants who began a diary phase kept on until the end.

In Phase 1, the 101 participants reported an average of 9.7 interactions per day on 16–23 days ( $M = 20.90$  days). In Phase 2, they reported an average of 10.9 interactions per day on 16–23 days ( $M = 20.98$  days). In both phases, the interaction partner could be identified in more than 95% of the cases.

## Results

### *Selectivity and Attrition of the Sample*

Participants who did not participate in one assessment were invited to the next one, but not once more if they did not appear the second time. Sample size dropped from initially 237 to 160 participants in the second assessment and then stabilized (sizes for the following assessments were 153, 141, 138, 135, 132). The analyses reported below refer only to those 92 women and 40 men who participated in the first and the last assessment. Because we had tolerated one missing participation, the effective sample sizes for the seven assessments varied between 123 and 132. The analyses of the diaries refer to those 70 women and 31 men who completed both diary phases.

We tested the representativeness of the initial sample ( $n = 237$ ) by comparing the means and standard deviations of the NEO-FFI scales with the norms that are based on 2,112 participants of the German population (mean age = 29 years; Borkenau & Ostendorf, 1993). Because of the large *degree of freedom* in the tests involving the normative sample, we report also effect sizes ( $d = 2t/\sqrt{df}$ ). The initial sample had significantly higher scores in Openness to Experience,  $t(2,347) = 6.16, p < .001, d = .25$ , and Agreeableness,  $t(2,347) = 5.96, p < .01, d = .25$ , than the normative sample; for Extraversion, Neuroticism, and Conscientiousness, significant differences were not found. The small Openness effect is expected for a student sample, whereas the small Agreeableness effect can be attributed to the self-selection of the participants. The variance in the scales was not restricted (mean *standard deviation* for the scales was .58 for the normative sample and .59 for the initial sample).

We studied attrition effects by comparing the 105 dropouts with the 132 participants of the final sample, and the 101 participants of the diary sample with the remaining 136 participants, in the first assessment of personality and relationships. Conscientiousness was higher in the final sample,  $t(235) = 3.29, p < .001, d = .43$ , and the diary sample,  $t(235) = 3.57, p < .001,$

Table 1  
*Mean Intercorrelations of the Personality Scales Across the Four Assessments*

Scale	1	2	3	4	5	6	7
1. Extraversion	—	.75	-.67	-.42	.17	.04	.11
2. Sociability		—	-.58	-.26	.26	.05	.08
3. Shyness			—	.45	-.14	.03	-.01
4. Neuroticism				—	-.14	-.20	.15
5. Agreeableness					—	.13	.12
6. Conscientiousness						—	.00
7. Openness							—

Note.  $N = 132$ . Mean correlations were computed using Fisher's  $r$  to  $Z$  transformation.

$d = .47$ ; the differences for the other six scales were not significant. The Conscientiousness effect is not surprising for an intensive longitudinal or diary study. No restrictions of range due to attrition were observed (mean *standard deviation* for dropouts in the Big Five scales was .59, compared with .58 for the final and the diary sample). The dropouts were also compared with the final and the diary sample with regard to five main relationship variables: overall network size, number of peers, and available support from peers, mother, and father. Significant differences were not found in each case.

#### Sex Differences

Because the male sample was small and strongly self-selected, we did not study sex differences.

#### Intercorrelations of the Personality Scales

Because the pattern of intercorrelations was stable across the four assessments, we report here only the mean intercorrelations (see Table 1). The correlations were not significantly different from those reported by Borkenau and Ostendorf (1993). As expected, Neuroticism was more closely related to Shyness than to Sociability. A hierarchical multiple regression indicated that Sociability accounted for 56% of the variance in Extraversion, and Shyness, for an additional 9% ( $p < .001$ ).

#### Kinds of Relationships

Of the 132 participants, 98% reported a relationship with a (step)mother, 93% with a (step)father, and 83% with at least one sibling at the first assessment. Thus, these relationships were sufficiently frequent for a between-subjects analysis of relationship status. A few participants reported two mothers or fathers because a parent had remarried. Therefore, we computed mean relationship ratings for mothers, fathers, and siblings. Relationships to partners were reported by 31% of the participants at the first assessment, and this rate increased only slightly to 40% at the last assessment. We therefore analyzed only whether the participants had a partner or not. In addition, we analyzed the number of peers (defined as persons aged 18–27 years, excluding siblings) and computed mean relationship ratings for peers (overall and for same- and opposite-sex peers).

#### Changes in Means Over Time

Table 2 contains the means and standard deviations for the seven personality scales and the eight relationship variables from the relationship questionnaire that produced significant findings. (To save space, we report here only the data for every second assessment of the relationship variables.)

*Personality.* Changes in means were tested by linear and quadratic contrasts within repeated-measures ANOVAs (four measurements for personality, seven for relationships). Because of the large number of tests, only contrasts significant at  $p = .01$  are reported. For personality, significant changes were found for the three scales that are most closely related to Shyness. Shyness decreased both linearly,  $F(1, 126) = 35.13, p < .001$ , and quadratically,  $F(1, 126) = 10.76, p < .001$ ; Neuroticism decreased linearly,  $F(1, 126) = 31.52, p < .001$ ; and Extraversion increased linearly,  $F(1, 126) = 7.25, p < .01$ . Table 2 indicates that the quadratic effect for Shyness was due to a particularly strong decrease during the first 6 months. No other contrasts were significant. Together, these findings indicate that the participants' Shyness and Neuroticism decreased, leading also to a slight increase in Extraversion.

