

# The ties that bother: Difficult relationships in the personal networks of older adults

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## ABSTRACT

**Objectives:** Theorizations of social exchanges often assume that people prefer interactions with supportive others but avoid others they perceive as demanding or difficult. Yet, many social relationships are ambivalent, i.e., entail a combination of positive and negative interactions. We refer to difficult relationships as ties with an equal and high share of both elements or ties where the net balance of these two elements is outweighed by negativity. This study inquires how many difficult relationships prevail in the personal network in late life and where they originate.

**Methods:** Survey data are from the Longitudinal Aging Study Amsterdam (LASA) on egocentric networks. The sample comprised 892 respondents (mean age 73; range 61–100) and their 4273 network members. Models consist of mixed effects and logistic regressions for explaining difficulty on the relationship level and the network level.

**Results:** We found that 15 % of older adults engage in difficult relationships. The difficulty was most often found in involuntary relationships (with siblings, parents, neighbors), and relationships characterized by low receipt but high provision of emotional support, and high volatility. The difficulty in a personal network was more likely for older adults embedded in instable networks and networks that yielded difficult relationships among members in their network.

**Discussion:** People may face structural constraints that pressure them to continue engaging socially with others, even if they sometimes find them to be difficult. Research should take these ties seriously, as negative ties may bother more than positive ties benefit older adults.

## Introduction

Research on social networks and health has skyrocketed in the last two decades without a sign of abatement (Chapman et al., 2022). The set of people an individual interacts with—a recognized source of support in both day-to-day routines and during stressful life events—gains particular significance in late life, when personal health declines and the need for assistance heightens (Roth, 2020). Socially integrated older adults have better physical, cognitive, and mental health (Holt-Lunstad, 2018; Litwin, 2011; Piolatto et al., 2022), higher resilience (MacLeod et al., 2016), and lower risk of premature mortality (Holt-Lunstad et al., 2010) than socially isolated older adults.

Yet, this convincing record is dominated by discussions of functional relationship characteristics, such as social support, strong relationships, and positive ties. This focus rests on the assumption from standard

network theories that burdensome ties are avoided or dissolved in favor of positive ties where possible (Carstensen, 1993; Offer and Fischer, 2018). Notably, people may face structural and individual constraints that pressure them to continue engaging socially with others, even if they sometimes find them to be demanding or difficult. Ignoring difficult ties is problematic in several ways. First, although typically outnumbered by positive connections, their challenging nature makes difficult ones more salient to those involved. Their persistence poses a risk to mental health, i.e., by invoking loneliness and feelings of disapproval from others, but also to health and well-being in general (Ellwardt and Van Tilburg, 2025; Offer, 2021; Rook, 2015; Umberson and Karas Montez, 2010; Peng and Roth, 2025). Second, previous research from family sociology on intergenerational solidarity has acknowledged the elevated likelihood of ambivalent emotions, i.e., both affect and conflict in the relationship between aging parents and their

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children (Bengtson et al., 2002; Kim et al., 2020; Offer and Fischer, 2018). Third, research on family networks has shown that conflicts between two quarreling parties often evolve further to affect entire families (Widmer et al., 2018).

Because difficult relationships may impede some benefits of social integration, it is surprising that current social gerontological literature offers little knowledge about *how many* difficult relationships prevail in the personal network in (very) late life and *where* they come from. Calls for systematic attention to difficult relationships have been mounting for both the general (Offer, 2021) and the older population (Cornwell and Schafer, 2016). Reasons for the persisting research gap are the emphasis on positive exchanges from social support and the paucity of egocentric network data in long-established surveys on aging (Cornwell and Schafer, 2016; Roth, 2020). Egocentric networks denote the set of alters that all have a tie to ego.

The purpose of this study is twofold. First, we describe the *prevalence* of difficult relationships in late life, spanning a large age range (61–100 years). Second, we investigate dyadic and network-level *predictors* associated with difficult relationships. A significant methodological contribution to this study is its research design, specifically tailored to close the abovementioned gap. We use perceptual data from the Dutch population-based Longitudinal Aging Study Amsterdam (LASA).

## Theory and evidence

### *Prevalence of difficult relationships*

Theorizations of social exchanges and network formation often assume that people prefer interactions with supportive others but avoid others they perceive as difficult or negative in their behaviors (Harrigan and Yap, 2017). Negativity in social ties, however, is commonplace, according to Offer (2021, p. 180): “... network members [...] frequently engage in aversive behaviors, such as making demands or judgmental critiques, getting into arguments or fights, or being generally thoughtless or inconsiderate, in a way that evokes negative feelings and attitudes.” Offer further suggests that purely negative or aversive interactions in one’s network are the exception, and instead, social relationships usually entail a combination of negative and positive interactions. Prior research on adults aged 50–70 indeed shows a low prevalence of difficult relationships: Offer and Fischer (2018) reported 5 % “difficult-only ties” and 8 % “difficult engaged-in-exchange ties,” totaling 13 %. Offer (2020) further operationalized difficult relationships as interactions respondents “sometimes find demanding or difficult” to enable quantitative analysis. Because of this, in the following, we refer to difficult relationships as ties where the net balance of these two elements is outweighed by negativity (negative ties, Offer, 2021) or ties with an equal and high share of both elements (ambivalent ties, Ross et al., 2019).

Prior research indeed documents low proportions of difficult ties among young-old and middle-old adults but without including the oldest-old. In their egocentric network study, Offer and Fischer (2018) found that among 50- to 70-year-olds 13 % of the social relationships were reported to be difficult, however, often in combination with social exchanges. About 5 % were described as difficult only. The latter prevalence compared well to previous findings from the literature on negative ties in work organizations, where estimates range from 1 % to 8 % (Labianca and Brass, 2006). Furthermore, research on personal networks found about one third of the difficult relationships to persist over time, rather than being dropped or transitioning to positive relationships (Kyeremeh and Schafer, 2024).

Even though negative social involvements occur less frequently than positive social involvements, their implications for the individual’s well-being are weighted disproportionately heavier (Rook, 2015). Due to this *negativity bias* (Ito et al., 1998), the positive aspects of older adults’ ambivalent relationships may be less health-protective, and the negative ones may be more health-damaging (Lee and Szinovacz, 2016; Rook

et al., 2012; Ross et al., 2019; Uchino et al., 2012). Our analysis, therefore, subsumes negative and ambivalent relationships into one category of difficult ties.

