Journal of Personality and Social Psychology
2009, Vol. 96, No. 6, 1152–1165

0022-3514/09/$12.00 DOI: 10.1037/a0014468

In the Eye of the Beholder: Perceived, Actual, and Peer-Rated Similarity in Personality, Communication, and Friendship Intensity During the Acquaintanceship Process

Maarten Selfhout
Utrecht University

Jaap Denissen
Humboldt University Berlin

Susan Branje and Wim Meeus
Utrecht University

The authors examined associations of perceived similarity, actual similarity, and peer-rated similarity in personality with friendship intensity during the acquaintanceship process in a naturalistic setting. Self- and peer-rated personality data were gathered from undergraduates (mean age = 18.9) at 5 time points during the first year of university using a round-robin design. Whereas perceived similarity and peer-rated similarity in personality were concurrently associated with more friendship intensity for just-acquainted individuals, actual similarity in personality was not. Further, bidirectional cross-lagged associations between perceived similarity and friendship intensity were found. Peer-rated similarity was also associated with increases in friendship intensity, and this association was mediated by communication frequency. These results indicate that specific types of similarity in personality are differentially associated with friendship intensity during early phases of acquaintanceship in a real-life setting. Further, insight was provided in the direction of causality between similarity and attraction: Perceived and peer-rated similarity seem to breed friendship intensity, whereas friendship intensity seems to breed perceived similarity only. Finally, peers' expectations seem to affect individuals' communicative behaviors, which in turn affect friendship formation.

Keywords: similarity–attraction, personality, friendship intensity, cross-lagged multilevel modeling, communication

A substantial body of anecdotal and empirical evidence suggests that similarity breeds attraction (Montoya, Horton, & Kirchner, in press). Although several experimental studies using bogus strangers showed that higher similarity in values is associated with higher attraction (e.g., Byrne, 1971; Byrne & Nelson, 1965; Hoyle, 1993), there is a lack of studies examining whether individuals tend to form friendships with others who have similar personality traits in real-life situations. In addition, although it has been suggested that similarity increases friendship intensity by making communication between individuals more predictable and therefore enjoyable (Berger & Calabrese, 1975), relatively few studies have examined the mediating role of communication in the effects of similarity on friendship intensity. In an attempt to address these lacunas, the current study first examined unique cross-sectional associations of perceived similarity, actual similarity, and peer-rated similarity in personality with friendship intensity for just-acquainted individuals. Further, bidirectional longitudinal associations between these different types of personality similarity and friendship intensity were studied to provide insight in the direction of causality between similarity and attraction. Finally, we examined to what extent communication mediates the longitudinal effects of personality similarity on friendship intensity.

Actual Similarity and Friendship Intensity

Early research and theorizing on the role of similarity in attraction has focused mainly on actual similarity in values (e.g., Byrne, 1971; Hoyle, 1993). These studies were predominantly laboratory experiments and focused on the association between actual similarity in values and attraction to a bogus stranger. Results of this research have been interpreted as support for the so-called *similarity–attraction hypothesis:* Higher actual similarity in values between participants and bogus strangers is associated with higher attraction to these bogus strangers. In addition, literature on assortative mating (Barelds & Barelds-Dijkstra, 2007; Luo & Klohnen, 2005; Lusk, MacDonald, & Newman, 1998) suggests that individuals tend to form intimate relationships with others who are similar to them in values, preferences, and personality traits.

Maarten Selfhout, Susan Branje, and Wim Meeus, Research Centre Adolescent Development, Utrecht University, Utrecht, the Netherlands; Jaap Denissen, Institute of Psychology, Humboldt University Berlin, Berlin, Germany.

This research was partly supported by funding of the Research Centre Adolescent Development, Department of Developmental Psychology, Linschoten Institute, and Langeveld Institute at the Utrecht University. We thank Mitja Back, Franz Neyer, Micheal Sunnafrank, Marcel Van Aken, and Cornelia Wrzus for very helpful comments on the manuscript.

Correspondence concerning this article should be addressed to Maarten Selfhout, Research Centre Adolescent Development, Utrecht University, Utrecht 3508 TC, the Netherlands. E-mail: m.selfhout@uu.nl

A set of related theoretical perspectives is usually used to explain individuals' preference for interaction with like-minded others. The reinforcement–affect explanation suggests that similarity in values reinforces individuals' opinions, views, and feelings and therefore triggers an implicit affective response that increases attraction (Clore & Byrne, 1974; Izard, 1960). Uncertainty reduction theory indicates that similarity in values affords predictability, allowing individuals to communicate with less effort and greater confidence (Berger & Calabrese, 1975). Finally, similarity may be important for maintaining intimate relationships because it is supposed to increase intimacy between partners through shared agreement and common knowledge of married and family life (Barelds & Barelds-Dijkstra, 2007; Esterberg, Moen, & Dempster-McCain, 1994).

It is presently unclear whether findings regarding the effects of actual similarity in laboratory studies can be generalized to effects of actual similarity on attraction in real-life settings. For example, even subtle environmental factors such as room temperature (Griffitt, 1970) and background music (May & Hamilton, 1980) have been shown to reduce effects of actual similarity in personality on attraction. In real-life settings, such environmental factors may be even more powerful and may therefore cancel out actual similarity effects on attraction. In addition, the saliency of actual similarity in values and personality is high in laboratory studies, because individuals in these studies receive the bogus stranger's attitude or personality information preceding their attraction assessments. In the absence of any additional information, this situation almost forces individuals to focus on similarity in these attributes regarding their attraction ratings. In contrast, in real-life situations, the saliency of attitudes and personality is likely lower, because a range of other factors may be important during interaction. Thus, the artificial nature of prior experimental designs may limit the generalizability of actual similarity effects on attraction to real-life situations.

Recent empirical evidence suggests that actual similarity in personality is not associated with friendship intensity in real-life settings. For example, a recent meta-analysis of 313 laboratory and field investigations on the link between attraction and similarity in values and personality traits showed that actual similarity in these domains is associated with attraction in no-interaction and short-interaction laboratory studies but not in field studies examining existing relationships (Montoya et al., in press). This result is consistent with recent findings showing that actual similarity in personality traits was not associated with relationship satisfaction in both same-sex (Morry, 2005) and cross-sex (Morry, 2006) friendships.

Perceived Similarity and Friendship Intensity

Several researchers have suggested that *perceived similarity* (i.e., similarity between two individuals as perceived by one individual) in both values and personality traits, and not actual similarity per se, is associated with higher attraction (Horton, 2003; Hoyle, 1993; Morry, Kito, Martens, Marchylo, & Stevens, 2005). Two causal directions of the association between perceived similarity and attraction have been hypothesized.

According to the attraction–similarity hypothesis, higher attraction breeds perceptions of similarity (Hoyle, 1993; Morry, 2005; Morry et al., 2005). Relationship partners may overestimate similarity to assure themselves of the correctness of their own attributes, a process that protects their self-esteem (Ross, Greene, & House, 1977). Balance theory (Heider, 1958) states that cognitions are organized in a harmonious (i.e., balanced) fashion. Because of the persistent (lay) belief that friends should be similar in traits, any dissimilarity in traits may cause a cognitive imbalance that is countered by illusions of similarity (Morry, 2005). Consistent with this theory, in an experimental study, priming satisfaction in existing same-sex friendships increased perceived similarity in personality traits (Morry et al., 2005).

Another line of research hypothesizes that perceived similarity increases attraction (similarity–attraction hypothesis). According to Sunnafrank and Ramirez (2004), individuals make an estimate of similarity on first encounters. When these estimates indicate a high degree of perceived similarity with another person, they can be expected to seek out future interactions with that person. The previously mentioned reinforcement–affect explanation can be invoked to explain this effect: Perceived similarity in personality might create a feeling of recognition, self-confirmation, and self-reassurance, which could then lead to more enjoyable interactions, which increases attraction (Berg & Clark, 1986).

Consistent with this, perceived similarity in various attitudes among previously unacquainted undergraduates predicted higher proximity, attraction, communication, and friendship intensity over a period of 9 weeks (Sunnafrank & Ramirez, 2004). In a similar vein, recent research on assortative mating has suggested that perceived similarity in values and traits, instead of actual similarity in these domains, increases relationship satisfaction because it enhances conflict resolution and mutual understanding (Murray, Holmes, Bellavia, Griffin, & Dolderman, 2005). For example, perceiving more similarity in personality traits predicted increased relationship satisfaction over a period of 6 weeks among just-acquainted dating couples (Lutz-Zois, Bradley, Mihalik, & Moorman-Eavers, 2006). In summary, there is empirical evidence for cross-sectional and bidirectional longitudinal associations between friendship intensity and perceived similarity in personality.