*Relationship questionnaire.* Strong linear and quadratic increases were found for the number of peer relationships (in both cases,  $F(1, 109) > 28.50, p < .001$ ). In contrast, neither the linear nor the quadratic effect for the number of nonpeer relationships was significant. Thus, increases were restricted to peer relationships. The reported contact with mother, father, and siblings decreased linearly: for mother,  $F(1, 106) = 25.68, p < .001$ ; for father,  $F(1, 100) = 22.44, p < .001$ ; for siblings,  $F(1, 88) = 9.59, p < .01$ . Perceived available support from opposite-sex peers also decreased particularly during the first 6 months: for the quadratic contrast,  $F(1, 105) = 28.62, p < .001$ . The contrasts for love and conflict with opposite-sex peers were not significant at  $p = .01$ .

The change in the number of peer relationships was analyzed in more detail. Figure 1 shows a strong increase in the number of peers over the first term (first to second assessment), no change between the end of the first and the beginning of the second term (second to third assessment), again an increase over the second term, though less marked than for the first one, a slight decrease over the summer break (fourth to fifth assessment), and then fairly constant means.

This change function suggested that new peer relationships were established mainly during a term, not during the breaks.

Table 2

Means, Standard Deviations, Reliability, and Stability of Personality Traits and Relationship Status (Relationship Questionnaire)

Variable	M at month				SD at month				R <sup>a</sup>	Stability r <sup>b</sup>		
	0	6	12	18	0	6	12	18		6	12	18
Big Five												
Extraversion	3.33	3.39	3.40	3.43	0.59	0.59	0.57	0.58	.83	.86	.79	.79
Sociability	3.49	3.50	3.48	3.48	0.68	0.65	0.63	0.63	.71	.79	.72	.76
Shyness	2.86	2.67	2.61	2.59	0.82	0.82	0.77	0.77	.86	.84	.77	.80
Neuroticism	2.84	2.72	2.65	2.59	0.66	0.65	0.72	0.66	.86	.80	.75	.72
Agreeableness	3.69	3.72	3.70	3.71	0.50	0.47	0.46	0.43	.76	.79	.75	.74
Conscientiousness	3.63	3.55	3.54	3.56	0.64	0.60	0.61	0.60	.86	.86	.79	.77
Openness to Experience	3.88	3.82	3.80	3.83	0.53	0.54	0.56	0.54	.73	.84	.80	.73
Relationship questionnaire												
Number of relationships	25.4	36.1	37.0	36.9	9.6	12.2	13.6	14.3	.86	.68	.41	.27
with peers (age 18–27)	14.2	24.4	25.0	25.4	6.2	10.0	10.8	11.0	.86	.63	.44	.30
In love <sup>c</sup>	.36	.42	.50	.48	.48	.49	.50	.50	.62	.37	.52	.42
Mean support from												
opposite-sex peers	2.55	2.29	2.31	2.34	0.72	0.53	0.63	0.61	.67	.46	.40	.35
Mean conflict with												
opposite-sex peers	1.86	1.67	1.71	1.71	0.72	0.59	0.52	0.48	.55	.26	.30	.28
Contact frequency												
Mother	4.06	3.66	3.58	3.52	1.24	1.31	1.22	1.17	.81	.63	.58	.49
Father	3.65	3.15	3.18	3.00	1.48	1.46	1.34	1.37	.82	.64	.63	.62
Siblings	3.38	2.98	2.96	2.87	1.36	1.43	1.28	1.31	.80	.75	.60	.47

Note.  $N = 132$  (for contact frequency with family members,  $n \geq 102$ ).

<sup>a</sup> For personality scales, mean internal consistency ( $\alpha$ ) across assessments; for relationship variables, mean 3-month stability following or (for last measurement) preceding assessments. Means were computed using Fisher's  $r$ -to- $Z$  transformation for correlations.

<sup>b</sup> Pearson product-moment correlation between first and later assessment at month indicated.

<sup>c</sup> No = 0; yes = 1.

Because the duration of each peer relationship had been assessed at every assessment, we could test this hypothesis directly by drawing a distinction between "new" and "old" peer relationships. Pre-university relationships were defined as "old relationships"; all others were defined as "new relationships". Figure 1 indicates that new peer relationships were established mainly during a term. Figure 1 also shows that dissolutions of pre-university peer relationships did not begin before the summer

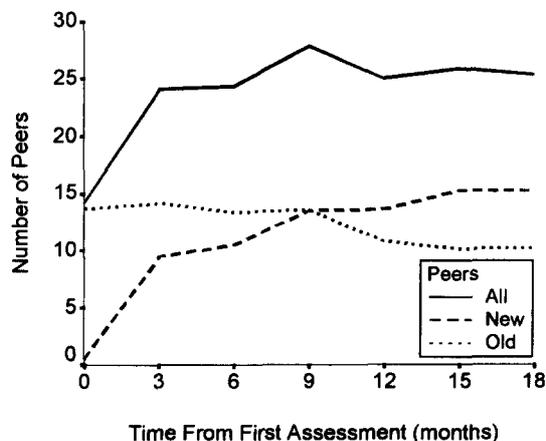


Figure 1. Change in number of peer relationships over time.

break; even after 18 months, 72% of the pre-university peer relationships were still intact. Thus, the dynamics of the peer network were mainly accounted for by the "intake" of new peers during the first term.