### *Predictors of difficult relationships*

A natural response to acute stressors from difficult encounters would be challenging or dropping a problematic contact, i.e., fight-or-flight; neither seems feasible in everyday-life interactions. On the one hand, individuals are constrained in their behaviors by relationship characteristics, i.e., they may feel normatively obliged to uphold and invest in the relationship due to their social role(s). A prime example is staying connected to troublesome family members, signaling a generalized commitment to the other members of the same family network. Avoiding one family member, such as an adult child, may simultaneously reduce contact with one or more additional, mutually connected family members, e.g., grandchildren. The emotional and instrumental costs of dropping ties to gatekeepers in close-knit networks may outweigh potential emotional gains. On the other hand, individuals may perceive the connection as unlikely or impossible to escape. Examples of hard-to-escape settings include a dependency on caretakers, a formal network membership in workplaces, and physical proximity due to residence in the same building. Predetermined networks of family, joint activities and obligations, and shared affinity and spaces restrain the latitude for selecting and deselecting close contacts. Less predetermined relationships, particularly friendships, are typically more easily avoided or even ended. In summary, the social role of an individual may present a structural context that force people into upkeeping a difficult relationship, previously described as role-based constraints (Offer and Fischer, 2018).

**Hypothesis 1.** (avoidance): Difficulty in a relationship is more likely with family and neighbors than with friends.

Yet, also in voluntary settings, the setup and dynamics of the surrounding social structure may influence the likelihood and persistence of difficult relationships. A high turnover of outgoing and incoming network relationships often occurs in an unstable social situation, such as around a move (Badawy et al., 2019) or due to poverty (Cornwell, 2015). In less volatile networks, selection has already taken place, and unsatisfactory relationships have ended earlier. In volatile networks, new relationships that fit the situation are constantly being sought. Because those relationships have not yet crystallized, there is an increased chance that problems will occur, and if they do, attempts are still being made to resolve any problems and continue the relationship. Newer network members are also less likely to be centrally embedded in the network. Stable, tightly knit networks may prevent conflicts from escalating, as shared ties foster common values, group commitment, and a willingness to resolve disputes. More fragmented networks with isolated members may reflect shorter relationship histories, limiting the development of trust, and may also expose individuals to conflicts of interest—both factors that increase the likelihood of difficult relationships.

**Hypothesis 2.** (volatility): (a) Difficulty in a relationship is more likely in new than in established relationships. (b) Difficult relationships are more likely in unstable than in stable networks.

Still, structural constraints beyond the individual’s local activity radius also exist. Turmoil between network members may diffuse through personal networks and eventually captivate people who were not involved initially. Particularly in small and close-knit networks, people no longer may be able to ignore ongoing quarrels but take sides, be it based on their evaluation or feeling pressured to choose a party. Patterns of conflict density and conflict centrality corresponded to a large extent with family composition and age (Girardin et al., 2018; Widmer et al., 2018). Specifically, conflicted dyads were over-represented in older adults’ networks, including intergenerational ties to

children and grandchildren, excluding partnership, among old people (75–84 years) and those lacking health resources and needing support (Girardin et al., 2018). Family conflicts often have a collective dimension because third parties get involved in seemingly dyadic conflicts (De Bel et al., 2021; Widmer et al., 2018). In addition, while embedded in a network of persistent tensions, ego may eventually become irritable and insecure. On the one hand, these emotions could evoke misunderstandings and difficult encounters between ego and ego's direct contacts (alters). On the other hand, observing difficulty in the social environment may sensitize ego to negative aspects of ego's social exchanges. Through these mechanisms, we expect the co-occurrence of relationship difficulty in alter-alter ties and ego-alter ties.

**Hypothesis 3.** (co-occurrence): Difficult ego-alter relationships are more likely in networks with difficult alter-alter relationships than without difficult alter-alter relationships.

Furthermore, the relationships' nature of social exchanges may be associated with difficulty. Much literature on ambivalence in old age acknowledges unbalanced support exchanges as a threat to social relationships. According to *exchange theory* (Blau, 1964), people prefer balanced support exchanges in their relationships. If this preference remains unmet over a long period, the relationship runs the risk of being terminated or at least strained. The chance of continuation despite an imbalance is highest in close kin relationships (Klein Ikkink and Van Tilburg, 1999). Strong dependency on receipt of support and substantial obligations to support a needy family member can tie family members permanently together in non-reciprocal exchanges. A helpful model for describing the consequences of an overcommitment to relationships with failed reciprocity is the *effort-reward imbalance model* (Van Vegchel et al., 2005). A consistent imbalance between high efforts and low rewards causes individual strain reactions that give rise to health risks, e.g., cardiovascular disease. Even though this model was initially designed to explain the effects of imbalance at work, it has successfully been extended to close social relationships. Lack of reciprocity in partnerships and parent-child relationships has been associated with poorer health, including sleep problems and depressive symptomatology (Chandola et al., 2007; Van Vegchel et al., 2005). Although reciprocity mechanisms apply to all exchange types, they are expected to be stronger for emotional support than for tangible forms of support. Instrumental support becomes harder to reciprocate with age and often differs across generations (e.g., assistance with grandchild care versus household chores), making balanced exchanges less feasible or expected. In contrast, emotional support is less contingent on physical capacity or neediness, which creates stronger expectations for balance in these exchanges.

**Hypothesis 4.** (support): Difficulty in a relationship is more likely in relationships with high provision but low receipt of emotional support (i.e., ego gives more support than alter).

## Research design

### Respondents

Data were obtained from the Longitudinal Aging Study Amsterdam (Hoogendijk et al., 2025). Three random samples of men and women born between 1908 and 1957 were taken from the population registers of three cities and six surrounding small municipalities. After baseline observations in 1992, 2002 and 2012, for the regular study all respondents were interviewed every three or four years. Attrition across waves is presented in Figure S1 in the Supplemental Material. For the current study, we take our starting point in the eighth follow-up observation conducted in 2018–2019 ( $T_1$ ;  $N = 1591$ ). We also use data from the seventh follow-up study ( $T_0$ ; 2015–2016), and one additional-study after  $T_1$ : the Network Additional Study ( $T_2$ ; 2018–2019). The LASA study, including the additional study in this

analysis, has been conducted in line with the Declaration of Helsinki, and the Institutional Review Board approved this study.

### Regular study ( $T_1$ )

A domain-specific approach for network delineation was employed that encompasses the following classification of personal relationships: household members (including the partner if applicable), children and their partners, other family members, neighbors, contacts through work (including voluntary work), members of associations (e.g., sports clubs, churches, political parties), and other non-kin relationships (e.g., friends and acquaintances). For each of the seven domains, the following name-generating question was posed: "Name the people you have frequent contact with and who are also important to you" (Van Tilburg, 1998). Respondents could only name a person once, and in practice the number of names was unlimited. The criteria of importance were left to the respondent's interpretation, and only persons aged 18 and older could be considered. For each identified network member, questions were asked on gender, the type of relationship (i.e., the social role), and contact frequency. Additionally, respondents reported on the travel time to and the emotional and instrumental support they received from and provided to each of the nine network members with whom they had the highest contact frequency. If respondents identified fewer than nine network members, they reported on travel time and the support of all their network members.