How Others Perceive Similarity in Dyads: Peer-Rated Similarity and Friendship Intensity

The focus of prior studies on the similarity–attraction link has typically been on either the self (i.e., perceived similarity) or the dyad (i.e., actual similarity). However, several researchers have emphasized that the role of personality in social relationships may also depend on how individuals are viewed by multiple others, such as peers (Hofstee, 1994; Kenny & Acitelli, 2001; Touhey, 1974).

Social comparison theory (Festinger, 1954) has stressed peer effects on individuals' thinking, in particular under conditions of uncertainty. The basic premise of this theory is that the evaluation of many skills and aptitudes can be achieved only by comparing one's own evaluation to those of peers. When there is doubt about the appropriateness of certain preferences, individuals will compare their own preferences with peers' ideas and try to confirm these preferences (Baron, Hoppe, Linneweh, & Rogers, 1996). Extending this view, peers' perceptions on individuals might affect the social choices an individual makes. For example, an experimental study showed that presenting the opinion of a majority concerning attractiveness of specific male students among female

college students directly alters their rating of attraction toward these men (Baron et al., 1996). Given strong and persistent lay beliefs of individuals that similarity is a prerequisite for friendship, this belief may act as a peer norm to which individuals conform. To the best of our knowledge, however, associations between peer-rated similarity in personality and friendship intensity have not been previously studied.

Associations of Similarity With Friendship Intensity Among Just-Acquainted Individuals

Studying just-acquainted individuals can provide insight into effects of similarity on friendship intensity during the acquaintanceship process. First, similarity effects on friendship intensity might work very fast and occur in the very beginning of the acquaintanceship phase (Sunnafrank & Ramirez, 2004). Although the previously mentioned studies using bogus strangers did tap into the role of similarity on attraction during the acquaintanceship phase, the generalizability of these studies has been questioned because of their artificial character (Sunnafrank, 1986). One notable exception is a longitudinal study on similarity in personality and friendship among 25 unacquainted freshmen (Izard, 1960). After 6 months of acquaintanceship, individuals who liked each other the most showed higher actual similarity in personality than those who did not like each other. However, actual similarity effects on first acquaintance as well as perceived and peer-rated similarity effects on attraction were not accounted for in this study.

Another reason to study associations between similarity and friendship in individuals who are just getting acquainted is that according to social comparison theory, peer-rated similarity effects occur especially under conditions of uncertainty. That is, during the acquaintanceship phase, individuals may be especially affected by the views of peers on which persons are similar in personality. Therefore, a design is needed that examines the role of different types of similarity in friendship intensity among just-acquainted individuals in a naturalistic setting.

Unique Associations of Perceived Similarity, Actual Similarity, and Peer-Rated Similarity With Friendship Intensity

To capture the unique influence of each type of similarity, one must control for all other indices using multiple regression. Because the three different indices of similarity can be expected to be positively related, this procedure slightly alters the meaning of each index. For example, controlling for actual and peer-rated similarity transforms the index of perceived similarity into a measure of *illusory similarity* (Murray et al., 2005) because it taps into similarity perceptions that are not grounded in reality.

In contrast, two persons may actually be more similar according to their independent ratings of each other but may not perceive this similarity in each other while peers also do not perceive this similarity (*unique actual similarity*). One study examined the unique associations of actual similarity and perceived similarity in values with attraction, showing that only the former was associated with attraction (Hoyle, 1993).

Some theorists have argued that aggregated peer estimations of personality traits are at least as reliable and valid as self-reports (e.g., Funder & Colvin, 1991; Kenny, Albright, Malloy, & Kashy, 1994). In line with this reasoning, aggregated peer ratings of just-acquainted individuals' Big Five personality traits show higher test–retest stability across 4 months compared with self-ratings (Denissen, Geenen, Selfhout, & Van Aken, 2008). In another study, aggregated peer ratings showed stronger associations with social behaviors, such as nervous withdrawal and tendencies to control others' behaviors, compared with self-reports (Kolar & Funder, 1996). Thus, although both aggregated peer reports and self-reports of personality likely contain measurement error, both are reliable and valid indicators of actual personality traits and may therefore provide a unique perspective concerning the role of personality traits in the formation of friendships. Therefore, it is important to simultaneously estimate effects of actual similarity based on self-reports and peer-rated similarity on friendship intensity to be able to disentangle the relative importance of both similarity indices in friendship intensity.

In summary, it seems that perceived similarity in personality, but not actual similarity in personality, is associated with friendship intensity. To what extent actual similarity, perceived similarity, and peer-rated similarity are uniquely associated with friendship intensity remains unclear, however. In the first part of the current study, we therefore focus on the unique associations of actual similarity, perceived similarity, and peer-rated similarity with friendship intensity.

Does Similarity Breed Attraction, or Does Attraction Breed Similarity?

The question of direction of causality between the associations of similarity and friendship intensity applies to associations between all three types of similarity and friendship intensity. Although results of prior studies concerning existing friendships (e.g., Morry, 2005) show no concurrent associations between actual similarity in personality and friendship intensity after controlling for perceived similarity, it has been suggested that it may take time for individuals to discover each others' core personality traits (Duck & Craig, 1978). Accordingly, it is still an open question whether associations between actual similarity and friendship intensity emerge during later phases of acquaintanceship.

As increasing satisfaction in existing friendships predicts more perceived similarity in traits (Morry, 2005) and perceived similarity in values predicts higher friendship intensity over time during acquaintanceship (Sunnafrank & Ramirez, 2004), one could expect bidirectional associations between perceived similarity and friendship intensity. However, because these associations have not been studied simultaneously during the acquaintanceship phase, the direction of causality in the links between perceived similarity and friendship intensity needs to be further studied.

Also, the bidirectional longitudinal associations between peers' perceptions of similarity and friendship intensity have not been examined yet. According to social comparison theory, the peer group may push individuals who are perceived as similar toward becoming friends (Festinger, 1954), suggesting that peer-rated similarity predicts friendship intensity. In contrast, if balance theory is extended from perceived similarity to views of peers on similarity of others, friendship intensity might also affect peer-rated similarity: As certain individuals become friends and spend

more time together, peers may balance out dissimilarities they see between them.

The Role of Communication in Similarity Effects on Attraction

Even if it is found that specific types of similarity predict friendship intensity, the processes behind similarity effects on friendship intensity remain relatively understudied. Why may higher perceived similarity or peer-rated similarity predict higher friendship intensity over time? Duck (1994) provided a theoretical framework that emphasized the role of communication in the link between similarity and attraction. Specifically, this theory claims that when two people discover similarities between them, this will enhance communication between these persons. One way in which shared personality traits may foster communication is that similar persons can effectively use information on their own states and personality to make valid inferences about the other person (Berger & Calabrese, 1975; Neyer, Banse, & Asendorpf, 1999).

The idea that communication is enhanced through similarity is also found in the reinforcement–affect explanation (Clore & Byrne, 1974) and uncertainty reduction theory (Berger & Calabrese, 1975), which suggests that greater actual similarity facilitates communication. Communication, in turn, has been shown to foster social relationships such as friendships (Goldstein & Woods, 2002; Kalyva & Avramidis, 2005; Koesten, 2004). If actual similarity predicts friendship intensity during later phases of acquaintanceship, communication might be found to mediate this link. However, because we hypothesized that actual similarity does not predict friendship intensity, actual similarity is not expected to predict friendship intensity through communication.

Nevertheless, the explanation regarding a mediation role of communication may also apply to peer-rated and perceived similarity effects on attraction. Peers might affect the communication between two individuals and thereby indirectly increase or decrease the friendship intensity between the two individuals. For example, peers may provide certain individuals with more opportunities to communicate by spending more or less time with these individuals themselves (Williams, Shore, & Grahe, 1998). In addition, peer norms about which individuals should be friends might be transferred to individuals' own perceptions about with whom they should become friends (Baron & Kerr, 2003; LaRocco, 1985), thereby guiding individuals' communicative behaviors. Similarly, perceiving similarities may increase pleasant communicative experiences because of lay assumptions that similar individuals should become friends. In other words, if individuals think they are similar, they may find communication more pleasant and easy and therefore decide to become friends. Prior results do indicate that for unacquainted undergraduates, the amount of communication during acquaintanceship is associated with higher perceived similarity in values (Sunnafrank, 1986). Accordingly, perceived similarity and peer-rated similarity in personality may increase communication, and communication, in turn, may predict higher friendship intensity.