*Diary.* Table 3 contains the means and standard deviations for the six relationship variables from the diary that are most relevant for the analyses reported below. Changes in the means between the first and the second diary phase were tested by  $t$  tests for dependent samples. The percentage of time spent with interaction increased,  $t(100) = 2.84, p < .01$ , the percentage of time spent with opposite-sex peers increased,  $t(100) = 2.15, p < .05$ , and the percentage of interactions with family members decreased,  $t(100) = 3.00, p < .01$ . The other variables did not change significantly. This pattern of change is consistent with the increasing number of peers and the decreasing family orientation that were found with the relationship questionnaire.

#### Stability Over Time

The stabilities of the personality and relationship questionnaire variables are also shown in Table 2. The stabilities were similar for the personality scales. Therefore, we computed mean stabilities across the seven scales. The mean stability decreased only slightly with increasing retest interval, from .83 (6 months) to .76 (18 months). In contrast, the stabilities for the relationship variables varied strongly across variables. The stability of the number of (peer) relationships was moderately high over

Table 3  
Means, Standard Deviations, Reliability, and Stability of Relationship Status (Diary)

Diary variable	M		SD		Reliability		Stability <sup>a</sup>
	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2	
Interaction per day (%)	32.9	35.1	11.6	11.3	.94	.95	.77
Same-sex peers	12.4	13.2	7.3	7.3	.92	.93	.76
Opposite-sex peers	9.9	11.4	7.8	8.6	.89	.90	.64
Romantic interactions (%)	1.4	1.4	2.0	2.2	.77	.89	.51
Mean conflict with							
opposite-sex peers	1.2	1.2	0.2	0.2	.85	.85	.42
Interactions with family (%)	27.3	23.4	18.6	15.6	.96	.91	.79

Note.  $N = 101$ .

<sup>a</sup> 6-month stability (Pearson product-moment correlation).

the first 6 months, and then decreased strongly; over 18 months, the stability was only approximately .30. The stability of contact with family members decreased less strongly from an initially high level. For the other variables, only low to moderate stabilities were found, even over 6 months.

To exclude the possibility that this lower stability was simply due to a lower reliability of measurement, we also estimated the reliability of the variables. For the personality scales, internal consistencies were computed. Because the relationship variables were not based on multiple items, the 3-month retest reliability following or (for the last assessment) preceding an assessment was used. Because the reliabilities of each variable were similar across the four assessments, we averaged them in order to obtain a more reliable measure.

As Table 2 indicates, the reliabilities of the relationship variables were high for the number of relationships and the contact with family members; for the three relationship qualities, they were somewhat lower. But even in these three cases, the long-term stability was clearly lower than the 3-month stability. In contrast, the long-term stability of the personality variables was not much lower than their reliability. When the observed stabilities were corrected for attenuation, the mean estimated true 1-year stability for the five Big Five scales was .95. Thus, the lower stability of the relationship variables was not a problem of unreliable measurement. Instead, it confirmed our expectation that relationship status showed more differential change than personality.

The reliabilities and stabilities of the diary variables are presented in Table 3. We computed the reliability of a variable by correlating each variable between odd and even days and estimating Cronbach's  $\alpha$  from this correlation (split-half reliability). All reliabilities were high. The 6-month stabilities varied strongly across variables and did not reach the level of the personality scales' stability after correction for attenuation. The stability of the diary variables tended to be higher than the 6-month stabilities of the questionnaire variables, but this difference can be attributed to the higher reliability of the diary variables. All in all, the personality scales were more stable than the relationship variables when differences in reliability were controlled.

#### Effects of Personality on Relationship Status

*Relationship questionnaire.* Personality effects on the relationship questionnaire variables were tested by using a series

of multiple regressions. Each relationship variable at Time  $t$  ( $t = 2, \dots, 7$ ) was regressed on this relationship variable at Time 1 and a personality trait at Time 1; the standardized  $\beta$  for the personality trait is the path coefficient for the direct "causal" path leading from this trait at Time 1 to the relationship variable at Time  $t$ , controlling for the synchronic correlation between the trait and the relationship variable at Time 1. We applied path analysis instead of structural equation modeling of latent variables because of the relatively small sample size and the fact that the relationship variables were not assessed by multiple items.

There were regressions for six time points, seven personality scales, and 49 relationship variables (six relationship qualities for mother, father, siblings, peers, same-sex peers, opposite-sex peers, and nonpeers; number of peers, same-sex peers, opposite-sex peers, and non-peers; in love or not; whether participants reported a partner or not; and frequency of intercourse), thus yielding 2,058 possible personality effects. Because of the large number of tests, it was extremely important to avoid false positive findings.

Because of the moderate stability of the relationship variables, true personality effects were expected to show up repeatedly in subsequent assessments. Therefore, we considered only those relationship-personality combinations that produced significant ( $p < .05$ ) paths for at least three subsequent assessments. Also, we avoided redundant findings for nested variables (e.g., effects for peers and same-sex peers for the same relationship quality) by considering only the effect for the higher order variable (e.g., for peers). Only 12 of the 343 relationship-personality combinations survived these strict criteria. The path coefficients for these 12 cases are presented in Table 4.