### Network additional study ( $T_2$ )

We collected additional data on the respondents' (ego) direct relationships with network members (alters) that were not included in the regular study, most notably information on relationship difficulty. This study also captured perceptual data on relationships between the network members. This study followed up on a maximum of five generated network members from the regular study.

Specifically, at the end of the regular interview ( $T_1$ : years 2018–2019), respondents were asked whether they would be interested in receiving an invitation to any of the upcoming additional studies. Our *Network Additional Study* was announced with this statement: "We would like to send you a questionnaire in a month or two. The questions will be about a few people (maximum five) you mentioned in the questions about the people with whom you have important and frequent contact. We are especially interested in whether people in your network know each other and how you perceive the quality of their contact with each other." Eligibility to an invitation was granted to respondents who had completed the network module in the regular study and generated at least two names (otherwise, assessing relationships between alters was not feasible) other than the partner and household members. Approximately one month after the completion of the interview of the regular study, respondents were mailed a personalized paper-and-pencil questionnaire that listed their generated names. The maximum of five names was similar to the National Social Life, Health, and Aging Project (NSHAP Network Roster A on core confidants; Cornwell et al., 2014). This was to reduce the respondent burden, limit early termination of answering the postal questionnaire, and fit all answers to a network question onto one page in large font size. Names were selected based on the highest contact frequency, excluding partners and household members (5 % in total). In cases where contact frequency was equally high for more than five contacts, names were selected randomly.

The questionnaire started with a listing of all names (first name and first letter of the last name) together with the relationship type to eliminate confusion about name duplicates, e.g., Jan B (cousin) and Jan B (neighbor). Relationships between alters were assessed by listing all possible pairwise combinations (e.g., Person A and Person B, Person A and Person C, ..., Person D and Person E). The minimum was one pair for two names, and the maximum was ten pairs for five names ( $n_{alter-alter\ ties} = 5 \times 4 / 2$ ). After completing this study, the data was linked to the

regular study to construct complete egocentric networks.

The vast majority of eligible  $T_1$  respondents ( $N = 1193$ ; 86 %) agreed to receive an invitation to the Network Additional Study, out of which  $n = 938$  respondents (79 %) returned a completed questionnaire. These respondents did not differ meaningfully from nonrespondents in our sociodemographic and health variables, except for a slight overrepresentation of respondents who named children in their network in the regular study (63 % versus 54 % among nonrespondents). Nearly all respondents received a questionnaire with five selected alters ( $M=4.9$ ,  $SD=0.4$ ) and were invited to rate the maximum of ten relationships between alters. Missingness overall was low to moderate and did not systematically increase toward the ultimate pair. This suggests an acceptable respondent's burden in this module, which is the most cognitively demanding. We dropped respondents with missing values on any variables used in the analysis. We excluded 25 respondents who likely suffered from cognitive impairments, typically indicated by an MMSE score of 23 points or lower (see measures). The final analytical sample consisted of 892 respondents and 4273 network members. Respondents on average were 72.8 years old ( $SD=7.3$ ); 52 % were female. The selection of respondents across  $T_1$  and  $T_2$  is illustrated in the flow chart of Figure S2 in the Supplemental Material.

## Measures

**Difficult relationship.** Our dependent variable of interest concerned the presence of a difficult relationship between a respondent (ego) and a contact (alter) in the personal network. In the Network Additional Study, respondents rated their relationship quality with the contacts extracted from the regular study. The question reads, "Please indicate whether you think you have a good or a difficult relationship with these persons," followed by answers on a five-point Likert scale from "very difficult," "difficult," "both difficult and good," "good," to "very good." We operationalized a difficult relationship as one in which difficulties at least partially characterized it and recoded the first three categories as "difficult" (1) and the last two categories as "good" (0). This approach was taken because, first, among important and frequent contacts, negative relationships are naturally sparse, and negative aspects inherent to ambivalent ties are likely more salient than positive aspects (Offer, 2021). Second, previous research used name generators asking whom respondents "sometimes find demanding or difficult" (Offer, 2020, p. 422), and thus relied on partial difficulty. Third, a more refined empirical analysis of the first three categories was problematic given the small number of (very) difficult ties ( $n_{\text{very difficult}}=41$ ,  $n_{\text{difficult}}=30$ ,  $n_{\text{both difficult and good}}=124$ ,  $n_{\text{good}}=1815$ ,  $n_{\text{very good}}=2263$ ).

**Relationship characteristics.** The regular study provided comprehensive measures of the relationship between respondents and their contacts. *Relationship type* categorized relationships as those of child (biological or stepchild), child in-law (including former), brother/sister (including half or step), brother/sister-in-law, parent, parent-in-law, grandchild, other kin, friend, neighbor, colleague (including former or through a spouse), known through an organization, or other non-kin. We used friend as the reference category, as we considered this relationship type most voluntary. For relationship volatility, a dummy variable indicated whether the respondent had identified the same person in the network delineation of the previous wave ( $T_0$ ) of the regular study approximately three years earlier (0) or whether it was a *new member* (1). *Emotional support balance* assessed the difference between ego's receipt and provision of support with regard to alter. Receipt of emotional support was measured with the question, "How often did it occur in the last year that you told ... about your personal experiences and feelings?" Provision of emotional support was measured with the question, "How often did it occur in the last year that ... told you about his / her personal experiences and feelings?" *Instrumental support balance* assessed the difference in instrumental support, using the questions, "How often did it occur in the last year that ... helped you with daily chores in and around the house, such as preparing meals, cleaning the

house, transportation, small repairs, filling in forms?" and "How often did it occur in the last year that you helped ... with daily chores in and around the house, such as prepare meals, clean the house, transportation, small repairs, fill in forms?" Possible answers for all questions on social support included "never" (1), "seldom" (2), "sometimes" (3), and "often" (4). We subtracted received from provided support, so that the scale ranged from  $-3$  to  $+3$ . Negative values indicated that ego had received more support than alter, positive values indicated that ego had provided more support than alter, zero indicated a balance between provision and receipt of support.

