A Latent Class Analysis of Friendship Network Types and Their Predictors in the Second Half of Life

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**Objective.** Friendships contribute uniquely to well-being in (late) adulthood. However, studies on friendship often ignore interindividual differences in friendship patterns. The aim of this study was to investigate such differences including their predictors.

**Method.** The study builds on Matthews's qualitative model of friendship styles. Matthews distinguished 3 approaches to friendship differing by number of friends, duration of friendships, and emotional closeness. We used latent class analysis to identify friendship network types in a sample of middle-aged and older adults aged 40–85 years (N = 1,876). Data came from the German Aging Survey (DEAS).

**Results.** Our analysis revealed 4 distinct friendship network types that were in high congruence with Matthews’s typology. We identified these as a discerning style, which focuses on few close relationships, an independent style, which refrains from close engagements, and 2 acquisitive styles that both acquire new friends across their whole life course but differ regarding the emotional closeness of their friendships. Socioeconomic status, gender, health, and network-disturbing and network-sustaining variables predicted affiliations with network types.

**Discussion.** We argue that future studies should consider a holistic view of friendships in order to better understand the association between friendships and well-being in the second half of life.

**Key Words:** Ageing—Friendship—Friendship style—Latent class analysis—Network Types.

Numerous studies have shown that friendships contribute uniquely to well-being in (late) adulthood (Adams & Blieszner, 1995; Akiyama, Antonucci, Takahashi, & Langfahl, 2003; Pinquart & Sörensen, 2001). The relational needs fulfilled by friendships are distinct from those fulfilled by family relationships (Adams & Blieszner, 1995; Akiyama et al., 2003; Pinquart & Sörensen, 2001). Whereas instrumental support is a typical provision of family relationships, friendships provide affirmation of worth and companionship that contributes to social integration in later life (Crohan & Antonucci, 1989; Messeri, Silverstein, & Litwak, 1993). Communication and mutual concern in friendships are associated with higher levels of well-being and help to alleviate depressive symptoms (McDonough & Munz, 1994). Furthermore, large numbers of friends reduce mental distress (Hintikka, Koskela, Kontula, Koskela, & Viinamäki, 2000). Also friendships are more effective than family relations in preventing loneliness (Pinquart & Sörensen, 2001).

However, a uniform construal of friendships exists neither in the research literature nor in everyday language. Fehr (1996, p. 7) defined friendship as "a voluntary, personal relationship, typically providing intimacy and assistance, in which the two parties like one another and seek each other’s company." In contrast, Atchley (1989) mapped friendships on a continuum from momentary sociable contacts to close, intense, and continuous interactions. Despite some intracultural consensus on the meaning of friendship (Beer, 2001; Höllinger & Haller, 1990), the usage of the term friendship might differ even within the same culture (de Vries, Dustan, & Wiebe, 1994). This diversity has been rarely addressed in empirical research (Adams, Blieszner, & de Vries, 2000).

Most studies on (older) adults' friendships have investigated effects of the availability of friends, others have considered number, closeness, or contact frequencies. Yet, to our knowledge, there have been no attempts to investigate prevalence rates and determinants of different friendship types or styles that can be distinguished by aggregate measures of a person’s friendship network.

One way to identify personal styles is to classify individuals into categories based on similarities in friendship patterns. Cluster analyses have been conducted to identify general network typologies based on structural and functional network variables (Fiori, Antonucci, & Cortina, 2006; Litwin, 2001). Yet few investigations have focused on friendship patterns. One study proposed a friendship typology based on the degree of shared individual characteristics with one’s closest friends (Adams & Torr, 1998). However, most previous studies did not go beyond simple accounts of friendship networks, for example, by including aggregate network properties (e.g., variation across friendships) as is the aim of the present study.
We propose that a more differentiated treatment of friendship in which we identify friendship network types is necessary in order to better understand the unique relational provisions of such relationships for different individuals. The aim of the present study, therefore, is to identify interindividual differences in friendship patterns in a large representative data set, to establish predictors of distinct friendship network types, and to contribute to theorizing about friendship networks in middle and late adulthood.

Friendship Styles

Based on a qualitative study of 63 older U.S. citizens (aged 60–80 years), who were interviewed on their life histories related to friendships, Matthews (1986, 1995, 2000) developed a theoretical model of three distinct friendship styles. In the first group, the discerning friendship style, individuals carefully selected a few friends and were deeply committed to these friendships. Friends were nonreplaceable and clearly distinguished from acquaintances. These people usually did not make new friends in late adulthood but kept their friends throughout life. In the second group, the independent friendship style, individuals were content with having a few people for friendly interactions. Independent individuals shied away from establishing close or long-lasting friendships and let life circumstances determine their friendships. The third group, the acquisitive friendship style, engaged in an ongoing endeavor to make new friends throughout the life course. Their friends could be both long-standing confidants and distant acquaintances. In this study, we employed a latent class analysis (LCA) model in order to replicate Matthews’s friendship typology with quantitative data. The idea underlying LCA is that unobserved subgroups are causally related to observed values. LCA analysis differs from cluster analysis techniques, which assume direct relationships between observed variables (McLachlan & Peel, 2000) and which assign unique group membership to each individual. By contrast, LCA estimates the probability of group membership for each individual. Therefore, LCA is more suitable given that the concept of friendship styles seeks to describe general ways of “doing friendship” and leaves room for variation in individual manifestations of friendship styles.