Table 4 indicates that three of the Big Five influenced the relationship status: Extraversion, Agreeableness, and Conscientiousness. As expected, the more extroverted and sociable, and the less shy the participants described themselves at the beginning of their first term, the more their peer network grew over the next months. After 1 year, these personality effects on the peer network faded away. All three scales passed the criterion for same-sex peers but failed for opposite-sex peers, although each produced at least two significant paths. The effects were also found when only new peer relationships were analyzed (see above); in this case, the path coefficients were slightly stronger for the earlier assessments and were slightly weaker for the

Table 4  
*Personality Effects on Relationship Status (Relationship Questionnaire)*

Relationship status and personality trait	$r^a$	Path from initial personality to relationship status after month <sup>b</sup>					
		3	6	9	12	15	18
<b>Number of peers</b>							
Extraversion	.34***	.25***	.20**	.18*	.19*	.03	.07
Sociability	.22*	.19**	.21**	.18*	.19*	.10	.16
Shyness	-.39***	-.25***	-.20**	-.24**	-.26**	-.15	-.13
<b>In love</b>							
Sociability	.08	.11	.13	.17*	.16*	.19*	.19*
Shyness	-.20*	-.15	-.13	-.11	-.20**	-.21**	-.21**
<b>Mean support from opposite-sex peers</b>							
Extraversion	.18*	.18*	.24**	.14	.24**	.27**	.23**
Sociability	.21*	.18*	.19*	.10	.18*	.18*	.17*
Shyness	-.22*	-.12	-.25**	-.20*	-.19*	-.19*	-.16
<b>Mean conflict with opposite-sex peers</b>							
Agreeableness	-.04	-.18*	-.20*	-.23**	-.17*	-.06	-.16
<b>Contact frequency/conscientiousness</b>							
Mother	.09	.20**	.25***	.22**	.28***	.24**	.24**
Father	.03	.19**	.23**	.17*	.17*	.15*	.14
Siblings	.08	.09	.15*	.18*	.21**	.20*	.18*

Note.  $N = 132$  (for contact frequency with family members,  $n \geq 102$ ).

<sup>a</sup> Pearson product-moment correlation between personality and relationship status at first assessment.

<sup>b</sup> Standardized beta in regression from later relationship status on initial relationship status and personality.

\*  $p \leq .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

later assessments. The effects were not found when only pre-university peer relationships were analyzed.

Figure 2 illustrates the effect of Shyness on the growth of new peer relationships. An extreme group of participants high in Shyness (Shyness scores in the upper quartile of the distribution at the first assessment) is contrasted with a control group of participants (Shyness scores below the median). This asymmetric extreme group approach makes it possible to interpret effects in terms of high Shyness (rather than low Shyness).

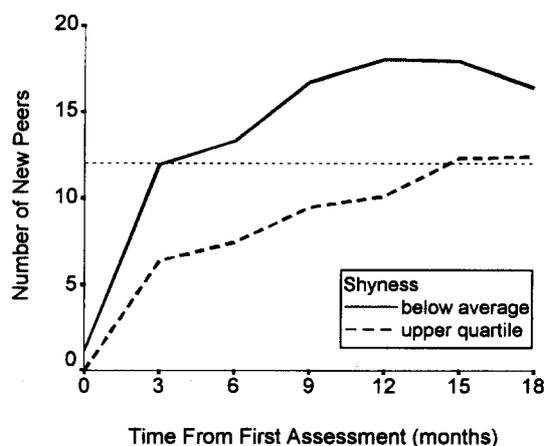


Figure 2. Change in number of new peer relationships over time, by shyness.

There was no need to control for an initial correlation between personality and relationships because the number of new relationships was zero for all participants shortly before the first assessment.

As Figure 2 shows, participants low in Shyness rapidly established relationships with new peers over the first 3 months of the study; in contrast, shy participants showed a much slower growth of their peer network. After 15 months, they reported as many new peer relationships as the control group had after 3 months. It should be noted that the peer network of the shy participants was still growing after the summer break, whereas the control group's growth had leveled off already before this break. Thus, shy participants showed a slower but longer lasting growth than the participants low in Shyness.

The second effect of Shyness and Sociability concerned falling in love (the broader Extraversion scale produced no significant path). To exclude the possibility that the effects of Shyness and Sociability on love were due to a high correlation between the number of peer relationships and being in love, we computed the correlations between being in love and the number of peers for each of the seven assessments. They were generally low, ranging from .20 to .26.

The effect of Shyness on falling in love is illustrated by Figure 3. As in Figure 2, the upper quartile of the Shyness distribution is compared with the lower half of this distribution. The initial correlation of  $-.20$  between Shyness and love was controlled by considering only participants who did not report being in love at the first assessment. Because the main variable of interest is the latency until a participant reported falling in love and be-

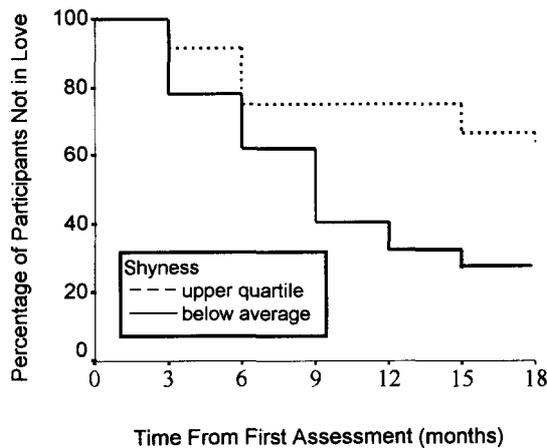


Figure 3. Survival functions for not falling in love by shyness, for participants reporting not being in love at first assessment.

cause many participants never reported falling in love during the observational period, an appropriate method of analysis is survival analysis (e.g., Griffin & Gardner, 1989).