**Contact's characteristic.** We constructed a variable *same gender* for each respondent-contact pair, coded into "both female or male" (1) versus "mixed" (0). *Alter degree centrality* captured a contact's connectedness within the ego-network, defined as the number of present ties to other alters (excluding "never" or "don't know each other"). Missing values (7 %) were imputed by rounded means (0 for a two-member network, 1 for three-member, 2 for four-member, 3 for five-member). To account for varying network sizes in the models, degree centrality was normalized by dividing by the maximum possible degree  $n-1$ , resulting in values between 0 (alter is an isolate) and 1 (alter is central, i.e., connected to all other alters). Same gender and degree centrality served as confounders in the analysis.

**Network characteristics.** Several variables describe the personal network. *Total network size* counted all generated contacts in the regular study. Recall that the total network size was restricted to a minimum of two, a prerequisite for participation in the Network Additional Study. *Network density* represented the proportion of observed versus possible relationships between all contacts in ego's network, excluding ego's direct relationships. Relationships between contacts were undirected. For example, a network with five contacts and seven relationships resulted in a density of 0.7 (i.e., 7 observed relationships divided by  $5 \times 4 / 2 = 10$  possible relationships). A relationship was operationalized as observed when two contacts had been in touch, and thus knew each other. In the Network Additional Study, respondents were asked about every contact pair, "Please indicate how often you think these people are in touch with each other. Their contact may be in person, via telephone or internet (e.g., via email, WhatsApp)." *Network density* could range from 0 (empty, no alter-alter ties) to 1 (fully connected, up to ten alter-alter ties), with higher values indicating greater density. *Network volatility* encompassed the proportion of new alters in the network compared to the previous wave ( $T_0$ ) from the main study, i.e., the number of alters not mentioned at  $T_0$  divided by the number of alters at  $T_1$ . Higher proportions indicated more volatility across network members. A *difficult alter-alter tie* denoted the reporting of any difficult relationship among the respondent's contacts. This covariate solely inquired about the relationship quality between alters, ignoring any direct ties between a respondent and his or her contacts—which is our outcome variable. Respondents were asked, "Please indicate whether you think those persons have a good or a difficult relationship." Answer categories were identical to the question above. The resulting variable was coded into the presence of one or more difficult ties versus none.

**Respondent's characteristics.** The analyses included several confounders on the individual level. Socio-demographic variables regarded age in years, gender (1 =female, 0 =male), and assessed at  $T_1$ , having a partner (1 =yes, 0 =no), having children in the network (1 =yes, 0 =no), educational level in categories (from 1 = elementary not completed to 9 = university education), and being employed (1 =yes, 0=no). *Self-rated health* measured whether respondents perceived their health overall as "excellent or good" (1) or "less than good" (0). *ADL*, i.e., a seven-item scale on limitations in activities of daily living, assessed the respondent's performance in walking stairs, dressing themselves or taking a shower etc. with and without difficulty and with help using. Alpha= 0.84 and scales values are 1–5, with higher scores indicating more functional limitations. *Cognitive functioning* was measured with the Mini-Mental State Examination (MMSE; Folstein et al., 1975). Values are 24–30. Higher values of this index indicated better cognitive

functioning. *Self-esteem* reflected a person's evaluation or appraisal of her or his own worth, assessed by an adapted version of the Self-esteem scale (Rosenberg, 1965). Alpha = 0.72 and scale values are 5–20, with higher values indicating greater self-esteem.

### Plan of analysis

The data contained information on the relationships with contacts (alters) clustered in a respondent's network (ego). We estimated two sets of models, one on the relationship level and one on the network level. First, as done typically with egocentric data (Perry et al., 2018, Chapter 8), we used a *random intercept logit model* (Model 1), where the binary dependent variable denotes a difficult (versus good) relationship from ego to alter. Covariates include characteristics of the same ego-alter tie (e.g., relationship type, emotional and instrumental support balance). Second, we ran a *logistic regression model* (Model 2), where the binary dependent variable denotes the presence (versus absence) of any difficult relationships in the ego's network. Covariates include aggregated network configurations (e.g., network size, presence of difficult relationships between alters) and ego attributes (e.g., age, gender, health).

Estimated coefficients were transformed into average marginal effects (AME) to allow comparison of predictors across models and ease interpretation. AME provides the averaged absolute difference in the probability score of observing a difficult ego-alter tie when a covariate increases by one unit, holding all other covariates constant. AME typically ranges between –1 and 1, with a positive value indicating an increase and a negative value indicating a decrease in the outcome's probability. To further assess the prevalence of difficult relationships, we calculated the marginal predicted means for significant covariates from the fully adjusted models 1 and 2.

Robustness checks inquired about the sensitivity of our results. All analyses were performed in STATA (18.0). A replication package with the code is made available online ([https://osf.io/mvxs8/?view\\_only=e39858b3093943e28c3c92fd648767b3](https://osf.io/mvxs8/?view_only=e39858b3093943e28c3c92fd648767b3)). Data is publicly available upon request (<https://lasa-vu.nl/en/request-data/>).

## Results

### Prevalence of difficult relationships

Table 1 shows the descriptive statistics of the variables used in the analysis. Of the 4273 respondents' relationships with network members (i.e., ego-alter ties), 5 % ( $n_{ties}=195$ ) were rated difficult. Of the 892 respondents, 15 % ( $n_{egos}=135$ ) had at least one difficult relationship. These proportions were much higher, about double, for relationships between network members (i.e., alter-alter ties). Of the 5703 relationships between network members, one out of ten was perceived as difficult, and one-third of the respondents reported at least one difficult relationship among the members in their network.

We further inspected the prevalence of mutually difficult contacts, where both ego and an alter shared a difficult relationship with the same network member. Out of all the 195 difficult ego-alter ties, 103 (53 %) were tied to a difficult alter-alter relationship with someone else in the ego's network. Because numbers were small in absolute terms, we refrained from a detailed analysis per subtype.

### Predictors of difficult relationships

Table 2 summarizes the results for the random intercept logit models on relationship difficulty at the relationship level. Table 3 summarizes the logistic regression models for difficult relationships in the personal network at the respondents' level. *Hypothesis 1 (avoidance)* assumed more difficulty in relationships with family and neighbors than with friends. The results in Table 2 lend some support for this assumption. As compared to friendships, relationships tended to be more difficult with children and children in-law, siblings, parents (with a large confidence

**Table 1**

Descriptive statistics of the variables, by unit of analysis.