Operationalization of Friendship Styles

Replicating Matthews’s typology using LCA requires quantitative indicator variables of friendship styles. Such indicator variables can be derived from the five central variables of friendship styles: number of friends, average emotional closeness to one’s friends, variation in emotional closeness across one’s friends, average duration of one’s friendships, and variation in friendship duration across one’s friends. To confirm Matthews’s typology, a LCA should detect three latent classes. (a) People with a discerning friendship style should have a small number of friends with high levels of closeness and small differences in closeness across friends. The duration of their friendships should be relatively long with small variation between friends. (b) The independents should have small numbers of friends with low levels of closeness and relatively small variation in closeness between friends. Regular change in friendship ties induces shorter friendship durations on average with moderate variation across friends. (c) Individuals with an acquisitive friendship style should have large numbers of friends. Their friendships originated at different periods of life. Therefore, friendship durations should be moderate on average with large variations across friends. Predictions about emotional closeness remain speculative because this group can have both close friends and distant acquaintances. We thus expect the acquisitive friendship style to display average levels of closeness with large variation across friends. Hypotheses about latent class indicator variables across friendship styles are summarized in Table 1.

Predictors of Friendship Network Types

In addition to identifying different friendship patterns, we aimed at exploring which factors cause individuals to approach friendships differently. Several variables are associated with differences in number, closeness, and duration of friendships.

Gender.—Men tend to define friendships on the basis of contact frequency and friendship duration (Blieszner, 2000), whereas women usually have closer, more supportive friendships (Johnson, 1996; Rubin, 1985). We therefore expect women to be overrepresented in friendship classes with high emotional closeness such as the discerning friendship style. Moreover, previous research suggests that the association between gender and having close friendships might be qualified by marital status. Widowed women are better able to maintain friendships over time, whereas men tend to rely on their spouse for interactions with friends (Hatch & Bulcroft, 1992). Thus, we expect single men to have even fewer and less close friendships compared with men with a partner.

Socioeconomic status.—Individuals with higher socioeconomic status (SES) are able to maintain larger networks of friends. Greater financial resources enable more varied

| Table 1. Hypothesized Composition of Latent Class Indicator Variables Across Friendship Styles |
|---------------------------------------------------------------|----------------|----------------|----------------|
| Friendship styles                                           | Discerning | Independent | Acquisitive |
| Number of friends                                           | Few        | Few          | Many          |
| Mean emotional closeness                                     | High       | Low          | Average       |
| Variation in emotional closeness                             | Small      | Small        | Large         |
| Mean friendship duration                                     | Long       | Short        | Moderate      |
| Variation in friendship duration                             | Small      | Moderate     | Large         |
social activities with friends and the maintenance of long-distance friendships (Walker, 1995). Financial strain may instigate conflicts between friends with lower SES (Krause, Newsom, & Rook, 2008). Higher educational attainments should have equipped individuals with better problem-solving abilities (Ross & Sastry, 1999), which are crucial for managing tensions in social relationships (Rook, Mavandadi, Sorkin, & Zettel, 2007). The larger friendship networks that are characteristic of the acquisitive friendship style are therefore more likely for individuals with higher incomes and higher levels of education (Broese van Groenou & van Tilburg, 2003).

Health.—When physical conditions worsen in later life, increased needs for instrumental support might cause withdrawal from friends so as not to burden these relationships (Essex & Nam, 1987; Johnson, 1983). Furthermore, declining health may be a reminder of increasing time constraints. According to Carstensen’s socioemotional selectivity theory (Carstensen, Isaacowitz, & Charles, 1999), a limited time perspective elicits the pursuit of emotion-regulation goals. Thus, poor health might motivate individuals to withdraw from less intimate friendships and turn to emotionally close friendships or family relations. Thus, with deteriorating health the discerning friendship style should become more prevalent.

Network-disturbing and network-sustaining variables.—Absence of network-disturbing variables (e.g., relocations) and presence of network-sustaining variables (e.g., spatial proximity) support friendship maintenance (de Jong Gierveld & Perlman, 2006) and should thus be associated with large friendship networks, as in the acquisitive friendship style, and with long-standing friendships, as in the discerning friendship style.