The Present Study

The current study focuses on the unique cross-sectional and longitudinal associations of perceived similarity, actual similarity, and peer-rated similarity with friendship intensity for just-acquainted freshmen. By examining the unique associations between these types of similarity and friendship intensity, we studied their relative importance in predicting friendship intensity during the acquaintance phase. As individuals are more likely to select same-sex friends than cross-sex friends (Tolson & Urberg, 1993), we controlled for effects of gender composition of the dyad on friendship intensity. Further, we examined to what extent communication mediated effects of perceived similarity and peer-rated similarity on friendship intensity. The following hypotheses were tested:

1. Perceived similarity is uniquely associated with greater friendship intensity for just-acquainted individuals.
2. Actual similarity is not uniquely associated with friendship intensity for just-acquainted individuals.
3. Peer-rated similarity is uniquely associated with greater friendship intensity for just-acquainted individuals.
4. Perceived similarity predicts higher friendship intensity over time, and friendship intensity predicts higher perceived similarity over time.
5. Actual similarity and friendship intensity are not bidirectionally associated over time.
6. Peer-rated similarity predicts higher friendship intensity over time, and friendship intensity predicts higher peer-rated similarity over time.
7. Communication mediates effects of peer-rated similarity on friendship intensity over time.
8. Communication mediates effects of perceived similarity on friendship intensity over time.

Method

Sample

Participants were psychology freshmen attending Utrecht University in the Netherlands who started their study in the autumn of 2006. Studying freshmen offers several advantages. First, they have a high need to discover new friends because they often move to a new city and enter a new phase of life away from existing friendships (Asendorpf & Wilpers, 1998). Second, for educational purposes, freshmen at the Utrecht University in the Netherlands are randomly placed in groups in which they work together during the remainder of the year to complete a substantial part of the psychology curriculum. This process means that studying this particular sample offers a unique possibility to examine to what extent similarity is associated with friendship intensity for just-acquainted individuals in a naturalistic setting.

A total of 489 students were assigned to one of the 20 introduction groups of around 25 people each. E-mails, flyers, posters, and an announcement during the first university lecture generated attention for the current study. A total of 378 participants (77% of all first-year students) stemming from 18 groups signed up for the study via a Web site. Of these, the 10 groups in which more than

80% of the participants registered for the current study were selected for participation. In these 10 groups of 238 individuals, 221 individuals registered for the current study (93% enrollment rate). The mean age of these individuals was 18.9 ($SD = 1.6$), and 181 (82%) were women. The majority of participants (92%) were of Dutch origin. The participants that were selected ($n = 221$) and those that were not ($n = 157$) did not differ significantly ($p > .10$) in gender and age. Only 5 pairs of group members reported that they already knew each other before the start of the study: They were excluded from all analyses.

Of the 221 participants at Wave 1, 205 individuals participated at all five waves (93% retention rate). Compared with these 205 participants, the 16 nonparticipating group members were rated by their peers as somewhat less neurotic (3.35 vs. 3.66, $F(5, 216) = 5.67$, $p < .05$) and substantially less conscientious (3.94 vs. 4.72, $F(5, 216) = 22.74$, $p < .01$). No differences were found for the other Big Five factors, communication, or friendship intensity. Finally, participants rated at each wave whether they were romantically involved with any of their group members. We excluded eight dyads in which at least 1 of the members indicated this was the case.

Procedure

Starting the second week of their University freshmen year, participants filled out the questionnaires online by accessing a Web site using a personal password. Participants completed the Big Five Inventory (BFI; Denissen, Geenen, Van Aken, Gosling, & Potter, 2008; John & Srivastava, 1999) at the first wave. Additionally, participants completed monthly Big Five and friendship intensity round-robin ratings for each group member over five waves. Confidentiality of all answers was explicitly guaranteed. The questionnaires used in the current study were part of a larger battery that took a median of 40 min to complete. Participants received 20€ (around $25), 2 hr of course credit, and (optionally) a personality feedback profile at the end of the study.

Instruments

Single-item BFI. Because letting participants rate all other participants on multi-item Big Five scales would place too many excessive demands on their motivation as well as cognitive abilities, we used the ultra-short revised Ten Item Personality Inventory (Denissen, Geenen, Selfhout, et al., 2008; Gosling, Rentfrow, & Swann, 2003). The revised questionnaire reduced the original 10 unipolar items to 5 bipolar items (Extraversion: *extraverted*, *enthusiastic* vs. *reserved, quiet*; Agreeableness: *critical, quarrelsome* vs. *sympathetic, warm*; Conscientiousness: *dependable, self-disciplined* vs. *disorganized, careless*; Neuroticism: *anxious, easily upset* vs. *calm, emotionally stable*; Openness to Experience: *open to new experiences, complex* vs. *conventional, uncreative*). Participants rated both themselves and their peers on these items, using a 1 (*extremely like the left adjective pair*) to 7 (*extremely like the right adjective pair*) scale. Following Woods and Hampson (2005), we varied the location of the socially desirable pole, with Extraversion, Openness, and Conscientiousness items having the desirable pole on the left side and Neuroticism and Agreeableness having this pole on the right side. All single-item measures demonstrated significant convergent validity correlations with multi-item scales (Denissen, Geenen, Selfhout, et al., 2008).

BFI. At Wave 1, participants completed the 44-item Dutch translation of the BFI (e.g., Denissen, Geenen, Selfhout, et al., 2008; John & Srivastava,, 1999) concerning their own personality dimensions. This instrument consists of 8 statements for the factors Extraversion (sample item: "is talkative") and Neuroticism (sample item: "can be moody"), 9 statements for the factors Conscientiousness (sample item: "does a thorough job") and Agreeableness (sample item: "is generally trusting"), and 10 statements for the factor Openness (sample item: "values artistic, aesthetic experiences"). Participants indicated their agreement regarding each statement on a 1 (*totally disagree*) to 5 (*totally agree*) Likert scale. Cronbach's alphas were .83, .76, .86, .88, and .82, from Wave 1 to Wave 5, respectively (see the study of Denissen, Geenen, Van Aken, et al., 2008, for descriptives as well as correlations with other scales of the BFI in the current sample).

Friendship intensity. Friendship intensity was measured at each wave by asking each participant to indicate to what degree they were friends with each of their group members on a continuous scale, ranging from 1 = *far acquaintance* to 7 = *best friend.* An equivalent single-item scale has been shown to be predictive of proximity, amount of communication, attraction, and type of relationship over a period of 9 weeks (Sunnafrank & Ramirez, 1994). In the current study, friendship intensity showed high within-wave correlations with other indicators of friendship, such as support ($r = .84–.87$, $p < .001$) and liking ($r = .85–.87$, $p < .001$), at all five waves. Medium sized monthly test–retest reliability was found ($r = .41–53$, $p < .001$).

Communication. Communication was measured by asking participants to indicate how much they had spoken to each of their group members during the last week on a scale ranging from 1 = *never* to 7 = *very often.* In the current study, communication was correlated very highly with an indicator of physical proximity during classes of group members ($r = .82–.87$, $p < .001$) and liking ($r = .86–.87$, $p < .001$) within waves. Medium sized monthly test–retest reliability was found ($r = .48–.68$, $p < .001$).

Strategy of Analysis

Instead of focusing on similarity in specific personality domains, we examined overall personality similarity by calculating q correlations (Cronbach & Gleser, 1953), which capture each dyad's similarity in terms of their organization (or patterning) of Big Five responses (i.e., in terms of personality profiles). Other types of similarity indexes, such as univariate difference scores, ignore multivariate agreement (or disagreement) on the many specific responses on which the profile of individuals' personalities is based and thus discard a substantial amount of information that is captured by profile similarity correlations (Luo & Klohnen, 2005). Profile correlations can range from 1 (*perfect similarity*) to −1 (*perfect opposites; complementarity*), with zero indicating neither similarity nor dissimilarity.

All scores were standardized first to account for possible mean-level differences between scales. Perceived similarity was examined by computing the q correlation between ratings of Person A's self-reported Big Five scores and Person A's ratings of Person B's Big Five scores. Actual similarity was examined by computing the q correlation between Person A's self-rated Big Five scores and Person B's self-rated Big Five scores. Finally, we constructed scores for peer-rated similarity by first computing mean scores based on all peer ratings of participants' Big Five traits and next computing q correlations between the mean scores of peers' ratings of Person A's Big

Five scores and the mean scores of peers' ratings of Person B's Big Five scores. Alternatively, one could compute peer-rated similarity by calculating the mean of all q correlations, indicating individual peers' ratings of participants' Big Five scores. This alternative peer-rated similarity index correlated highly (r = .93–.97, $p < .05$, across the five waves), with the peer-rated similarity indices we used in all following analyses.

Because we are dealing with dyadic data, each of the dyadic judgments is entered twice (i.e., A judges B, but B also judges A), which creates nonindependence of data and therefore violates independence assumptions associated with standard regression analyses. Models typically used when dealing with round-robin data, such as the actor partner interdependence model (Cook & Kenny, 2005), are not able to deal with cross-lagged modeling including as many variables as used in the present study while controlling for dyadic nonindependence, because the modeling would become too complex. We therefore randomly selected half of each of the dyadic judgments, resulting in 2,345 unique dyadic judgments.