| Variable                                                               | T <sup>a</sup>        | Mean <sup>b</sup> | SD   | Min. | Max. |
|------------------------------------------------------------------------|-----------------------|-------------------|------|------|------|
| <i>Respondent's relationships with network members: ego-alter ties</i> |                       |                   |      |      |      |
| Difficult ego-alter tie                                                | $T_2$                 | 0.05              |      |      |      |
| Relationship type                                                      | $T_1$                 |                   |      |      |      |
| Child                                                                  |                       | 0.28              |      |      |      |
| Child in-law                                                           |                       | 0.11              |      |      |      |
| Brother/sister                                                         |                       | 0.08              |      |      |      |
| Brother/sister in-law                                                  |                       | 0.04              |      |      |      |
| Parent                                                                 |                       | 0.01              |      |      |      |
| Parent in-law                                                          |                       | 0.01              |      |      |      |
| Grandchild                                                             |                       | 0.02              |      |      |      |
| Other kin                                                              |                       | 0.02              |      |      |      |
| Friend                                                                 |                       | 0.10              |      |      |      |
| Neighbor                                                               |                       | 0.19              |      |      |      |
| Colleague                                                              |                       | 0.05              |      |      |      |
| Known through organization                                             |                       | 0.09              |      |      |      |
| Other non-kin                                                          |                       | 0.01              |      |      |      |
| New network member                                                     | $T_0 \rightarrow T_1$ | 0.25              |      |      |      |
| Emotional support balance                                              | $T_1$                 | 0.11              | 0.82 | -3   | 3    |
| Instrumental support balance                                           | $T_1$                 | 0.09              | 1.19 | -3   | 3    |
| <i>Network member: alter</i>                                           |                       |                   |      |      |      |
| Same gender as ego                                                     | $T_1$                 | 0.61              |      |      |      |
| Alter degree centrality <sup>c</sup>                                   | $T_1$                 | 0.68              | 0.32 | 0    | 1    |
| $N_{ego\text{-}alter\text{ ties}}$                                     |                       | 4273              |      |      |      |
| <i>Relationships between network members: alter-alter ties</i>         |                       |                   |      |      |      |
| Difficult alter-alter tie                                              | $T_2$                 | 0.10              |      |      |      |
| $N_{alter\text{-}alter\text{ ties}}$                                   |                       | 5703              |      |      |      |
| <i>Respondent's network</i>                                            |                       |                   |      |      |      |
| Difficult ego-alter tie in network                                     | $T_2$                 | 0.15              |      |      |      |
| Difficult alter-alter tie in network                                   | $T_2$                 | 0.34              |      |      |      |
| Total network size                                                     | $T_1$                 | 17.5              | 8.6  | 2    | 36   |
| Network density                                                        | $T_2$                 | 0.66              | 0.28 | 0    | 1    |
| Network volatility                                                     | $T_0 \rightarrow T_1$ | 0.25              | 0.25 | 0    | 1    |
| <i>Respondent: ego</i>                                                 |                       |                   |      |      |      |
| Age                                                                    | $T_1$                 | 72.8              | 7.3  | 61   | 100  |
| Female                                                                 | $T_1$                 | 0.52              |      |      |      |
| Has partner                                                            | $T_1$                 | 0.75              |      |      |      |
| Has child(ren)                                                         | $T_1$                 | 0.63              |      |      |      |
| Educational level                                                      | $T_1$                 | 5.0               | 2.1  | 1    | 9    |
| Employment                                                             | $T_1$                 | 0.20              |      |      |      |
| Self-rated health (ref.=excellent/good)                                | $T_1$                 | 0.72              |      |      |      |
| Activities of daily living (ADL)                                       | $T_1$                 | 4.7               | 0.5  | 1    | 5    |
| Cognitive functioning (MMSE)                                           | $T_1$                 | 28.4              | 1.5  | 24   | 30   |
| Self-esteem                                                            | $T_1$                 | 15.8              | 2.1  | 5    | 20   |
| $N_{respondents}$                                                      |                       | 892               |      |      |      |

Notes. <sup>a</sup> Timing of measurement:  $T_0$ =regular study previous wave: years 2015–2016;  $T_1$ =regular study: years 2018–2019;  $T_2$ =Network Additional Study: years 2018–2019. <sup>b</sup> For dummy variables, proportions only are reported.

<sup>c</sup> Normalized to range between 0 and 1.

interval), and neighbors. *Hypothesis 2 (volatility)* was supported: (a) A relationship with network members who were already part of the personal network three years earlier was perceived as difficult less often than that with new members (Table 2). Further underpinning this result, relationships with less central or even isolated network members were more often difficult than relationships with central others. (b) A high network turnover increased the prevalence of difficult relationships in the network (Table 3). *Hypothesis 3 (co-occurrence)* argued that a respondent's likelihood to report a difficult relationship with a network member would increase with the presence of difficult relationships between the members in the network. The results in Table 3 support this expectation: The presence of difficult alter-alter ties was positively associated with having difficult ego-alter ties.

*Hypothesis 4 (support)* suggested that an overinvestment of particularly emotional support increases relationship difficulty. Table 2's results support this notion: Relationship difficulty gets more likely when a respondent's provision of support outweighs that respondent's receipt of support. There was no such evidence for an association for instrumental

**Table 2**

Random intercept logit model for presence of a difficult relationship between ego and alter (relationship level).

| Covariate                                 | Model 1   |                |
|-------------------------------------------|-----------|----------------|
|                                           | AME       | CI             |
| Relationship type                         |           |                |
| Friend                                    | ref.      |                |
| Child                                     | 0.030**   | 0.008, 0.053   |
| Child in-law                              | 0.029*    | 0.002, 0.056   |
| Brother/sister                            | 0.044**   | 0.013, 0.075   |
| Brother/sister in-law                     | 0.005     | -0.026, 0.035  |
| Parent                                    | 0.185**   | 0.067, 0.303   |
| Parent in-law                             | 0.043     | -0.060, 0.147  |
| Grandchild                                | 0.004     | -0.030, 0.038  |
| Other kin                                 | 0.008     | -0.035, 0.052  |
| Neighbor                                  | 0.035**   | 0.014, 0.056   |
| Colleague                                 | 0.010     | -0.018, 0.037  |
| Known through organization                | -0.000    | -0.020, 0.019  |
| Other non-kin                             | 0.020     | -0.028, 0.068  |
| Same gender                               | -0.003    | -0.015, 0.009  |
| New network member                        | -0.035*** | -0.050, -0.019 |
| Emotional support balance <sup>a</sup>    | 0.009*    | 0.001, 0.017   |
| Instrumental support balance <sup>a</sup> | 0.004     | -0.002, 0.010  |
| Alter degree centrality <sup>b</sup>      | -0.066*** | -0.090, -0.041 |
| <i>N<sub>ego-alter ties</sub></i>         | 4273      |                |

Notes. AME denote the difference in the probability score when observing a difficult ego-alter tie. <sup>a</sup> Higher values indicated that ego had provided more support than alter, i.e. overprovision by ego. <sup>b</sup> Normalized to range between 0 and 1. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , two-tailed test.