To summarize, the main objectives of the present study were (a) to identify different friendship network types based on quantitative indicators of friendship styles and to compare these with Matthews’s friendship typology and (b) to test factors that might be associated with interindividual differences in friendship style.

**Method**

**Participants**

Data for the study came from the German Aging Survey (DEAS). The DEAS is a nationwide cross-sectional and longitudinal survey representative of the German population aged 40–85 years, which was conducted in 1996, 2002, and 2008. The third wave included a new group of individuals who participated in the survey for the first time.

Our analysis used data from these participants ($N = 6,205$). Cases without friends ($N = 3,440$) and with only one friend ($N = 889$) had to be excluded from the LCA at first. The latter group collapsed into one latent class due to missing variability in emotional closeness and friendship duration, which made it impossible to determine friendship style for these individuals. According to Matthews, differences and consistencies between the friendships of a person are needed to determine friendship style. Consequently, we conducted our LCA analyses that were directed on identifying qualitative different latent friendship classes on a reduced sample with 1,876 participants. Individuals in this subsample were somewhat younger, reported higher incomes, and were better educated than individuals with fewer than two friends. Effect sizes of these differences, however, remained relatively small (all $d’s < .25$). No group differences were found for health and years since last relocation. However, in subsequent analyses, in which we examined the association of class memberships and the predictors mentioned earlier, we further included the 889 participants who had only one friend as a distinct class.

**Analytic Strategy**

**Identification of friendship network types.**—Starting from a single latent class model, we increased the number of classes by one in each subsequent step until no further improvement in model fit was achieved. We used the Bayesian Information Criterion (BIC) as a reliable indicator to evaluate model fit (Nylund, Asparouhov, & Muthén, 2007). In addition, following Collins and Lanza (2010), we used likelihood ratio ($L^2$) plots to determine the optimal number of classes, which is at the number of classes at which the decrease in the $L^2$ plot levels off.

**Analysis of predictors of friendship network types.**—Next, designated predictor variables were introduced to the latent class model. In this model, we fixed conditional class probabilities to the estimates of the previously identified best-fitting latent class model. To compare characteristics of the identified latent classes to that of the single-friend group, we included individuals with one friend as a separate group in these analyses. To test designated predictor variables, a three-step procedure was employed (Clark & Muthén, 2009). First, for each of the 10 predictors, a separate latent class model was estimated, and model fit was compared with that of the empty latent class model using Satorra–Bentler chi-square difference testing (Satorra & Bentler, 2001). Second, to test whether each predictor was significant over and above the effect of the other predictors, we compared model fit of the full model (including all significant predictors from the first step) to a model with one predictor each being omitted (Collins & Lanza, 2010; Satorra, 2000). Third, a final model with all significant predictors from the second step was computed to estimate the size of each effect (Clark & Muthén, 2009). All analyses were conducted using Mplus Version 5 (Muthén & Muthén, 1998–2010).
Latent Class Indicator Variables

Number of friends.—Participants named up to eight important relations and indicated each role relationship. The number of relationships characterized as a friend, colleague, neighbor, club member, and acquaintance was added to derive number of friends. We used this approach because Western Europeans, and particularly Germans, are conservative in using the term “friend” (Höllinger & Haller, 1990), assuming that relationships with colleagues, neighbors, club members, or acquaintances may be regarded as friendships (even if not named by self-definition) when mentioned among the eight closest network ties. Moreover, the fact that friendships originate from various social settings (Beer, 2001) warrants this more inclusive approach.

Mean emotional closeness.—Emotional closeness of each friendship was assessed with one item (“How close is your relationship to X today?”). The scale for answers ranged from 1 (not at all close) to 5 (very close).

Variation in emotional closeness.—From the emotional closeness ratings, we computed standard deviations of emotional closeness across all friends of a participant. The standard deviation was used as a measure of variation in emotional closeness.

Mean friendship duration.—The number of years a participant had known each friend was averaged across friends. However, because friendship duration was confounded with age (older participants had longer friendship durations; \( r = .48, p < .001 \)), we residualized friendship durations on age, which represents the number of additional (or fewer) years a participant knows his friends compared with the average duration at his age.

Variation in friendship duration.—The standard deviation of friendship duration across all friends of a participant served as a measure of differentiation in friendship duration. To correct for the potentially spurious age association, we calculated standard deviations from the residualized friendship durations.

Due to a dense multivariate distribution of continuous indicator variables, latent class models did not converge when using continuous indicators. Continuous scores were therefore recoded into three categories (1 = low, 2 = average, 3 = high) using tertiles.