Because each participant is a member of up to 25 different dyads (A rates B, A rates C, etc.), associations of actual, perceived, and peer-rated similarity with friendship similarity were computed within participants through cross-lagged multilevel modeling in Mplus (Muthén & Muthén, 1998–2006), tapping into processes of similarity and friendship intensity for each participant of the sample. In this model, each similarity type was used to predict subsequent friendship intensity 1 month later, and friendship intensity was used to predict each of the subsequent three similarity types. By following this procedure, we controlled all cross-lagged effects for concurrent associations as well as stability paths. Thus, cross-lagged effects of the similarity types reflect the degree to which similarity predicts an increase or decrease in friendship intensity 1 month later, and cross-lagged effects of friendship intensity reflect the degree to which friendship intensity predicts an increase or decrease in similarity 1 month later.

To account for possible shared variance because individuals are nested within each of the 10 groups, we controlled for Level 3 (between-group) differences in the analyses. Because this process did not affect any of the results in a significant way, we decided to model only Level 1 and Level 2 in the final analyses. Root mean square errors of approximation (RMSEAs) smaller than .05 and comparative fit indices (CFIs) larger than .95 indicate adequate fit of the models to the data (Muthén & Muthén, 1998–2006).

We followed the several steps of Holmbeck (1997) to test whether communication mediates effects of perceived similarity and peer-rated similarity on friendship intensity. Partial mediation is found when similarity significantly predicts communication over time (Condition 1), communication subsequently significantly predicts friendship intensity over time (Condition 2), and direct effects of similarity on friendship intensity significantly reduce in size compared with the nonmediation model (Condition 3). We tested this last condition by examining confidence intervals of similarity effects on friendship intensity in Mplus. To test the fourth condition of full mediation, we compared two versions of this mediation model. In the *unconstrained model of mediation,* direct effects of similarity on subsequent friendship intensity are modeled. In contrast, in the *constrained model of mediation,* direct effects of similarity are constrained to zero across five waves while all other associations remain the same. Condition 4 is met if the fit does not improve significantly when the unconstrained model of mediation is compared with the constrained model of mediation using chi-square tests. Note that in all these models, we controlled for the reverse direction of effects by letting communication predict similarity and further letting friendship intensity predict communication at each wave. We examine these conditions separately for actual similarity, perceived similarity, and peer-rated similarity effects on friendship intensity.

Results

Descriptives

Table 1 shows the number of women, same-sex female dyads, same-sex male dyads, and cross-sex dyads across the 10 groups. Overall, few men were present in the groups and most dyads were same-sex female dyads, followed by cross-sex dyads and same-sex male dyads. Further, Table 2 shows the means and standard deviations of all variables (self-ratings on friendship intensity, communication, all Big Five traits, perceived similarity, actual similarity, and peer-rated similarity) across five waves. Repeated-measure analyses were run to check whether there were mean-level changes in these variables. Whereas friendship intensity

Table 1
Size and Gender Composition of the 10 Groups of Undergraduates

	Individuals (*n*)		Dyads (*n*)			
Group	Female	Total	Female	Male	Cross sex	Total
1	17	21	136	6	68	210
2	18	24	153	15	108	276
3	20	23	190	3	83	253
4	18	24	153	15	108	276
5	18	24	153	15	108	276
6	15	21	105	15	90	210
7	23	23	253	0	0	253
8	17	19	136	1	34	171
9	16	21	120	10	80	210
10	19	21	171	1	38	210
Total	181	221	1,547	81	718	2,345

Note. All dyads were unique: One dyadic judgment was randomly selected of dyads that were entered twice.

Table 2
Descriptives of Single-Item Big Five Traits, Communication, and Friendship Intensity Over 4 Months

	Wave 1		Wave 2		Wave 3		Wave 4		Wave 5	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Friendship intensity	2.73	1.21	2.74	1.10	2.74	1.24	2.77	1.22	2.78	1.23
Communication	3.31	1.62	3.22	1.64	3.01	1.65	2.88	1.66	2.67	1.78
Openness	4.60	1.29	4.63	1.31	4.61	1.28	4.60	1.29	4.62	1.31
Conscientiousness	4.75	1.39	4.74	1.35	3.76	1.38	3.36	1.37	4.74	1.36
Extraversion	4.79	1.34	4.81	1.33	4.82	1.25	4.83	1.30	4.80	1.29
Agreeableness	5.13	1.04	5.14	1.03	5.13	1.03	5.12	1.02	5.13	1.03
Neuroticism	3.63	1.31	3.65	1.38	3.67	1.36	3.65	1.33	3.64	1.34
Perceived similarity	.55	.43	.53	.49	.54	.48	.54	.53	.55	.52
Actual similarity	.33	.44	.32	.42	.33	.23	.31	.22	.33	.54
Peer-rated similarity	.42	.51	.41	.54	.43	.60	.44	.60	.44	.57

Note. All similarity scores range from −1 (dissimilar profiles) to 1 (similar profiles). Perceived similarity = similarity in ratings of Person A's self-reported Big Five scores and Person A's ratings of Person B's Big Five scores; Actual similarity = similarity between Person A's self-rated Big Five scores and Persons B's self-rated Big Five scores; Peer-rated similarity = peers' ratings of Person A's Big Five scores and peers' ratings of Person B's Big Five scores.

significantly increased over time, $F(4, 201) = 933$, $p < .01$, communication significantly declined over time, $F(4, 201) = 1{,}164$, $p < .01$, which suggests that on average, individuals became more befriended with each other over time but communicated less with each other over time. All other variables showed mean-level stability across the 4-month period.

Concurrent Associations Between Different Types of Similarity and Friendship Intensity

Through the use of the multilevel module in SPSS 12.0, bivariate multilevel correlations between the different types of similarity and friendship intensity were obtained for the first wave (see Table 3). Friendship intensity showed positive correlations with all types of similarity. The similarity indices themselves showed positive but low correlations with each other, suggesting that they partially overlap but reflect different types of similarity in personality. This finding suggests that peer-rated similarity in the present study is not merely another index of actual similarity as measured by self-reports.

Unique Associations of Perceived Similarity, Actual Similarity, and Peer-Rated Similarity With Friendship Intensity

To examine the unique associations of perceived similarity, actual similarity, and peer-rated similarity with friendship intensity, we entered each of the types simultaneously in a multilevel regression analysis, while controlling for effects of focal participant's age, sex, and the gender composition of the dyad (i.e., same sex vs. cross sex). The fit of this model was adequate: $\chi^2(16, N = 205) = 104.22$, $p < .01$; CFI = .99; RMSEA = .03. Results are shown in Table 4. The first three hypotheses were confirmed: Higher perceived similarity and higher peer-rated similarity were associated with higher friendship intensity. Furthermore, actual similarity was not uniquely associated with friendship intensity. Finally, same-sex dyads reported higher friendship intensity than cross-sex dyads. No sex and age effects on friendship intensity were found.

Addressing Alternative Explanations

To examine whether actual similarity based on single items has equivalent associations with friendship intensity compared with actual similarity based on the (more reliable) BFI, we replaced the former similarity index by the latter similarity index in the multilevel regression analysis. The association of unique actual similarity based on the BFI with friendship intensity ($\beta = .02, p > .05$) was equivalent to the association of unique actual similarity based on the single items with friendship intensity. Thus, the null associations between friendship and unique actual similarity were not due to measurement of the Big Five with single items.

Table 3
Time 1 Correlations Among Friendship Intensity, Perceived Similarity, Actual Similarity, Peer-Rated Similarity, and Communication

Variable	Perceived similarity	Actual similarity	Peer-rated similarity	Communication
Perceived similarity	—			
Actual similarity	.23*	—		
Peer-rated similarity	.22*	.19*	—	
Communication	.26*	.05*	.17*	—
Friendship intensity	.25*	.06*	.14*	.74*

* $p < .01$.

Table 4
Multivariate Beta Weights Indicating the Associations Between Similarity and Friendship Intensity at Wave 1

Variable	Friendship intensity
Sex (0 = male, 1 = female)	.02
Cross sex (0 = same sex, 1 = cross sex)	−.08**
Age	.00
Perceived similarity	.29**
Actual similarity	.01
Peer-rated similarity	.14**

** $p < .001$.

To examine whether including only perceptions of one single rater of friendship intensity affected the associations between perceived similarity and friendship intensity, we ran regression analyses in which we replaced the dependent variable of friendship intensity as reported by the focal individual by friendship intensity as reported by both dyadic partners (i.e., computed as the mean of these two scores). Results showed equivalent effects of perceived similarity ($\beta = .25$, $p > .001$), actual similarity ($\beta = .02$, $p > .05$), and peer-rated similarity ($\beta = .12$, $p < .05$) on friendship intensity. In addition, using scores of the partners' perception on friendship intensity showed a similar pattern of results. Thus, associations of perceived similarity and peer-rated similarity with friendship intensity seem to be relatively unaffected by intraindividual reporting biases.