**Table 3**

Logistic regression model for presence of a difficult relationship in ego's personal network (respondent level).

| Covariate                          | Model 2  |                |
|------------------------------------|----------|----------------|
|                                    | AME      | CI             |
| <i>Socio-demographic variables</i> |          |                |
| Age                                | -0.003   | -0.007, 0.000  |
| Female                             | -0.032   | -0.079, 0.016  |
| Has partner                        | -0.035   | -0.087, 0.018  |
| Has child(ren)                     | 0.015    | -0.034, 0.064  |
| Educational level                  | 0.007    | -0.004, 0.019  |
| Employment                         | -0.078*  | -0.142, -0.013 |
| <i>Network</i>                     |          |                |
| Total network size                 | -0.000   | -0.003, 0.003  |
| Network density                    | -0.108** | -0.188, -0.028 |
| Network volatility                 | 0.107*   | 0.022, 0.193   |
| Difficult alter-alter tie          | 0.188*** | 0.146, 0.230   |
| <i>Health and well-being</i>       |          |                |
| Self-rated health                  | -0.042   | -0.093, 0.010  |
| Activities of daily living (ADL)   | -0.021   | -0.065, 0.022  |
| Cognitive functioning (MMSE)       | -0.011   | -0.026, 0.005  |
| Self-esteem                        | -0.015** | -0.025, -0.005 |
| <i>N<sub>respondents</sub></i>     | 892      |                |

Notes. AME denote the difference in the probability score when having any difficult ego-alter tie in ego's network. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , two-tailed test.

support. Effect sizes are illustrated in Figs. 1 and 2, showing the marginal predicted means for covariates with significant differences. For example, the probability of reporting a difficult relationship with a network member was 8 % when this network member was new in  $T_1$  and 4 % when this network member was also identified in  $T_0$  (Fig. 1). Difficult relationships were more likely with socially isolated alters (13 %) than with central alters who are fully interconnected (2 %). The probability of ego reporting one or more difficult relationships increased from 8 % to 29 % with any difficult relationships between network members (co-occurrence, Fig. 2).

### Sensitivity analysis

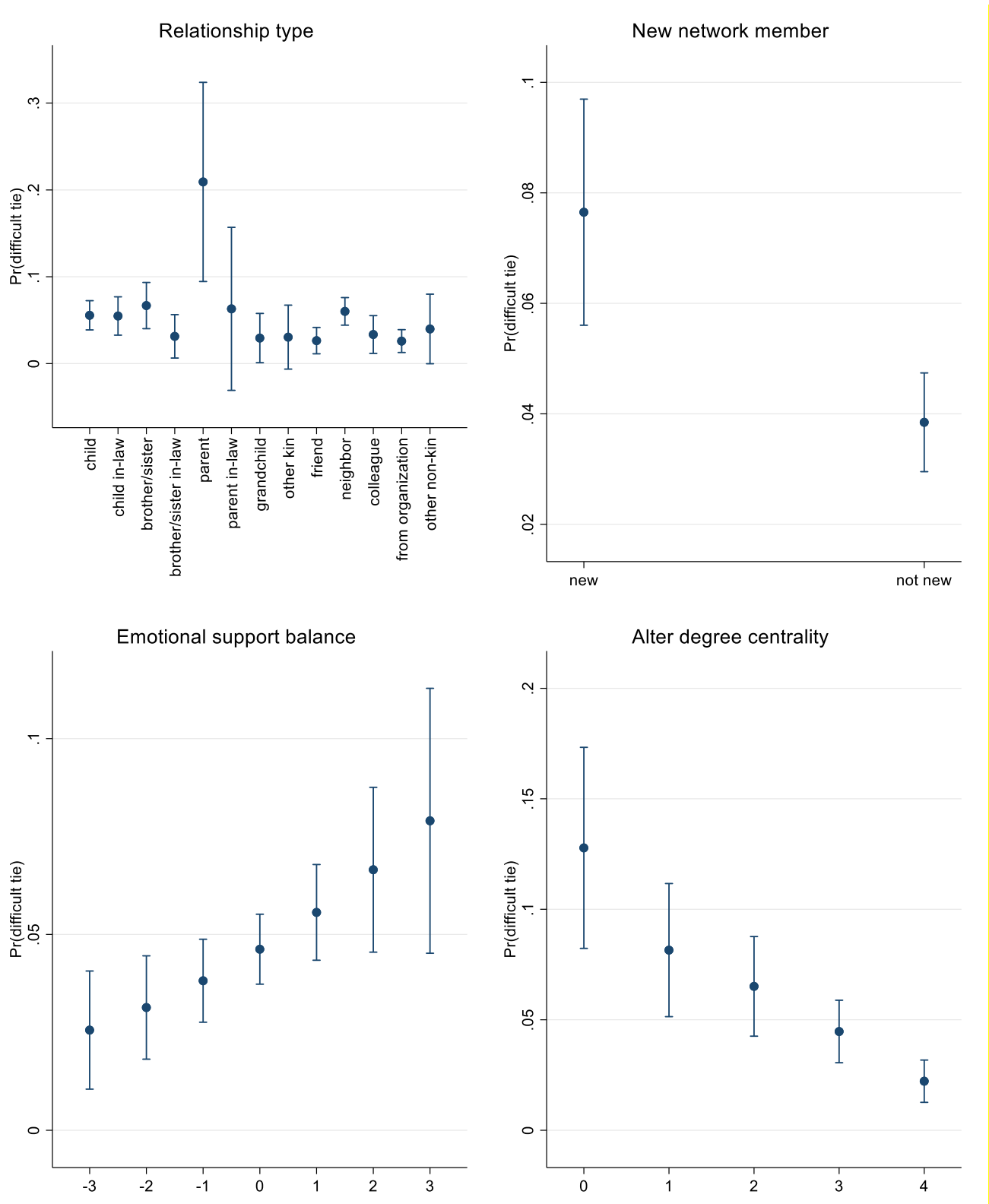
A series of additional tests scrutinized the robustness of our findings. (1) Collinearity was of no particular concern, as the Pearson correlations between covariates were low to moderate (maximum  $r = -0.45$  between self-rated health and ADL, mean  $VIF_{ego-alter\ ties} = 1.19$  and mean  $VIF_{egos} = 1.24$ ). (2) We tested several alternative variables and model specifications (for the results see Tables S1 and S2 in the Supplemental Material), all of which did not reveal a significant contribution to explaining relationship difficulty: exclusion of relationships to parents, exclusion of respondents with relationships to parents, controlling for the number of kin to check whether parents or kin drive the co-occurrence effect. Mutual difficult network members partly drove the co-occurrence effect. When dichotomizing very difficult and difficult relationships ( $N_{ego-alter\ ties} = 71$ ,  $N_{respondents} = 40$ ) versus all other ties ( $N_{ego-alter\ ties} = 4202$ ,  $N_{respondents} = 852$ ), effects were weaker, with alter degree centrality and co-occurrence remaining the most robust predictors. The significance for neighbors was driven by ambivalent relationships (both good and difficult) rather than by purely difficult ones (very difficult or difficult), as the effect disappeared once the reference category was changed—the point estimate in Model 1 lays outside the confidence intervals of Model 1b. (3) We carried out a multiverse analysis on each of the network variables in the logistic regression models. Each analysis included a set of 16 models that assessed the influence of an included covariate on the model. The coefficients of all the network variables showed 100 % stability in terms of sign and significance. (4) We included the 25 cognitively impaired respondents in the analytical sample, which did not change the results.