Survival analysis tests group differences in survival functions. A survival function plots the probability against time that a latency exceeds a particular time. These probabilities are estimated from the relative frequencies of events, taking into account that the latency variable is censored. Figure 3 shows the cumulative survival functions for the two groups of participants as estimated by the SPSS–Kaplan–Meier procedure. The cumulative survival is the probability at Time  $t$  that one has not fallen in love until this time. Because we considered only those participants who reported not being in love at the first assessment, the initial probability was 1 for both groups. Figure 3 indicates that the probability of not falling in love decreased more rapidly for the 37 participants low in Shyness than for the 24 shy participants. The probability that a shy student did not fall in love within 18 months, given that she or he was not in love at the beginning of the study, was 63%, whereas this probability was only 27% for students low in Shyness. The group difference was significant according to the log rank test,  $\chi^2(1, N = 61) = 7.36, p < .01$ .

As Table 4 indicates, all three Extraversion-related scales also showed an effect on later available support from opposite-sex peers (the paths for same-sex peers were not significant). Because mean support controls for the number of peers, it is not surprising that mean support was not significantly correlated with the number of peers for all seven assessments; the synchronic correlations with falling in love were also close to zero. Thus, the effects on support were independent of the other two Extraversion-related effects.

As expected, Agreeableness predicted low conflict with peers, but only with opposite-sex peers (see Table 4); no significant paths were found for same-sex peers. An inspection of the residuals of the paths indicated that low Agreeableness was unrelated to conflict, whereas high Agreeableness was incompatible with high conflict. Thus, high Agreeableness prevented the emergence of conflict with opposite-sex peers.

Conscientiousness did not significantly predict the longevity

of relationships for any assessment. However, it predicted high contact frequency with family members (see Table 4). Contact with mother correlated approximately .70 with contact with father, and contact with siblings correlated approximately .60 with contact with mother and father for all seven assessments. Therefore, the contact frequencies with mother, father, and siblings were z-transformed and averaged, yielding a new measure of family contact. Conscientiousness produced highly significant positive paths to family contact for all assessments ( $p < .01$ ). Thus, conscientiousness predicted a less strong decrease of family contact (remember that contact with family members decreased overall; see Table 2). No other personality scale showed consistent significant effects on relationship status. In particular, contrary to expectation, Neuroticism did not interfere with the establishment of new relationships.

*Diary.* Table 4 shows that five different relationship variables were affected by personality. In an attempt to replicate these findings with the diary method, we analyzed all paths from personality to the five diary variables that best corresponded to these five questionnaire variables; in addition, we analyzed the time spent with interaction as a measure of overall sociability. Because the amount of interaction with peers is related both to the size of the peer network and to the quality of the peer relationships, we analyzed the time spent with peer interaction both for same-sex peers (which tended to show the stronger findings for the number of peers in the relationship questionnaire) and for opposite-sex peers (which showed the stronger findings for support and conflict). The incidence of romantic interactions corresponded best to falling in love, conflict was again analyzed for opposite-sex peers, and contact with family was assessed by using the percentage of interactions with family members.

Altogether, 6 (relationship variables)  $\times$  7 (personality) = 42 relationship-personality combinations were analyzed. These analyses were strictly parallel to those of the relationship questionnaire variables. For example, time spent with interaction during the second diary phase was regressed on both time spent with interaction during the first diary phase and the first assessment of Extraversion (1 month before the first diary phase began). Because all paths for Neuroticism and Openness were not significant, we report only the results for the remaining 30 regression analyses (see Table 5).

Of the 13 expected paths, 10 were replicated significantly. The three nonreplicated paths referred to the time spent with same-sex peers; only the paths to the time spent with opposite-sex peers were significant. One unexpected negative path was found from Sociability to interaction with family members: Sociable students interacted less with family members than with others. The remaining 16 unexpected paths were not significant. All in all, the pattern of results was highly consistent across the two methods of relationship assessment.

To summarize, Extraversion and Sociability predicted the overall interaction rate, the number of new peers, and various aspects of relationships with opposite-sex peers: high amount of interaction, available support, falling in love (only Sociability), and percentage of romantic interactions. All these effects were replicated for Shyness in inverse form. Agreeableness predicted low conflict with opposite-sex peers, and Conscientiousness predicted interactions with family. Whether the students

Table 5  
*Personality Effects on Relationship Status (Diary)*

Diary variable	Extraversion		Shyness		Sociability		Agreeableness		Conscientiousness	
	$r^a$	Path <sup>b</sup>	$r^a$	Path <sup>b</sup>	$r^a$	Path <sup>b</sup>	$r^a$	Path <sup>b</sup>	$r^a$	Path <sup>b</sup>
Interaction per day (%)	.19*	.17**	-.23*	-.21**	.24*	.15*	.28**	.05	.09	.00
Same-sex peers	.24*	-.05	-.05	-.04	.36***	.01	.17	.04	.02	-.01
Opposite-sex peers	.18	.22**	-.43***	-.17*	.21*	.23**	.22*	.08	-.04	-.01
Romantic interactions (%)	.23*	.12	-.20*	-.17*	.17	.18*	.11	.00	.00	.02
Mean conflict with										
opposite-sex peers	-.10	.06	.04	-.02	-.09	.05	-.17*	-.19*	-.08	.01
Interactions with family (%)	-.25**	-.07	.29**	.07	-.23*	-.18**	-.13	.00	.13	.17**

Note.  $N = 101$ .