Finally, to examine whether perceived similarity or peer-rated similarity effects suppress associations between actual similarity and friendship intensity, we first omitted peer-rated similarity from the original analysis while keeping all other variables, followed by omitting only perceived similarity. Results showed that whereas omitting only perceived similarity from these analyses revealed a significant association between actual similarity and friendship intensity ($\beta = .05$, $p < .05$), omitting peer-rated similarity from the analysis did not produce an association between actual similarity and friendship intensity. This result suggests that the (small) bivariate association between actual similarity and friendship intensity is completely accounted for by subjective perceptions of similarity. In contrast, the variance shared by peer-rated and actual similarity (i.e., the variance tapping into actual similarity that is agreed on by self and peers) does not seem to be associated with friendship intensity.

Cross-Lagged Longitudinal Associations Among Perceived Similarity, Actual Similarity, Peer-Rated Similarity, Friendship Intensity, and Communication

The longitudinal associations between perceived similarity, actual similarity, peer-rated similarity, and friendship intensity across five monthly intervals were examined in a cross-lagged multilevel model in Mplus. To examine bidirectional associations between the three types of similarity and friendship intensity, we estimated the effect of each of the three types of similarity on friendship intensity at each subsequent wave. At the same time, the effect of friendship intensity on the three types of similarity at each subsequent wave was estimated. We controlled for within-wave correlations and stability paths. To examine the unique effects of actual, perceived, and peer-rated similarity, we simultaneously estimated within-wave associations and bidirectional longitudinal associations among these three types of similarity. The fit indices indicated that the model provided a close fit to the data: $\chi^2(473, N = 205) = 911.27$, $p < .01$; CFI = .98; RMSEA = .02.

Table 5 shows all associations in the cross-lagged multilevel model. The concurrent correlations show the same pattern as found in the bivariate correlations: Whereas higher perceived similarity and peer-rated similarity were associated with higher friendship intensity, actual similarity were not. Table 5 shows that the within-wave correlations between all variables became smaller across waves. This finding can be partially explained by the design of the cross-lagged model: Because we controlled for each within-wave correlation for the previous concurrent correlations as well as prior stability paths, the variance to be explained at each subsequent wave becomes smaller.[1] Stability paths increased from Wave 1 to Wave 3 but remained at the same level from Wave 3 onward. Confidence intervals of the stability paths indicated that whereas high stability for friendship intensity and peer-rated similarity were found across all waves, perceived similarity and actual similarity showed significantly ($p < .05$) lower stability from the first to the last waves, respectively.

Hypothesis 4 was confirmed: The cross-lagged associations revealed that higher perceived similarity predicted higher friendship intensity 1 month later, and higher friendship intensity predicted higher perceived similarity 1 month later, respectively. This pattern of results was found consistently across all five waves. Hypothesis 5 was also confirmed: Actual similarity and friendship intensity were not significantly associated at any of the waves. Hypothesis 6 was partly confirmed: Higher peer-rated similarity predicted higher friendship intensity over time. However, the second part of Hypothesis 6 was not confirmed: Friendship intensity did not predict subsequent peer-rated similarity.[2,3]

Different types of similarity also had effects on each other over time: First, higher perceived similarity predicted higher actual similarity over time, and higher actual similarity predicted higher perceived similarity over time at all waves. Second, perceived similarity predicted higher peer-rated similarity from Wave 1 to Wave 2 and from Wave 3 to Wave 4, indicating that as individuals perceived more similarity, peers also began to perceive more similarity. The reverse is also true: Higher peer-rated similarity predicted higher perceived similarity at all waves. Higher peer-rated similarity also predicted higher actual similarity from Wave 1 to Wave 2. As perceived similarity subsequently predicted higher friendship intensity at each wave, both actual similarity and peer-rated similarity had indirect effects on friendship intensity through perceived similarity. That is, as dyad partners increased in actual similarity and peer-rated similarity,

[1] Because one disadvantage of modeling all five waves is that the variance to be explained in the later waves becomes smaller (see Table 3), we additionally modeled bidirectional associations between Wave 1 and Wave 5 of perceived, actual, and peer-rated similarity with friendship intensity. The same pattern of results emerged. Whereas perceived similarity and peer-rated similarity at Wave 1 uniquely predicted friendship intensity at Wave 5, actual similarity did not. Further, friendship intensity at Wave 1 predicted perceived similarity at Wave 5.

[2] To examine the development of as well as the association between each of the similarity types and friendship intensity, we used a multivariate latent growth model analysis in which the 5 months of data were used to estimate initial levels and growth over time for each variable. The final model consisted of eight latent factors: both initial level and growth for actual similarity, perceived similarity, peer-rated similarity, and friendship intensity. Initial levels were all correlated with each other. Whereas initial levels of perceived similarity and peer-rated similarity were associated with increases in friendship intensity, initial levels of actual similarity were not. Further, initial levels of friendship intensity were associated with increases in perceived similarity. Thus, using latent growth modeling resulted in the same pattern of results.

[3] Because randomly selecting half of the sample may have affected the results found in the cross-lagged model, we also ran the cross-lagged model for the other half of the sample. No differences in the size of associations emerged: Perceived similarity significantly ($\beta = .04–.07$, $p < .05$) predicted friendship intensity over time, friendship intensity significantly ($\beta = .11–.15$, $p < .05$) predicted perceived similarity over time, and peer-rated similarity predicted friendship intensity over time ($\beta = .04–.07$, $p < .05$). Actual similarity was not associated with friendship intensity. Thus, randomly selecting half of the sample did not seem to affect the results.

Table 5
Associations Among Friendship Intensity, Perceived Similarity, Actual Similarity, and Peer-Rated Similarity Across Five Waves

Association	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5
Within-wave correlations					
Actual similarity ↔ friendship intensity	.02	.03	.00	.00	.00
Perceived similarity ↔ friendship intensity	.10**	.08**	.06**	.04	.02
Peer-rated similarity ↔ friendship intensity	.04**	.05**	.05**	.00	.00
Perceived similarity ↔ actual similarity	.13**	.10**	.07*	.09**	.06**
Actual similarity ↔ peer-rated similarity	.02	.01	.02	.00	.00
Perceived similarity ↔ peer-rated similarity	.26**	.09**	.04	.02	.03
Stability paths					
Actual similarity		.34**	.47**	.54**	.56**
Perceived similarity		.29**	.45**	.44**	.48**
Peer-rated similarity		.78**	.85**	.86**	.85**
Friendship intensity		.72**	.80**	.80**	.82**
Cross-lagged paths					
Actual similarity → perceived similarity		.08**	.05**	.04*	.06*
Actual similarity → peer-rated similarity		.09**	.03	.00	.01
Actual similarity → friendship intensity		.01	.00	.00	.00
Perceived similarity → actual similarity		.09**	.07**	.04*	.05*
Perceived similarity → peer-rated similarity		.07**	.03	.06**	.02
Perceived similarity → friendship intensity		.06**	.04*	.05*	.06**
Peer-rated similarity → actual similarity		.12**	.08**	.03	.15**
Peer-rated similarity → perceived similarity		.18**	.12**	.10**	.13**
Peer-rated similarity → friendship intensity		.06**	.07**	.05**	.04*
Friendship intensity → actual similarity		−.02	.00	.02	.01
Friendship intensity → perceived similarity		.07**	.09**	.15**	.12**
Friendship intensity → peer-rated similarity		.00	.01	.02	.01

* $p < .01$. ** $p < .001$.

they ended up perceiving more similarity themselves. This, in turn, predicted increases in friendship intensity over time.

Mediation of Communication: Perceived Similarity and Peer-Rated Similarity Effects on Friendship Intensity

Table 3 shows the initial correlations of communication with different types of similarity and friendship intensity. Consistent with conditions for mediation, communication was significantly positively correlated with perceived similarity, peer-rated similarity, and friendship intensity at Time 1. To test whether communication mediated the longitudinal effects of perceived similarity and peer-rated similarity on friendship intensity, we checked the three conditions necessary for partial mediation and the four conditions necessary for full mediation for each similarity type separately.

Peer-rated similarity. To test Hypothesis 7, we created a mediation model of communication for effects of peer-rated similarity on friendship intensity. Fit indices of this model again indicated a close fit to the data (CFIs $> .98$; RMSEAs $< .02$). In Figure 1, the conceptual model of communication as mediator of peer-rated similarity effects on friendship intensity is shown. The first condition of partial mediation was met: Peer-rated similarity predicted more communication over time at each wave (B paths: $\beta = .04–.05$, $p < .01$). Higher communication in this model predicted higher friendship intensity at all waves (C paths: $\beta = .24–.29$, $p < .01$), confirming the second condition for partial mediation. The third condition of partial mediation was also met: Effects of peer-rated similarity on subsequent friendship intensity became significantly ($p < .05$) smaller after we controlled for effects of communication on friendship intensity (A paths: $\beta = .00–.01$, $p > .05$), with one exception: The association between peer-rated similarity at Wave 4 and friendship intensity at Wave 5 ($\beta = .05$, $p < .01$) did not become significantly smaller.