### Discussion

The dark side of social networks has been broadly acknowledged by researchers in health and aging (Cornwell and Schafer, 2016; Offer, 2021), yet empirical study designs often neglected that crucial side. We found 15 % of older adults to engage in ambivalent or negative relationships. The difficulty was most often found in involuntary relationships (with siblings, parents, neighbors), and relationships characterized by low receipt but high provision of emotional support, and high volatility. The difficulty in a personal network was more likely for older adults embedded in instable networks and networks that yielded difficult relationships among members in their network.

The prevalence of older adults' difficult relationships (5 %) was lower than in previous research, in which adults aged 50–70 in the University of California Social Networks Study reported an average of 13 % of the relationships to be sometimes difficult or demanding (Offer and Fischer, 2018). This difference is likely because our network study measured a subset of high frequency contacts. A higher level of difficulty may be lurking in the periphery of the network if individuals keep unpleasant interaction partners at distance. A unique feature of our data collection presented the additional assessment of relationship quality between network members. This allowed us to test for co-occurrence of relationship difficulty in respondents' direct and indirect relationships.

The proportion of difficult relationships among network members was 10 %, i.e., twice as high as among ego relationships with network members. Multiple explanations for the lower prevalence within ego-alter ties seem feasible. One explanation is a perceptual inaccuracy, where the ego underreports her relationship difficulty. However, the negativity bias (Rook, 1984) would forecast the opposite: overreporting of threatening others (Marineau and Labianca, 2021). Another explanation is overreporting of others' relationship difficulty. Ego's viewpoint on alters' number of difficult relationships may be distorted, similar to the generalized friendship paradox (Feld, 1991; here: perception that an enemy has more enemies than oneself). Also recall that the data resembled cognitive social structures (Krackhardt, 1987) instead of objective networks. In addition, others may selectively share negative information, e.g., when seeking comfort from ego during a



**Fig. 1.** Marginal predicted means of the probability (Pr) of a difficult ego-alter tie, for covariates with significant differences in Model 1.  $N_{ego-alter\ ties}=4273$ ,  $N_{respondents}=892$ .

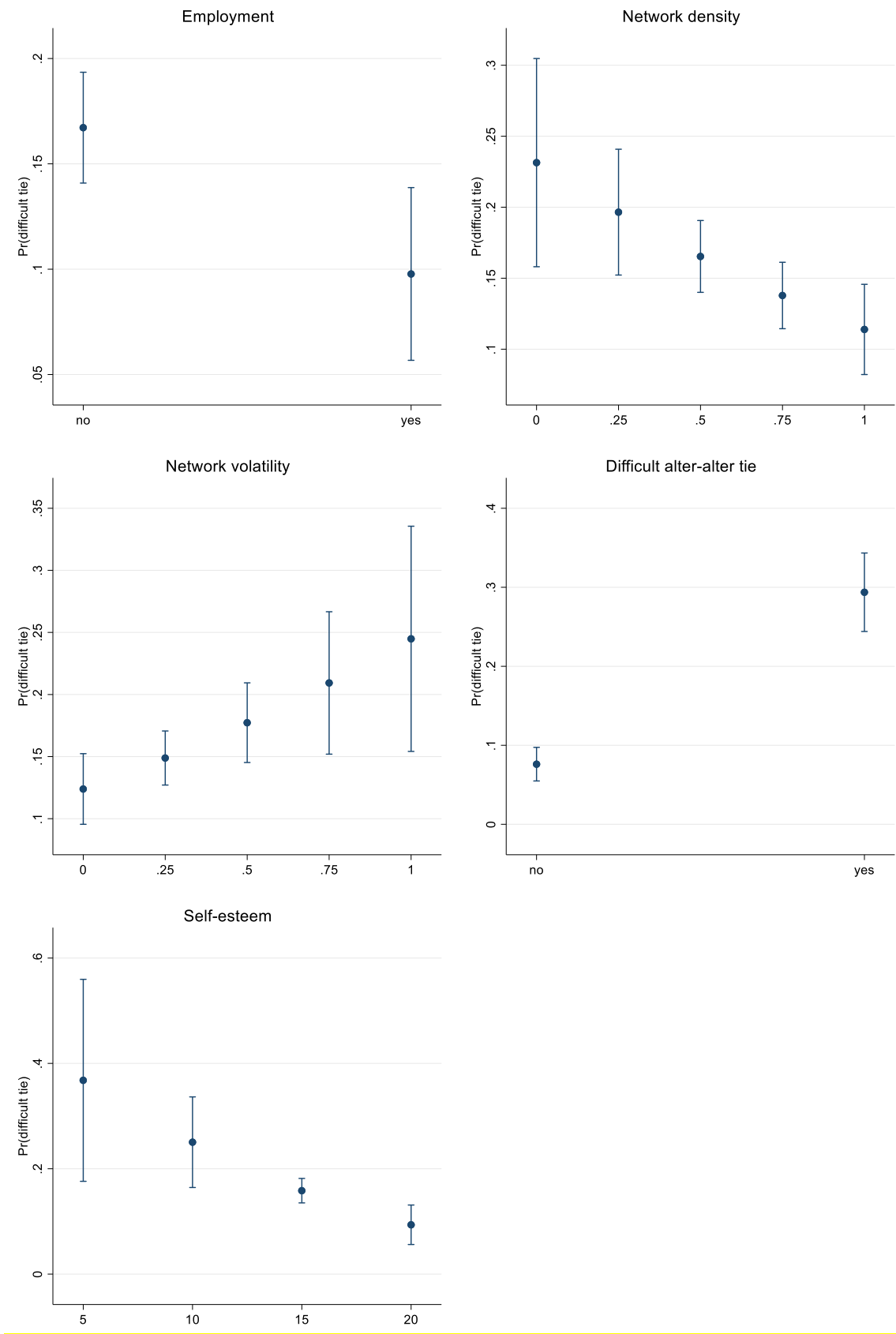


Fig. 2. Marginal predicted means of the probability (Pr) of having any difficult ego-alter tie in ego's network, for covariates with significant differences in Model 2.  $N_{respondents} = 892$ .

conflict. Negative encounters between alters may be equally prevalent but made disproportionately salient to ego.