Latent Class Predictor Variables

Partner status.—Participants were asked to indicate their marital status and, if divorced, widowed, or unmarried, whether they currently had a partner. This information was dummy coded to indicate partner status (0 = no partner, 1 = partner available).

SES.—To capture effects of different SES components, we used separate indicators for education and income. Participants reported the highest level of school education attained. Level of education was classified into three categories (low, average, and high). For income, participants were asked to provide the monthly total net income for the household, which we adjusted for household size (Figini, 1998).

Health.—We distinguished physical, functional, and self-rated health. A cutoff criterion (having three or more diseases of a checklist of 11 health problems) was used to differentiate between poor and good physical health. Functional health was assessed with the physical functioning subscale of the SF-36 questionnaire (Bullinger et al. 1995; Ware & Sherbourne, 1992). Self-rated health was measured with one item (“How would you rate your present state of health?”), a five-point scale (1 = very bad, 5 = very good).

Network-disturbing and network-sustaining variables.—Following de Jong Gierveld and Perlman (2006), we used years since last change of residence, number of contacts with friends per day, and number of activities with friends per day. Participants reported the year when they moved to their current city. This measure was residualized on age because years since last change of residence were confounded with age (\( r = .47, p < .001 \)). Contact frequency with each person of the core network was assessed on a seven-point scale (1 = never, 7 = daily). The number of contacts per day was calculated and summed across all friends as a measure of contact frequency. Furthermore, participants indicated with whom and how often they engaged in a list of eight different activities. By summing up the frequency per day of each activity done with friends, we computed the number of activities with friends per day.

Results

Descriptive Analysis

Participants in our sample reported an average of 3.1 friends in their personal network. The majority of these were originally labeled as friends (79.2%). The second most common role relation mentioned was neighbor (9.7%) followed by colleague (7.6%), acquaintance (1.8%), and club member (1.7%). Table 2 summarizes descriptive statistics and correlations of latent class indicator variables.

Evaluation of Model Fit

Best model fit (Table 3) was achieved for a model with four, instead of the expected three, latent classes (BIC = 18,578). Moreover, the \( L^2 \) plot supported a four-class model, and entropy of the four-class solution (0.85) was satisfactory. We therefore settled for a four-class model.
Table 2. Means, Standard Deviations, and Correlations of Continuous Latent Class Indicator Variables

<table>
<thead>
<tr>
<th>Latent class indicator variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number of friends</td>
<td>3.11</td>
<td>3.13</td>
<td>-0.04</td>
<td>0.24**</td>
<td>-0.06*</td>
</tr>
<tr>
<td>2. Mean emotional closeness</td>
<td>3.79</td>
<td>0.61</td>
<td>—</td>
<td>0.00</td>
<td>0.15**</td>
</tr>
<tr>
<td>3. Variation in emotional</td>
<td>0.36</td>
<td>0.38</td>
<td>—</td>
<td>-0.05*</td>
<td>0.16**</td>
</tr>
<tr>
<td>4. Mean friendship duration</td>
<td>0.21</td>
<td>12.60</td>
<td>—</td>
<td>0.19**</td>
<td></td>
</tr>
<tr>
<td>5. Variation in friendship</td>
<td>8.68</td>
<td>7.86</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

Note. *p < .05. **p < .01.

Table 3. Fit Indices of Latent Class Analysis on Friendship Network Types

<table>
<thead>
<tr>
<th>Estimated classes</th>
<th>L^2</th>
<th>df</th>
<th>BIC</th>
<th>BLRT p value</th>
<th>Entropy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2114.93</td>
<td>232</td>
<td>20.101</td>
<td>n/a</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>748.52</td>
<td>221</td>
<td>18.818</td>
<td>0</td>
<td>0.91</td>
</tr>
<tr>
<td>3</td>
<td>495.29</td>
<td>210</td>
<td>18.648</td>
<td>0</td>
<td>0.89</td>
</tr>
<tr>
<td>4</td>
<td>343.00</td>
<td>199</td>
<td>18.578</td>
<td>0</td>
<td>0.85</td>
</tr>
<tr>
<td>5</td>
<td>269.65</td>
<td>188</td>
<td>18.588</td>
<td>0</td>
<td>0.79</td>
</tr>
<tr>
<td>6</td>
<td>234.12</td>
<td>177</td>
<td>18.635</td>
<td>0</td>
<td>0.82</td>
</tr>
</tbody>
</table>

Note. Indices pointing at best model fit are printed in bold. BIC = Bayesian information criterion; BLRT = Bootstrap likelihood ratio test; n/a = not applicable.

Characteristics of Friendship Network Types

Probabilities for the three-category latent class indicators conditional on latent class membership are presented in Table 4. In addition, for better interpretability of conceptual model fit, we estimated class means of T-transformed continuous indicator variables, which are indicated in brackets in the following.