The additional fourth condition for full mediation was also met for the first four waves: The fit of the constrained model (the model in which all direct effects between Waves 1 and 4 of peer-rated similarity on friendship intensity were constrained to zero, $\chi^2 = 924.46$, $\Delta df = 473$) did not significantly differ from the fit of unconstrained model (the model in which effects of peer-rated similarity on friendship intensity from Wave 1 to Wave 4 were left unconstrained, $\chi^2 = 912.53$, $\Delta df = 477$: $\Delta\chi^2 = 12.6$, $\Delta df = 4$, $p > 05$). Thus, in line with Hypothesis 4, these results support the full mediation model of communication in the effects of peer-rated similarity on friendship intensity from Wave 1 to Wave 4: As individuals were perceived as more similar by their peers, they tended to communicate more often, which, in turn, predicted higher friendship intensity over time. However, by the fourth month of the acquaintanceship process, higher peer-rated similarity also uniquely predicted higher friendship intensity.

Perceived similarity. To test Hypothesis 8, we created a mediation model of communication for effects of perceived similarity on friendship intensity. Fit indices of this model were all satisfactory (CFIs $> .96$; RMSEAs $< .03$). The first condition of partial mediation was not fully met: Effects of perceived similarity on subsequent communication were inconsistent, because perceived similarity predicted more communication only from Wave 1 to Wave 2 ($\beta = .08$, $p < .01$). Although the second condition of partial mediation was met (effects of communication on later friendship intensity ranged from $\beta = .23$ to $\beta = .28$, $p < .001$, between Waves 1 and 5; C paths in Figure 1), examining confi-

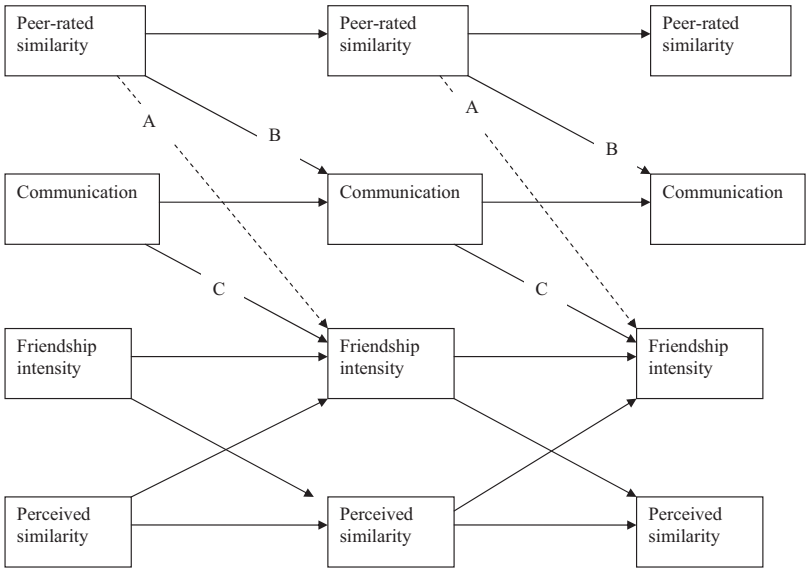

Figure 1. Conceptual model of longitudinal effects between perceived similarity, peer-rated similarity, communication, and friendship intensity. Although paths between only three waves are shown in this conceptual model, all five waves were estimated simultaneously. Dotted lines indicate that after controlling for effects of communication on friendship intensity, effects of peer-related similarity on friendship intensity disappeared. Effects among different similarity indices and within-wave correlations were estimated, but are not shown in this figure.

dence intervals showed that perceived similarity effects on friendship intensity did not significantly ($p < .05$) reduce in size. Thus, Hypothesis 5 was not confirmed: Communication did not mediate effects of perceived similarity on friendship intensity.

Actual similarity. Because no effects of actual similarity on friendship intensity were found, Condition 3 of mediation was not met.

Discussion

The purpose of this study was to examine both the concurrent and the bidirectional longitudinal associations among perceived similarity, actual similarity, and peer-rated similarity, and friendship intensity during the acquaintanceship process. In the following, we discuss results for the three different types of similarity as well as the extent to which communication acts as a mechanism behind similarity effects on friendship intensity.

Perceived Similarity and Friendship Intensity

The first part of the results showed that greater perceived similarity in personality was uniquely associated with more friendship intensity for freshly acquainted individuals. The current study thus offers support for the claim that perceived similarity effects on friendship intensity work very fast and early in the acquaintanceship phase (Sunnafrank & Ramirez, 2004). Although prior studies have shown cross-sectional associations between perceived similarity in values and attraction to bogus strangers (e.g., Byrne, 1971), the current study expands these findings by showing that perceived similarity in personality is associated with higher friendship intensity for real individuals in a naturalistic setting. In addition, prior findings were expanded by showing that associations of perceived similarity and friendship intensity exist even when controlling for actual similarity as indicated by self-ratings or peer ratings of each dyad member's personality. In other words, it seems that if people have the illusionary perception of being similar to others (Murray et al., 2005), they are more likely to be friends with them, regardless of whether individuals actually are more similar in personality.

In addition, results showed bidirectional longitudinal associations between perceived similarity in personality and friendship intensity. On the one hand, individuals who are more befriended with each other increasingly seem to perceive that they are similar in their personality profiles. This result is consistent with findings showing that in existing friendships, higher satisfaction predicted subsequent higher perceptions of similarity in personality (Morry, 2005, 2006). Our study expands these findings by showing that this is the case not only for existing friendships but also for freshly acquainted individuals in a real-life setting. This result is consistent with balance theory (Heider, 1958): Because similarities between individuals are believed to be inherent to relationships, any dissimilarity may cause a cognitive imbalance that is countered by illusions of similarity (Morry, 2005).

On the other hand, higher perceived similarity in personality predicted higher friendship intensity over time. This finding is consistent with earlier studies showing that perceived similarity in values predicts higher attraction to bogus strangers (Hoyle, 1993) and higher friendship intensity between freshly acquainted undergraduates (Sunnafrank & Ramirez, 2004). The current study extends prior findings by indicating that, next to perceived similarity in values, perceived similarity in personality traits also affects friendship intensity. Findings are also in line with research on assortative mating, in which perceived similarity in personality,

and not actual similarity in personality, has been found to be associated with higher relationship satisfaction over 6 weeks (Murray et al., 2005). As indicated before, people seem to make an estimate of similarity on the first encounter and tend to believe these first impressions affect the way people will interact in the future (Berg & Clark, 1986; Sunnafrank & Ramirez, 2004).

Several explanations previously applied to actual similarity effects on attraction may apply to perceived similarity effects on attraction. For example, the reinforcement–affect explanation could be taken to suggest that perceptions of similarity between oneself and others work as a reinforcement of the opinions, views, and feelings one holds on the world, and therefore perceived similarity triggers an implicit affective response that increases attraction (Clore & Byrne, 1974). As no support was found for mediation of communication of the association between perceived similarity and friendship intensity, explanations focusing on communication do not seem to apply to perceived similarity effects on friendship intensity (Berscheid & Walster, 1978).

Actual Similarity and Friendship Intensity

Results from this study show that actual similarity is not uniquely associated with friendship intensity for just-acquainted individuals, thus providing no support for uncertainty reduction theory (Berger & Calabrese, 1975) or the reinforcement–affect explanation (Clore & Byrne, 1974; Izard, 1960) regarding actual personality similarity effects on attraction during the acquaintanceship process. Results showed that when we controlled for perceived similarity, associations between actual similarity and friendship intensity disappeared. In a similar vein, longitudinal analyses revealed no bidirectional longitudinal associations between friendship intensity and actual similarity: Thus, actual personality similarity was also not associated with friendship intensity during later phases of acquaintanceship.

Peer-Rated Similarity and Friendship Intensity

Concerning unique associations between peer-rated similarity and friendship intensity, we found that as peers perceive similarity in personality between two individuals, these individuals tend to be more befriended, even if these individuals are only freshly acquainted. Moreover, because we controlled for effects of other similarity types on friendship intensity, the present study provides evidence for unique peer-rated similarity effects: Similarity perceived by peers is associated with more friendship intensity, over and above associations of idiosyncratic perceptions of similarities and actual similarity (as indicated by independent self-reports) with friendship intensity.

Results provide more insight in the direction of causality between these associations. Support was found for social comparison theory (Festinger, 1954) in that peer-rated similarity directly predicted friendship intensity, but only after 3 months of getting acquainted (peer-rated similarity also predicted higher friendship intensity before these 3 months, but this effect disappeared after we controlled for communication). It may be that the group as a whole has to develop a certain coherence to be able to influence individuals' behaviors. For example, only from the norming stage onward does the group create certain group norms that affect individuals' behaviors (Tuckman, 1965; Tuckman & Jensen, 1977). Similarity between befriended individuals may become such a peer norm, and individuals may conform to this norm by seeking out friends who peers view as similar to them in personality. Future studies should address whether the stages of groups and consensus among peers concerning personality moderate the effects of peers' perceptions on friendship intensity.