<sup>a</sup> Pearson product-moment correlation between personality and relationship status at Time 1.

<sup>b</sup> Standardized beta in regression from relationship status at Time 2 on relationship status and personality at Time 1.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

reported a partner or not and the number and quality of their nonpeer relationships were not affected by their personality.

#### *Effects of Relationship Status on Personality*

*Relationship questionnaire.* Relationship effects were tested in a strictly parallel fashion to personality effects on these relationships. For example, the effect of the number of peer relationships at Time 1 on later Shyness was tested by regressing Shyness at Time  $t$  ( $t = 3, 5, 7$ ) on both Shyness at Time 1 and the number of peer relationships at Time 1. Thus, 49 (relationship status)  $\times$  7 (personality)  $\times$  3 (time) = 1,029 paths from relationship status to personality were tested for significance. To avoid false positive results, we considered only relationship-personality combinations that produced two subsequent significant paths. This criterion is parallel to the criterion for the prediction of relationship status from personality because in both cases the effect was required to be stable over 6 months. Only 3 of the 343 relationship-personality combinations survived this criterion. These effects can be attributed to chance.

*Diary.* Relationship effects on personality were also tested strictly parallel to personality effects on diary relationships. Of the 42 paths, only 2 were significant. First, time spent with interaction in the first diary predicted later Sociability ( $\beta = .16, p < .02$ ). However, this path could not be replicated for Extraversion or for Shyness. Second, interaction with family members predicted later Agreeableness. Because of these inconsistencies and the small number of positive results, they can be attributed to chance. All in all, no clear effects of early relationship status on later personality were found.

#### *Correlations Between Personality Change and Relationship Change*

Growth curves were estimated separately for the 49 variables of the relationship questionnaire, the seven personality scales, and each participant, using the ordinary least square (OLS) approach (see Bryk & Raudenbush, 1992). Because the type of change function was different for different variables, we analyzed  $z$  scores for each assessment instead of raw scores (see Asendorpf, 1994, for the same approach). Thus, we analyzed

differential change functions. Inspection of the individual residuals indicated that linear change functions sufficiently described differential change. The slope of the function of a participant described the linear change of the participant's score relative to the other participants.

Slopes were computed over 6, 12, and 18 months. For example, the five assessments of a participant's  $z$ -transformed number of peers over the first 12 months of the study were approximated by a straight line that minimized the squared differences between these five scores and the line; similarly, the three assessments of a participant's  $z$ -transformed Shyness score over the same observational period were also approximated by a straight line. Subsequently, the slopes for Shyness were correlated with the slopes for the number of peers. The personality changes over 6 months were simply differences between the two  $z$ -transformed assessments. Thus, altogether, 49 (relationship status)  $\times$  7 (personality)  $\times$  3 (observation periods) = 1,029 correlations were computed. To avoid false positive results, we considered only relationship-personality combinations that produced significant correlations for both the 6- and 12-month interval or for both the 12- and 18-month interval. This criterion is not very strong, because in both cases the shorter interval is part of the longer one. Of the 343 cases, 7 survived this criterion.

Because the change scores can be correlated with initial status, we ran additional analyses where initial personality and initial relationship status were both partialled out from each correlation between the change scores. For example, from the correlation between the 12-month change in Shyness and the 12-month change in the number of peers, both Shyness and the number of peers at the first assessment were partialled out. Of the 343 relationship-personality combinations, only 4 survived the criterion, and only 2 were consistent with the results for the simple correlations; in both cases, the (partial) correlations were below .30. These findings can be attributed to chance. All in all, no more correlations were found between relationship change and personality change than can be expected by chance.

#### Discussion

The main result of this study is easy to summarize: Personality influenced social relationships, but not vice versa. During

an important life transition in young adulthood, Extraversion and its subfactors Shyness and Sociability, as well as Agreeableness and Conscientiousness influenced the number and quality of participants' social relationships, whereas the strong changes in these relationships had no effect on any of the Big Five personality scales. Although the effect sizes of the paths from personality to relationships presented in Table 4 may appear low, it is important to note that path coefficients are standardized betas in multiple regressions, which cannot be directly compared with correlations. Furthermore, when extreme groups were considered, it became evident that the effects were far from being negligible. For example, when participants with below average shyness scores were contrasted with shy participants, the students low in shyness reported nearly twice as many new peers in their network after 1 year as their shy counterparts (see Figure 2) and had fallen in love twice as often as the shy participants by the end of the study (see Figure 3).

Most personality effects on relationships were found already for the second assessment, and half of them were still detectable after 18 months. Thus, most of the effects were enduring. It is interesting to note that the effects were not strongly related to the synchronic correlations at the first assessment. For example, Agreeableness was not related to initial conflict with peers as assessed by the relationship questionnaire but predicted later conflict with peers, and Conscientiousness was not related to contact with members of the family but predicted later contact with all members of the family. Thus, the effects of personality on relationships could not be inferred from the synchronic correlations; only the longitudinal findings could substantiate them.

That personality differences affected the development of social relationships, but not vice versa, is provocative for current dynamic-interactionistic views of personality development for two reasons. First, this causal asymmetry suggests the hypothesis that personality is so much crystallized already in young adulthood that it is immune even to major reorganizations of one's social relationships. Second, in contrast to traditional assumptions that one's later personality is a function of one's past relationships with parents and peers, the results suggest that the opposite may be true for young adults: Their later social relationships are a function of their personality at the dawn of adulthood.