Class 1, Discerning.—Class 1 was the group with the smallest number of friends (M = 44.64). Average emotional closeness was high (68.8% reported mean emotional closeness of four or higher) with almost no differentiation between friends (M = 42.57). Little differentiation between friends was also found for friendship duration (M = 43.16). Overall, this pattern conformed to the predictions made for the discerning friendship style. However, contrary to expectations, friendship durations in this class were moderate and shorter than in all other classes (M = 49.65). Performing a LCA on unresidualized friendship durations also yielded a four-class solution with a similar profile of indicator variables across latent classes. In this latent class model, below-average friendship durations were likewise obtained for the discerning friendship style.

Class 2, Independent.—Class 2 had somewhat more friends than Class 1 but fewer than Classes 3 and 4 (M = 46.26). Emotional closeness was comparably low (35.8% reported a closeness of four or higher) but with large differences between friends (M = 60.46). Friendship duration (M = 49.65) was moderate and differed slightly across friends (M = 50.44). The small number of friends and their relative emotional distance correspond to the independent friendship style. Contrary to predictions for the independent style, variation in emotional closeness was somewhat elevated.

Class 3, Selectively acquisitive.—Class 3 was characterized by larger numbers of friends (M = 50.43), high levels of closeness (71.4% reported a closeness of four or higher) with small differences between friends (M = 46.50), the longest average friendship duration (M = 52.35), and the largest variation in friendship durations (M = 56.09). Somewhat smaller friendship networks than in Class 4 suggest that this friendship type was more selective regarding the friendships that were maintained—especially the close friendships seem to be retained. This could also explain elevated mean friendship durations. “Selectively acquisitive” therefore seemed an appropriate label for Class 3.

Class 4, Unconditionally acquisitive.—Class 4 had the largest numbers of friends (M = 56.83). Although emotional closeness differed across friends (M = 55.70), it was comparably low on average (36.3% reported a closeness of four or higher). Residualized average friendship durations were moderate in size (M = 49.55), and variation across friends (M = 51.46) suggested that friendships originated at different phases of life. In contrast to Class 3, friends

Table 4. Latent Class Prevalence and Conditional Class Probabilities Across the Three-Category Latent Class Indicators

<table>
<thead>
<tr>
<th>Latent class</th>
<th>Discerning</th>
<th>Independent</th>
<th>Selectively acquisitive</th>
<th>Unconditionally acquisitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latent class prevalence</td>
<td>.30</td>
<td>.19</td>
<td>.29</td>
<td>.28</td>
</tr>
<tr>
<td>Number of friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>.76</td>
<td>.82</td>
<td>.38</td>
<td>0</td>
</tr>
<tr>
<td>Average</td>
<td>.16</td>
<td>0</td>
<td>.29</td>
<td>.44</td>
</tr>
<tr>
<td>High</td>
<td>.09</td>
<td>.18</td>
<td>.33</td>
<td>.56</td>
</tr>
<tr>
<td>Mean emotional closeness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>.33</td>
<td>.63</td>
<td>.30</td>
<td>.64</td>
</tr>
<tr>
<td>Average</td>
<td>.55</td>
<td>0</td>
<td>.56</td>
<td>0</td>
</tr>
<tr>
<td>High</td>
<td>.12</td>
<td>.37</td>
<td>.14</td>
<td>.36</td>
</tr>
<tr>
<td>Variation in emotional closeness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>.92</td>
<td>0</td>
<td>.77</td>
<td>0</td>
</tr>
<tr>
<td>Average</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>.92</td>
</tr>
<tr>
<td>High</td>
<td>.08</td>
<td>1.00</td>
<td>.23</td>
<td>.08</td>
</tr>
<tr>
<td>Mean friendship duration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>.47</td>
<td>.37</td>
<td>.19</td>
<td>.31</td>
</tr>
<tr>
<td>Average</td>
<td>.23</td>
<td>.29</td>
<td>.41</td>
<td>.39</td>
</tr>
<tr>
<td>High</td>
<td>.30</td>
<td>.34</td>
<td>.41</td>
<td>.30</td>
</tr>
<tr>
<td>Variation in friendship duration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>.75</td>
<td>.38</td>
<td>0</td>
<td>.18</td>
</tr>
<tr>
<td>Average</td>
<td>.19</td>
<td>.31</td>
<td>.45</td>
<td>.41</td>
</tr>
<tr>
<td>High</td>
<td>.06</td>
<td>.32</td>
<td>.55</td>
<td>.42</td>
</tr>
</tbody>
</table>

Note. Conditional probabilities higher than .50 are printed in bold.
were emotionally more distant on average. This suggests that both closer and more distant friendships were maintained throughout life as indicated by greater variation in emotional closeness and friendship duration. This led us to label Class 4 “unconditionally acquisitive.”