Our study provides evidence for communication as a possible mechanism explaining how peer-rated similarity affects friendship intensity; we examined the role of communication in mediating the link between peer-rated similarity and friendship intensity. Peer-rated similarity indirectly affected friendship intensity from the start of the study onward by exerting an influence on communication behavior. That is, even as individuals were just becoming acquainted, higher perceptions of similarity by peers predicted more communication over time between these individuals, which in turn predicted increases in friendship intensity over time.

There are at least two ways in which peer perceptions of similarity may affect communication. Peer-rated similarity in personality may pertain to different aspects of actual personality traits than the current construct labeled *actual similarity* according to self-ratings (Hofstee, 1994). That is, both self-ratings and peer ratings may be valid indicators of actual similarity between individuals, but peers may report certain aspects of personality traits that individuals themselves cannot or will not report. The previously mentioned theoretical explanations regarding actual similarity effects on attraction could therefore apply to peer-rated similarity effects on attraction as well. For example, in line with uncertainty reduction theory, higher peer-rated similarity may increase the predictability of a conversation between two individuals and thereby increase attraction. In line with the notion that self-ratings and peer ratings of similarity pertain to different constructs, concurrent associations between actual similarity and peer-rated similarity were small. Moreover, additional analyses found that peer-rated similarity did not suppress associations between actual similarity and friendship intensity. This finding suggests that peer-rated similarity is not a substitute for actual similarity according to self-ratings and has its own unique effects on friendship intensity through communication.

Alternatively, communication might be directly affected by peers' behaviors. Social comparison theory claims that individuals conform to views of peers and adjust their behaviors accordingly. That is, peers may provide certain individuals with more opportunities to communicate by spending more or less time with these individuals themselves (Williams et al., 1998). Further, peer norms about which individuals should be friends might be transferred to individuals' own perceptions about whom they should become friends with (Baron & Kerr, 2003; LaRocco, 1985), thereby guiding their communicative behaviors. This way, peers' expectations that "birds of a feather flock together" may create a press for individuals to befriend those who are perceived as similar and shun those who are perceived as dissimilar. According to the present study, one effective way peers can do this is by increasing or decreasing communication between individuals. Future studies should examine what types of peer behaviors influence individuals' communicating behaviors that in turn affect the formation of friendships.

Note that although communication and friendship intensity were highly correlated across waves in the current study, research suggests that these two variables pertain to different constructs. Con-

ceptually, it seems that although friends tend to communicate frequently, frequent communication between two individuals does not necessarily indicate friendship. For example, research suggests that more hostile relationships, such as relationships between bullies and their victims, are also characterized by frequent interaction (Veenstra et al., 2007). Further, the current study showed that whereas mean levels of friendship intensity increased over time, mean levels of communication decreased over time. This finding suggests that overall, freshmen in this study became more befriended but at the same time became more selective with whom they communicated. Moreover, communication and friendship intensity differentially predicted and were differentially predicted by other constructs. For example, although perceived similarity and friendship intensity were bidirectionally associated across waves, perceived similarity only predicted more communication from Wave 1 to Wave 2, and communication did not predict perceived similarity across time.

The present study also offered a unique possibility to examine indirect effects of actual and peer-rated similarity through perceived similarity on friendship intensity. Regarding the former, there were no direct longitudinal effects of actual similarity on friendship intensity. Therefore, it seems that perceived similarity does not mediate effects of actual similarity on friendship intensity. However, because actual similarity consistently predicted perceived similarity, it seems that actual similarity between individuals increases perceptions of similarities in personality (Hoyle, 1993), which, in turn, seems to enhance friendship intensity over time. Peer-rated similarity also predicted higher perceived similarity at all waves, indicating that peers' perceptions on similarity in personality traits may affect individual's own perceptions. As perceived similarity subsequently predicted higher friendship intensity, peers seem to indirectly affect friendship intensity through individuals' perceptions.

The present study deals with similarity in personality, and the question arises whether results are generalizable to similarity in other domains. Prior research has shown that actual similarity in values within friendships is even lower than actual similarity in personality (Tolson & Urberg, 1993), and actual similarity in values is not associated with attraction to bogus strangers (Hoyle, 1993). In contrast, studies have shown bidirectional associations between perceived similarity in values and attraction (Morry, 2006; Sunnafrank & Ramirez, 2004). It seems likely that similar results would have been found regarding similarity in values and friendship intensity, though it remains unclear to what extent these findings are generalizable to peer-rated similarity in values, or similarity in other domains such as problem behaviors (Tolson & Urberg, 1993) and leisure activities (Selfhout, Branje, Ter Bogt, & Meeus, in press).

One limitation of the present study is the reliance on a relatively highly educated sample, consisting primarily of female students, which may have limited the choices people could make of potential friends, because similarity in demographical traits of individuals may affect friendship selection (see Gilson, Hunt, & Rowe, 2001). On the other hand, because social homogamy (i.e., individuals tend to form friendship with others that are similar to them in social background) is a pervasive fact of life, the high similarity in social background in the present study may form a realistic setting in which individuals usually form friendships. Further, we controlled for sex effects, age effects, and sex composition of the dyad effects on friendship intensity and still found direct effects of perceived similarity and indirect effects of peer-rated similarity on friendship intensity. Notwithstanding, future studies should investigate the possible effect of social homogamy by examining just-acquainted individuals from various demographical backgrounds.

Another limitation of the current study is that effect sizes found in this study were relatively small, implying that other factors may also be important when getting acquainted. For example, appearances (Sprecher & Regan, 2002; Zakin, 1983), initial expected outcome of the relationship (Sunnafrank & Ramirez, 2004), and practical limitations such as the possibilities to interact frequently (Haynie & Osgood, 2005) have been shown to determine which friends to select in these introduction groups. However, results were found irrespective of intraindividual biases, such as reporting on both friendship intensity and similarity, and even more important, the pattern of results was found consistently across five waves, suggesting that these relatively small effects of similarity in personality may act in a cumulative way to predict friendship intensity over time.

In conclusion, the current study provides insight in the similarity–attraction link in several ways. First, specific types of similarity in personality were associated with greater friendship intensity for just-acquainted individuals in a naturalistic setting, suggesting that similarity is associated with attraction already during early phases of acquaintanceship and can be generalized to real-time situations. Further, the current results reinforce the need to use a multiple informant design when studying the similarity–attraction link because only perceived similarity and peer-reported similarity in personality were associated with greater friendship intensity, whereas actual similarity in personality was not. Moreover, through the use of a longitudinal design, insight was provided in the direction of causality between similarity and attraction: Perceived similarity and peer-rated similarity seem to enhance friendship formation, and being befriended seems to enhance perceptions of similarity. Finally, processes underlying effects of peer-rated similarity on friendship intensity were studied: Peer perceptions of similarity in personality seem to affect individuals' communicative behaviors, which in turn affect friendship formation.

References

Asendorpf, J. B., & Wilpers, S. (1998). Personality effects on social relationships. *Journal of Personality and Social Psychology, 74,* 1531–1544.

Barelds, D. P. H., & Barelds-Dijkstra, P. (2007). Love at first sight or friends first? Ties among partner personality trait similarity, relationship onset, relationship quality, and love. *Journal of Social and Personal Relationships, 24,* 479–496.

Baron, R. S., Hoppe, S., Linneweh, B., & Rogers, D. (1996). Social corroboration and opinion extremity. *Journal of Experimental Social Psychology, 32,* 537–597.

Baron, R. S., & Kerr, N. L. (2003). *Group process, group decision, group action.* Buckingham, England: Open University Press.

Berg, J. H., & Clark, M. S. (1986). Differences in social exchange between intimate and other relationships: Gradually evolving or quickly apparent? In V. J. Derlega & B. A. Winsted (Eds.), *Friendship and social interaction* (pp. 101–128). New York: Springer.

Berger, C. R., & Calabrese, R. J. (1975). Some explorations in initial interaction and beyond: Toward a developmental theory of interpersonal communication. *Human Communication Research, 1,* 99–112.

Berscheid, E., & Walster, E. (1978). *Interpersonal attraction* (2nd ed.). Reading, MA: Addison-Wesley.

Byrne, D. (1971). *The attraction paradigm.* New York: Academic.

Byrne, D., & Nelson, D. (1965). Attraction as a linear function of proportion of positive reinforcements. *Journal of Personality and Social Psychology, 1,* 659–663.

Clore, G. L., & Byrne, D. A. (1974). A reinforcement-affect model of attraction. In T. L. Huston (Ed.), *Foundations of interpersonal attraction* (pp. 143–165). New York: Academic Press.

Cook, W. L., & Kenny, D. A. (2005). The actor-partner interdependence model: A model of bidirectional effects in developmental studies. *International Journal of Behavioral Development, 29,* 101–109.