Before we discuss in more detail these two hypotheses and the empirical evidence on which they are based, we emphasize that general answers to causal questions about influences of personality on relationship status and vice versa cannot be expected from a single study. What can be expected are answers to more specific questions, such as which aspects of the relationship status influence which personality traits (or vice versa), when, and in which population. We turn now to such specific questions.

### *Sample*

We targeted young university students at the beginning of their first term. We chose this sample not because of convenience; we chose it in order to increase the chance of detecting personality influences on relationship status, and vice versa. The sample included students from all faculties, not only psychology. Because of the self-selection of the participants, however, the sam-

ple is not broadly representative of university students and, of course, not of the general population. The longitudinal sample had somewhat higher scores in Openness to Experience, Agreeableness, and Conscientiousness than larger samples from the general population, which is not surprising given the challenging, time-consuming study. It is important to note, however, that there was no evidence for a restriction of range in any of the Big Five factors of personality.

An additional sampling problem was that women were much more willing to participate in this lengthy study than men. Because of this sex difference in the self-selection for the study, we refrain from interpreting sex differences. Men's greater unwillingness to participate in studies of social relationships is a frequent problem that may be due to their lower tendency to self-disclose and to communicate about relationships (e.g., Eagly, 1987). In the future, researchers might try to attract a higher proportion of men by using a cover story that appeals better to them.

### *Influences of Personality on Relationships and Vice Versa*

Our participants were old enough to choose their social relationships as freely as adults can do in general (and perhaps even more freely, because their choice of peer relationships was less strongly restricted by occupational roles and consideration for family members). Also, the confrontation with the new social world of university destabilized their relationships, thus increasing the likelihood of finding personality effects on the reorganization of their relationships. Therefore, it is not surprising that personality effects on relationships were found. It should be noted that these effects cannot be attributed to shared method variance of personality and relationships because this variance was statistically controlled.

In contrast, no clear effects of initial relationship status on later personality were found. This is even less surprising, because, contrary to personality, the relationship status was not stable over the course of the study, and the effects of unstable factors are limited because they do not accumulate over time. What was surprising to us, however, was the finding that relationship change was unrelated to personality change. Whether students' peer network grew quickly or slowly, whether they experienced increasing or decreasing conflict with parents or peers, whether they fell in love or not, whether they began a serious romantic relationship or not, and whether their perception of available support from parents or peers increased or decreased had no effect on their personality. This failure to find effects of relationship change on personality change can hardly be attributed to an unreliability of the measurement of change because we based our change measures on growth curves that fully used the power of a longitudinal design with seven assessments.

Instead, the high stability of personality in our sample seems to be the key to understanding the absence of relationship influences on personality. The Big Five scales showed a level of stability close to perfect if corrected for unreliability. The mean estimated true 1-year stability of the Big Five was .95. In his review of self-ratings of personality in adulthood, Conley (1984) estimated the true 1-year stability of personality in adult-

hood as .98, which is close to our finding. Thus, our sample did not show a much lower stability of personality than adults in general despite the fact that our sample was particularly young (below 23 years of age at the beginning of the study) and experienced a particularly unstable social environment. The high stability of personality in this sample was surprising, but on the basis of such a high stability, it was less surprising that even strong relationship changes had no impact on personality (see McCrae, 1993).

In contrast, the true stability of the relationship variables was much lower. For example, the true 1-year stability was .51 for the number of peer relationships, .60 for perceived support from opposite-sex peers, and .55 for the mean conflict with such peers. These moderate stabilities indicate substantial differential change, which opens the door for causal effects of external variables such as personality. This does not mean, of course, that it was trivial to find personality effects on relationship status. The differential change in the relationship variables could be due only to the strong changes in the social environment of the participants. Because these changes interfered with personality effects on relationships, it is a remarkable finding that three of the Big Five showed clear effects on relationship status that could be replicated by two different methods of relationship assessment: network questionnaires and diaries.

In their discussion of personality development in adulthood, Costa and McCrae (1994) distinguished between "basic tendencies" and "characteristic adaptations." Basic tendencies refer to the "underlying potentials of the individual," whereas characteristic adaptations refer to products of the transaction between basic tendencies and the environment, such as attitudes, roles, relationships, and goals. Costa and McCrae assumed that basic tendencies remain highly stable across adulthood despite changes in characteristic adaptations. Our results fully confirmed this assumption. They are also consistent with the expectation by Caspi (in press) that basic tendencies influence characteristic adaptations to new circumstances: The readaptation of the relationships to new environmental demands are shaped by one's personality.

That Shyness and Neuroticism significantly decreased over the course of the study is not at variance with the assumption of highly stable basic tendencies. Shyness is characterized by feelings of uneasiness and behavioral inhibition in unfamiliar or in social-evaluative situations (Asendorpf, 1987, 1989a, 1989b; Caspi, Elder, & Bem, 1988). Therefore, Shyness is particularly salient in novel social settings such as university for first-year students. We interpret the decreasing Shyness judgments of the participants as a reflection of the decrease in their *state* Shyness that was aroused by the novel social environment at the beginning of the study, not as a change in the participants' basic tendency to react shyly in novel situations. The decreasing Neuroticism scores may be similarly due to the decrease of an initially higher state anxiety about the new and somewhat unpredictable world of university. The slight increase in Extraversion seems to be due to the decrease in Shyness because Sociability did not change (see Table 2).