Distribution of latent classes.—The distribution of friendship network types varied slightly by age. Mean ages of the discerning \((M = 60.1)\), independent \((M = 60.5)\), and selectively acquisitives \((M = 60.5)\) were almost identical, whereas unconditionally acquisitives were somewhat younger \((M = 58.4)\). Probability estimates (Table 4) indicate that the most common type in our sample was discerning, and independent was the least prevalent friendship network type.

Predictors of Friendship Network Types

Gender, education, physical health, number of contacts with friends per day, and years since last change of residence were identified as significant predictors of latent classes in the three-step procedure described earlier. The gender by partner interaction was excluded as an insignificant predictor in the first step of the analysis \((\Delta \chi^2 = 1.70, \text{df} = 4, p = .89)\). Income, functional health, subjective health, activities with friends, and partner status were rendered insignificant when effects of the other predictor variables were included \((\Delta \chi^2 < 8.26, \text{df} = 4, p < .08)\). Odd ratio results from the final categorical latent variable regression model are presented in Table 5.

Results suggest that the probability for the discerning type relative to the one-friend group and the independent type was lower for women than for men. With higher levels of education, probabilities for the independent and the two acquisitive types increased relative to the one-friend group. With increasing numbers of physical conditions, probabilities for the independent type increased relative to all other friendship types. Less contact with friends was associated with higher probabilities for the one-friend group relative to all other friendship types. Furthermore, belonging to the larger friendship types (e.g., selective and unconditionally acquisitive) became more likely the more daily contact with friends a person had. Finally, the longer a person had lived in the same city the less likely he or she was to belong to the unconditionally acquisitive friendship type relative to the selective acquisitive friendship type, the independent friendship type, and the one-friend group.

Discussion

This study used a person-oriented approach to friendship networks and focused on interindividual differences in notions of friendship—a subject that has received little attention in empirical research. Our purpose was to retrieve Matthews’s (1986, 1995, 2000) friendship styles, derived from qualitative data, in a representative set of quantitative data using LCA and to test several predictors of friendship network types.

Comparison of LCA Results and Matthews’s Friendship Styles

Instead of the three types proposed by Matthews, we were able to identify four different network types, which were highly compatible with Matthews’s friendship styles. Therefore, our study provides support for Matthews’s model of friendship styles, suggesting that individuals differ in their understanding of and their way of being involved in friendships.

Moreover, results of the LCA allow further presumptions about friendship style characteristics that add to Matthews’s model. We found two distinct groups of individuals, who established their friendships throughout different periods of life: one group with high levels of closeness (selectively acquisitive) and another group with emotionally more distant friends (unconditionally acquisitive). Given that Matthews did not define levels of emotional closeness for the acquisitive style, this is a relevant advancement of her model. Although individuals of both subtypes remain open for building new relationships, their friendship networks might fulfill two very different relational needs. The friendship network of the unconditionally acquisitive style seems best suited for socializing purposes, whereas a selected network of close friends best meets the need for emotional support goals. Furthermore, friendship styles were conceptualized as a trait-like proclivity toward friendships that people acquire early in life (Matthews, 1986, 1995, 2000). However, corroborating other studies

Table 5. Odds Ratio Results for the Categorical Latent Variable Regression Analysis Using the One-Friend Group as Reference Class

<table>
<thead>
<tr>
<th>Predictors of friendship network types</th>
<th>Discerning</th>
<th>Independent</th>
<th>Selectively acquisitive</th>
<th>Unconditionally acquisitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR (SE)</td>
<td>OR (SE)</td>
<td>OR (SE)</td>
<td>OR (SE)</td>
<td>OR (SE)</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.45 (0.15)**</td>
<td>0.10 (0.20)</td>
<td>-0.28 (0.16)</td>
<td>-0.16 (0.15)</td>
</tr>
<tr>
<td>Education</td>
<td>0.15 (0.13)</td>
<td>0.41 (0.17)*</td>
<td>0.46 (0.14)**</td>
<td>0.56 (0.13)**</td>
</tr>
<tr>
<td>Physical health</td>
<td>-0.25 (0.15)</td>
<td>0.43 (0.19)*</td>
<td>0.06 (0.16)</td>
<td>-0.15 (0.15)</td>
</tr>
<tr>
<td>Number of contacts with friends per day</td>
<td>1.50 (0.12)**</td>
<td>1.44 (0.16)**</td>
<td>1.83 (0.12)**</td>
<td>2.19 (0.11)**</td>
</tr>
<tr>
<td>Years since last change of residence</td>
<td>-0.01 (0.00)</td>
<td>0.00 (0.01)</td>
<td>0.00 (0.00)</td>
<td>-0.01 (0.00)**</td>
</tr>
</tbody>
</table>

Note. *p < .05. **p < .01. ***p < .001.
(Wright & Patterson, 2006), we found a slightly lower mean age for individuals in the unconditionally acquisitive group. Following socioemotional selectivity theory (Carstensen et al., 1999), these age-differences might indicate that motivational shifts toward emotionally meaningful goals in later life entail changes in preferences regarding friendships style.