Cronbach, L. J., & Gleser, G. C. (1953). Assessing similarity between profiles. *Psychological Bulletin, 50,* 456–473.

Denissen, J. J. A., Geenen, R., Selfhout, M., & Van Aken, M. A. G. (2008). Single-item big five ratings in a social network design. *European Journal of Personality, 22,* 37–54.

Denissen, J. J. A., Geenen, R., Van Aken, M. A. G., Gosling, S. D., & Potter, J. (2008). Development and validation of a Dutch translation of the Big Five inventory (BFI). *Journal of Personality Assessment, 90,* 152–157.

Duck, S. (1994). *Meaningful relationships: Talking, sense, and relating.* Thousand Oaks, CA: Sage.

Duck, S., & Craig, G. (1978). Personality similarity and development of friendship: A longitudinal study. *British Journal of Social and Clinical Psychology, 17,* 237–242.

Esterberg, K. G., Moen, P., & Dempster-McCain, D. (1994). Transition to divorce: A life-course approach to women's marital duration and dissolution. *Sociological Quarterly, 35,* 289–307.

Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7,* 117–157.

Funder, D. C., & Colvin, C. R. (1991). Explorations in behavioral consistency: Properties of persons, situations, and behaviors. *Journal of Personality and Social Psychology, 60,* 773–794.

Gilson, M. S., Hunt, C. B., & Rowe, D. C. (2001). The friends of siblings: A test of social homogamy vs. peer selection and influence. *Marriage and Family Review, 33,* 205–223.

Goldstein, H., & Woods, J. S. (2002). Promoting communication competence in preschool age children. In R. Mark, H. M. Walker, & G. Stoner (Eds.), *Interventions for academic and behavior problems ii: Preventive and remedial approaches* (pp. 469–499). Washington, DC: National Association of School Psychologists.

Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the big-five personality domains. *Journal of Research in Personality, 37,* 504–528.

Griffitt, W. B. (1970). Environmental effects on interpersonal affective behavior: Ambient effective temperature and attraction. *Journal of Personality and Social Psychology, 15,* 240–244.

Haynie, D. L., & Osgood, D. W. (2005). Reconsidering peers and delinquency: How do peers matter? *Social Forces, 84,* 1109–1130.

Heider, F. (1958). *The psychology of interpersonal relations.* New York: Wiley.

Hofstee, W. K. B. (1994). Who should own the definition of personality? *European Journal of Personality, 8,* 149–162.

Holmbeck, G. N. (1997). Toward terminological, conceptual, and statistical clarity in the study of mediators and moderators: Examples from the child-clinical and pediatric psychology literatures. *Journal of Consulting and Clinical Psychology, 65,* 599–610.

Horton, R. S. (2003). Similarity and attractiveness in social perception: Differentiating between biases for the self and the beautiful. *Self and Identity, 2,* 137–152.

Hoyle, R. H. (1993). Interpersonal attraction in the absence of explicit attitudinal information. *Social Cognition, 11,* 309–320.

Izard, C. (1960). Personality similarity, positive affect, and interpersonal attraction. *Journal of Abnormal and Social Psychology, 61,* 484–485.

John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (pp. 102–138). New York: Guilford Press.

Kalyva, E., & Avramidis, E. (2005). Improving communication between children with autism and their peers through the "circle of friends": A small-scale intervention study. *Journal of Applied Research in Intellectual Disabilities, 18,* 253–261.

Kenny, D. A., & Acitelli, L. K. (2001). Accuracy and bias in the perception of the partner in a close relationship. *Journal of Personality and Social Psychology, 80,* 439–448.

Kenny, D. A., Albright, L., Malloy, T. E., & Kashy, D. A. (1994). Consensus in interpersonal attraction: Acquaintance and the big five. *Psychological Bulletin, 116,* 245–258.

Koesten, J. (2004). Family communication patterns, sex of subject, and communication competence. *Communication Monographs, 71,* 226–244.

Kolar, D. W., & Funder, D. (1996). Comparing the accuracy of personality judgments by the self and knowledgeable others. *Journal of Personality, 64,* 311–337.

LaRocco, J. M. (1985). Effects of job conditions on worker perceptions: Ambient stimuli vs. group influence. *Journal of Applied Social Psychology, 15,* 735–757.

Luo, S., & Klohnen, E. C. (2005). Assortative mating and marital quality in newlyweds: A couple-centered approach. *Journal of Personality and Social Psychology, 88,* 304–326.

Lusk, J., MacDonald, K., & Newman, J. R. (1998). Resource appraisals among self, friend and leader: Implications for an evolutionary perspective on individual differences. *Personality and Individual Differences, 24,* 685–700.

Lutz-Zois, C. J., Bradley, A. C., Mihalik, J. L., & Moorman-Eavers, E. R. (2006). Perceived similarity and relationship success among dating couples: An idiographic approach. *Journal of Social and Personal Relationships, 23,* 865–880.

May, J. L., & Hamilton, P. A. (1980). Effects of musically evoked affect on women's interpersonal attraction toward and perceptual judgments of physical attractiveness of men. *Motivation and Emotion, 4,* 217–228.

Montoya, R. M., Horton, R. S., & Kirchner, J. (in press). Is actual similarity necessary for attraction? A quantitative research synthesis of actual and perceived similarity. *Journal of Social and Personal Relationships.*

Morry, M. M. (2005). Relationship satisfaction as a predictor of similarity ratings: A test of the attraction–similarity hypothesis. *Journal of Social and Personal Relationships, 22,* 561–584.

Morry, M. M. (2006). The attraction–similarity hypothesis among cross-sex friends: Relationship satisfaction, perceived similarities, and self-serving perceptions. *Journal of Social and Personal Relationships, 24,* 117–138.

Morry, M. M., Kito, M., Martens, L., Marchylo, A., & Stevens, K. (2005). *The attraction-similarity model: Friendship and dating studies.* Paper presented at the 2005 Society for Personality and Social Psychology Conference, New Orleans, LA.

Murray, S. L., Holmes, J. G., Bellavia, G., Griffin, D. W., & Dolderman, D. (2005). Kindred spirits? The benefits of egocentrism in close relationships. *Journal of Personality and Social Psychology, 82,* 563–581.

Muthén, B., & Muthén, L. K. (1998–2006). *Mplus user's guide* (4th ed.). Los Angeles, CA: Muthén & Muthén.

Neyer, F. J., Banse, R., & Asendorpf, J. B. (1999). The role of projection and empathic accuracy in dyadic perception between older twins. *Journal of Social and Personal Relationships, 16,* 419–442.

Ross, L., Greene, D., & House, P. (1977). The false consensus effect: An egocentric bias in social perception and attribution processes. *Journal of Experimental Social Psychology, 13,* 279–301.

Selfhout, M., Branje, S., Ter Bogt, T., & Meeus, W. (in press). Similarity in music preferences in adolescents' best friendship formation and discontinuation. *Journal of Adolescence.*

Sprecher, S., & Regan, P. C. (2002). Liking some things (in some people) more than others: Partner preferences in romantic relationships and friendships. *Journal of Social and Personal Relationships, 19,* 463–481.

Sunnafrank, M. (1986). Communicative influences on perceived similarity and attraction: An expansion of the interpersonal goals perspective. *Western Journal of Speech Communication, 50,* 158–170.

Sunnafrank, M., & Ramirez, A., Jr. (2004). At first sight: Persistent relational effects of get-acquainted conversations. *Journal of Social and Personal Relationships, 21,* 361–379.

Tolson, J. M., & Urberg, K. A. (1993). Similarity between adolescent best friends. *Journal of Adolescent Research, 8,* 274–288.

Touhey, J. C. (1974). Situated identities, attitude similarity and interpersonal attraction. *Sociometry, 37,* 363–374.

Tuckman, B. W. (1965). Developmental sequence in small groups. *Psychological Bulletin, 63,* 384–399.

Tuckman, B. W., & Jensen, M. A. (1977). Stages of small-group development revisited. *Group and Organization Studies, 2,* 419–427.

Veenstra, R., Lindenberg, S., Zijlstra, B. J. H., De Winter, A. F., Verhulst, F. C., & Ormel, J. (2007). The dyadic nature of bullying and victimization: Testing a dual perspective theory. *Child Development, 78,* 1843–1854.

Williams, K. D., Shore, W. J., & Grahe, J. E. (1998). The silent treatment: Perceptions of its behaviors and associated feelings. *Group Processes and Intergroup Relations, 1,* 117–141.

Woods, S. A., & Hampson, S. E. (2005). Measuring the Big Five with single items using a bipolar response scale. *European Journal of Personality, 19,* 373–390.

Zakin, D. F. (1983). Physical attractiveness, sociability, athletic ability, and children's preference for their peers. *Journal of Psychology: Interdisciplinary and Applied, 115,* 117–122.

Received January 9, 2008
Revision received September 30, 2008
Accepted October 1, 2008 ■