#### *Effects of Specific Traits on Relationships*

Extraversion and two of its subfactors, Sociability and Shyness, affected the size of the peer network of the participants,

how much time they spent in social interaction in general, and with opposite-sex peers in particular, how much they felt that they could rely on them, and whether they fell in love (here, only the subfactors showed significant effects). The Extraversion-related effects overlapped only to a small degree for different kinds of relationship qualities. Because Sociability and Shyness were not highly negatively correlated, the replication for these two subfactors of Extraversion is not trivial.

As expected, Agreeableness prevented conflict with opposite-sex peers (see Graziano et al., 1996, for similar findings). This result was found both for the network interview and for the diary. In contrast, our hypothesis that Neuroticism interfered with the development of relationships was not confirmed. It seems that Neuroticism is less relevant for establishing new relationships than Shyness.

Interestingly, all personality effects on the quality of peer relationships were restricted to opposite-sex peers, both for the relationship questionnaire and for the diary. These effects concerned love, emotional support, and interpersonal conflict, all aspects of close, intimate relationships. Establishing smooth opposite-sex relationships and finding a partner is a major developmental task for young adults; only 40% of the sample reported a steady partnership at the end of the study. It seems that personality effects were stronger for opposite-sex peer relationships because these were the major targets of participants' social efforts.

Unexpectedly, Conscientiousness predicted relatively high contact with family members (mother, father, and siblings) both in the network interview and in the diary. This finding cannot be explained by the assumption that more conscientious students invest more in long-term relationships than less conscientious ones because Conscientiousness was not correlated with the mean duration of peer relationships at the beginning of the study and did not affect the mean duration of peer relationships during the course of the study. Instead, Conscientiousness showed specific effects on family relationships.

There are at least two different interpretations of the Conscientiousness effect. First, more conscientious students feel more obliged to continue contact with parents and siblings than less conscientious ones, who are more easily distracted by the new opportunities for peer relationships. Second, as one reviewer suggested, Conscientiousness may be fostered in the context of extremely close families, and familial closeness would be the driving force behind the conscientious students' tendency to stick to their family.

Finally, Openness did not show significant effects on our measures of relationship status. This does not imply, of course, that Openness has no social consequences. McCrae (1996) has listed many social concomitants of self-rated Openness that mainly concerned the similarity of friends and spouses with regard to attitudes and values. Using a methodology similar to ours, Caspi, Herbener, and Ozer (1992) found that husbands' aesthetic values influenced their wives' later aesthetic values, whereas wives' religious values influenced their husbands' later religious values, but not vice versa, and that the change of various kinds of values was positively correlated between husbands and wives. Future studies may similarly test the hypothesis that Openness in early adulthood affects the mean Openness of

one's significant others, and vice versa (see Alwin, Cohen, & Newcomb, 1991; Caspi, Bem, & Elder, 1989).

### Interpretation of the Personality Effects

The personality effects on social relationships in the present study can be attributed not only to the fact that adults are able (within limits) to shape their own social world according to their personality (active personality effects); reactive and passive personality effects also may have been in operation (see Plomin, DeFries, & Loehlin, 1977). For example, agreeable students' friendly behavior may have prevented conflicts because others reacted more positively to them, or shy students may have fallen in love less frequently because they were more ignored by their peers (reactive effects). Conscientious students may have had more frequent contact with family members because that contact had been maintained by their parents and siblings, who were conscientious as well because of shared genes or shared environment (passive effect). Personality effects on social relationships are not confined to the intentional shaping of one's environment; they can operate unexpectedly, or even against one's intentions.

### Problems and Limitations

The personality-on-relationship effects in the present study were based on paths controlling for synchronic correlations. It should be noted that such paths can be significant simply because the initial assessment is less reliable than the subsequent ones. For example, it could be argued that the participants failed to remember many significant relationships in the first network questionnaire but did better in the second one because they had a second chance to remember them. Although the hypothesis of a lower reliability of the first network assessment cannot be ruled out directly because the internal consistency of the network data could not be evaluated, there is twofold evidence against this hypothesis. First, the stabilities from the first to the second network assessment were similar to the stabilities from the second to the third assessment. Second, the diary data showed similar reliabilities for the first and the second assessment and replicated most findings for the network data.

The result that relationships had no effect on personality should not be generalized beyond the relationship and personality aspects that were assessed in the present study. It may well be that social-environmental aspects such as the attitudes and values of a particular peer group at university have long-term influences on one's own attitudes and values, including one's Openness. And as we have already pointed out, it is not clear whether the results for this self-selected sample can be generalized to the general student population. We consider our results more as a warning against the naive environmentalism that has for a long time dominated the literature on personality development.

### Implications for the Study of Personality Development

The major theoretical advancement of dynamic interactionism was to acknowledge personality influences on the environment and reciprocal influences between personality and environment.

Our study strongly confirmed the first, but not the second, tenet of dynamic interactionism. Reciprocal influences can be expected only if there are also environmental effects on personality. In theoretical discussions of personality development, reciprocal effects are too often and too easily assumed because it is believed that environmental effects on personality occur anyway. Our study warns against such premature conclusions. The question of which trait influences which environmental variable (and vice versa), when, and in which population, can be answered only empirically, study by study, with all the inherent limitations of such studies.

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