Although we were able to replicate the distinguishing characteristics of the discerning friendship type (few friends, high levels of emotional closeness, and little differentiation between friends), this group had comparatively short average friendship durations, which was contrary to our hypotheses. One possible explanation for this deviation from Matthews’s model could be that we included data from adults as young as 40 years old—an age at which discerning persons might still establish new friendships that last until old age. The presumption that discerning individuals have particularly long-standing friendships might be more applicable to older individuals. Also in contrast to our predictions, variation in emotional closeness was greater than expected for the independent friendship style. This might indicate that independents allow at least some friends to be emotionally closer than others although on a low average level of emotional closeness in comparison to other groups.

**Predictors of Friendship Network Types**

Contrary to our expectations, the probability of belonging to the discerning type was lower for women compared with men, and this effect was not qualified by partner status (e.g., married men having closer friendships through their wives). This finding is inconsistent with numerous studies that demonstrate an emphasis on closeness in women’s friendship relations (Johnson, 1996; Rubin, 1985). However, among the participants with less than two friends, which had to be excluded from the latent class model to identify friendship network types, women were more likely than men to report having a friend, and these friendships were typically of high emotional closeness. Thus, one consequence of excluding the one-friend group might have been an underestimation of the prevalence of the discerning type particularly among female participants.

Partial confirmation was found for our hypothesis that larger networks of friends are more prevalent among individuals with higher SES. Class probabilities of the both acquisitive network types increased with higher educational levels. The greater likelihood of more highly educated individuals belonging to either of the acquisitive styles could be due to better social skills, which are useful for navigating larger friendship networks (Broese van Groenou & van Tilburg, 2003). Interactions in small and close friendship networks might be easier to manage and thus be preferred by individuals with lower levels of education. This is, however, a tentative explanation and other causes could explain the observed association (e.g., more highly educated individuals might have more opportunities for making new friends). Future studies should thus examine directly how social skills relate to friendship style.

Furthermore, results indicate that physical health is more decisive for friendship networks than functional and subjective health. Unexpectedly, the independent but not the discerning type increased in likelihood when physical health was poor. Thus, corroborating previous studies on associations between background variables and network composition, individuals with poor health seem to withdraw from friendships and might turn to family relationships for support instead (Litwin & Shiovitz-Ezra, 2011).

We predicted that network-sustaining variables would foster large friendship networks (de Jong Gierveld & Perlman, 2006) like those found in both acquisitive types. Having lived in the same city for a longer time increased the likelihood of belonging to the selectively acquisitive type relative to the unconditionally acquisitive type negatively, suggesting that people who move to a new location first make widespread emotionally more distant contacts and subsequently, after they had enough time to establish closer friendships, some may switch to the selectively acquisitive type (Hess, 1972). Higher contact frequencies with friends, which promote large friendship networks according to our prediction, had a positive effect on the prevalence of all four friendship network types in relation to the one-friend group, and larger friendship networks were more likely the higher a person’s frequency of contact with friends was. Thus, those who emphasize frequent socializing over closeness in friendships might adopt an unconditionally acquisitive style. However, the cross-sectional design of the study allows no final conclusions on the direction of effects. Conversely, different compositions of friendship networks might cause differences in contact frequency across friendship styles.

**Limitations and Future Directions for Research**

To our knowledge, this is the first study that applied Matthews’s typology of friendship styles to a culture outside the United States. In doing so, one needs to consider differences in friendship cultures across countries. An important distinction of Western European cultures and Germany in particular is the conservative use of the word “friend” (Höllinger & Haller, 1990). Often, the word friend is reserved for a “special emotional relationships” (Gareis, 1995). Not surprisingly, a large number of individuals in our sample reported having no friends, even when friend-like relationships were included (colleagues, neighbors, club members, and acquaintances). Consequently, more than half of the sample had to be excluded from the LCA, which raises concerns about the generalizability of our findings. As the German Aging Survey (DEAS) is representative for the German population between the ages of 40 and 85 years, it is unlikely that the large number...
of participants without friends is due to sampling error. Furthermore, supporting the notion of cultural differences, the network sizes of the DEAS participants compared to other German samples of individuals aged 40 and older. For example, Pinquart (2003) observed an average number of 0.51 friends ($SD = 1.24$) for married men to 1.47 friends ($SD = 1.85$) for never-married women in a sample of 4,130 older adults aged 53–79 years. Of the participants of the Berlin Aging Study (BASE), about one third (31.4%) did not mention a friend in their network of personally meaningful others (Wagner, Schütze, & Lang, 1996). This slightly larger prevalence of friends, despite the older age range of the participants (70–84 years), might be due to sampling procedures used in determining network size (i.e., no restriction of maximum network size). In our study, restricting the maximum nameable ties to eight could have resulted in more family dominated networks with only the closest friends being mentioned. Furthermore, we did not explicitly remind participants to focus on friendships as has been done in Matthews’s qualitative interviews. Unfortunately, these methodological and cultural causes are indistinguishable. However, the fact that we were able to replicate the expected general pattern of latent class indicators derived from Matthews’s model, despite overall smaller friendship networks in our sample, points to intercultural validity of the model (at least for those participants who reported friends in their network).

Furthermore, as variation in friendship closeness and duration were important indicators of friendship style, we were unable to use data of participants with only one friend in the LCA. Relinquishing these friendship style indicators would have meant ignoring important features of Matthews’s typology. Differences in friendship duration across friends are central characteristic of the acquisitive and the independent friendship style, and differences in emotional closeness across friends are central both to the discerning and the independent friendship style. An unambiguous assignment of individuals with a single friend either to the discerning or to the independent friendship style, however, would have required an investigation of the development of their friendship network over time. A replication of our analysis with data on individuals’ life histories of friendships would be necessary to further substantiate the four-class model derived from our analyses.

Matthews’s conceptualized friendship styles as a stable characteristic of the aging individual. The only change that she anticipated is that from a discerning to an independent style when people are faced with the loss of their friends. Although the question whether friendship style is a trait-like or state-like characteristic cannot be settled conclusively, the predictors that reached significance in this study suggest that individuals adopt a different friendship styles when being faced with changing life circumstances (e.g., deteriorating health, change of residence). Future studies are needed to test whether friendship styles are stable over time, particularly in old age. Longitudinal analyses should also focus on developmental outcomes that might be associated with friendship styles (e.g., loneliness, well-being, cognitive functioning) in order to understand possible implications of friendship network types for successful aging.

**Conclusion**

Our study replicated and extended Matthews’s typology of interindividual differences in approaches to friendships. We demonstrated that friendship networks are an important experiential dimension in middle age and later life with substantial variation in friendship patterns between individuals. Such variability represents a true network property and should be considered in future studies to gain a more comprehensive picture of the unique relational needs friendships might fulfill for individuals with different friendship styles.

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**References**


Bullinger, M., Kirchberger, I., & Ware, J. (1995). Der deutsche SF-36 Health Survey: Übersetzung und psychometrische Testung eines
Crohan, S. E., & Antonucci, T. C. (1989). Friends as a source of social sup-
Latent class and latent transition
Clark, S., & Muthén, B. O. (2009). Relating latent class analysis results
652
Litwin, H. (2001). Social network type and morale in old age. The
and network type among older Americans: Is “who you are” related to “who you are with”?: Research on Aging, 33, 735–759. doi:10.1177/0164027511409441
Matthews, S. H. (1986). Friendships through the life course: Oral biogra-
Brooks/Cole.
Holstein (Eds.), Aging and everyday life (pp. 155–194). Malden, MA: Blackwell.
McDonough, E. M., & Munz, D. C. (1994). General well-being and per-
ceived adult friendship patterns. Journal of Social Behavior and
Personality, 9, 743–752.
NY: Wiley & Sons.
Messeri, P., Silverstein, M., & Litwak, E. (1993). Choosing optimal sup-
port groups: A review and reformulation. Journal of Health and Social Behavior, 34, 122–137.
the number of classes in latent class analysis and growth mixture mode-
Pinquart, M. (2003). Loneliness in married, widowed, divorced, and never-
being in later life. In C. M. Aldwin, C. L. Park, & A. I. Sprio (Eds.),
Handbook of health psychology and aging. New York, NY: Guilford
Press.
Areneshnell & J. C. Phelan (Eds.), Handbook of the sociology of
analysis of moment structures. In R. D. H. Heijmans, D. S. G.
Pollack, & A. Satorra (Eds.), Innovations in multivariate statistical
Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test
Menschen [Social relationships of older adults]. In K. U. Mayer &
H. A. Holstein (Eds.), Die Berliner Altersstudie (pp. 301–319). Berlin, Germany: Akademie Verlag.
expectations among middle- and working-class men and women.
Ware, J. E., Jr., & Sherbourne, C. D. (1992). The MOS 36-item short-form
Medical Care, 30, 473–483. doi:10.1097/00005650-199205000-00008
and the macrodynamics of friendship: The role of friendship style
and communication in friendship across the lifespan. Communication
Research Reports, 23, 163–170. doi:10.1080/088240906007096377