We conclude that difficult relationships are continued and upheld, including quasi-ascribed relationships with close kin. Similar to Widmer et al. (2018), we found that intergenerational ties between our respondents and their parents had the highest potential to captivate older adults in hard-to-escape difficult exchanges. Role obligations toward needy kin—particularly aging parents—likely increase the commitment to provide social support. The neighborhood effect was primarily associated with ambivalent, rather than purely difficult, relationships in the sensitivity analysis, possibly because neighbors also offer immediate local assistance. In the life course, networks are constantly changing, partly as a result of changing social roles. When the situation calls for it, support and companionship is sought from other people (Antonucci et al., 2014). When older people have a stable network, it is a sign that network members are sorted out: The positive value of those relationships has been demonstrated. The positive volatility effects in our data may indicate that difficult relationships are still in a formative stage, and that they are either improved and maintained, or later terminated. Also on the network level, poorly connected networks—that perhaps were in a transitional or formative stage—more often included difficult relationships than close-knit networks, as shown by the negative effect of network density. We conclude that fragmented networks with isolated members are more likely to contain difficult relationships, possibly due to shorter relationship histories and more conflicts of interest, as there was a negative correlation between being a new member and alter centrality in our data.

Unique data on relationship quality between network members allowed us to look beyond the individual perspective and take relationship difficulty to a network level. Previous research has shown that embeddedness in balanced relationship triangles is positively associated with self-esteem and less stress (de Bel et al., 2021; Ellwardt et al., 2020). The individual's local social environment also clearly mattered in our study. The positive co-occurrence effect in our study suggests that relationship difficulty among others can pose an issue for ego. The presence of troublesome exchanges between network members significantly increased a respondent's risk of reporting relationship difficulty. Importantly, in roughly half of the cases, a difficult relationship was connected to a second difficult relationship through a *mutual* network member (e.g., the difficulty between ego and *alter A* and between *alter A* and *alter B*). This co-occurrence effect remained highly significant after excluding respondents with such shared difficult relationships from the analysis, so they drove this result only partly. In other words, even non-overlapping dyads of difficult alter-alter ties predicted difficult ego-alter ties. Respondents perceiving difficulty in their social environment may be more irritable and pessimistic about their exchanges. Conversely, individuals with difficult relationships may project their experienced conflicts onto others' relationships, so that reverse causation cannot be ruled out. Similarly, unobserved personality traits might have been a common cause.

A significant innovation of our study was the *Network Additional Study*, which presents a hands-on example of how egocentric network research can be incorporated into any large-scale random population-based sample. A limitation remains the one-time measurement of relationship difficulty so that the findings do not warrant causal interpretation. Future research may scale up the present example and incorporate dyadic and triadic information on relationship difficulty into longitudinal panels on aging. Another limitation is that the name generator did not explicitly capture problematic ties but was restricted to contacts with whom respondents had frequent and important interactions. This boundary specification problem (Perry and Roth, 2021) likely omitted less salient, purely unsupportive, or disturbing contacts, thereby limiting insights into successfully avoided others and potentially underestimating predictors related to the voluntary aspects of relationships. The analysis was further constrained by the generally low number of (very) difficult relationships, which was particularly small for certain

relationship types. Future research with larger samples would allow for more robust testing.

Social epidemiological research has suggested social network integration's health and survival benefits (Holt-Lunstad et al., 2010; Thoits, 2011; Umberson and Karas Montez, 2010). Our study showed that networks regularly include social relationships that are perceived as unpleasant and unsupportive and are nevertheless continued, often by vulnerable individuals and in the company of other difficult relationships in the same network. Research should take these ties seriously, as negative ties may bother more than positive ties benefit older adults.

## Author contributions

L. Ellwardt planned the study, performed all statistical analysis, and wrote the original draft. T. G. van Tilburg helped to plan the study, supervised the data analysis and contributed to writing and revising the paper. Both authors designed the primary data collection.

## CRediT authorship contribution statement

**Theo G. van Tilburg:** Writing – review & editing, Methodology, Conceptualization. **Lea Ellwardt:** Writing – original draft, Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization.

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## Declaration of Competing Interest

None.

## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.socnet.2025.11.006.

## Data availability

See methods section in the manuscript.

## References

- Antonucci, T.C., Ajrouch, K.J., Birditt, K.S., 2014. The convoy model: explaining social relations from a multidisciplinary perspective. *Gerontologist* 54 (1), 82–92. <https://doi.org/10.1093/geront/gnt118>.
- Badawy, P.J., Schafer, M.H., Sun, H., 2019. Relocation and network turnover in later life: how distance moved and functional health are linked to a changing social convoy. *Res. Aging* 41 (1), 54–84. <https://doi.org/10.1177/0164027518774805>.
- Bengtson, V., Giarrusso, R., Mabry, J.B., Silverstein, M., 2002. Solidarity, conflict, and ambivalence: Complementary or competing perspectives on intergenerational relationships? *J. Marriage Fam.* 64 (3), 568–576. <https://doi.org/10.1111/j.1741-3737.2002.00568.x>.
- Blau, P., 1964. *Exchange and Power in Social Life*. John Wiley.
- Carstensen, L.L., 1993. Motivation for social contact across the life-span – a theory of socioemotional selectivity. *Neb. Symp. Motiv.* 40, 209–254.
- Chandola, T., Marmot, M., Siegrist, J., 2007. Failed reciprocity in close social relationships and health: Findings from the Whitehall II study. *J. Psychosom. Res.* 63 (4), 403–411. <https://doi.org/10.1016/j.jpsychores.2007.07.012>.
- Chapman, A., Verdery, A.M., Moody, J., 2022. Analytic advances in social networks and health in the twenty-first century. *J. Health Soc. Behav.* 63 (2), 191–209. <https://doi.org/10.1177/00221465221086532>.
- Cornwell, B., 2015. Social disadvantage and network turnover. *J. Gerontol. Ser. B Psychol. Sci. Soc. Sci.* 70 (1), 132–142. <https://doi.org/10.1093/geronb/gbu078>.
- Cornwell, B., Schafer, M.H., 2016. Social networks in later life. In: Geoghe, L.K., Ferraro, K.F. (Eds.), *Handbook of Aging and the Social Sciences*, eighth ed. Elsevier, pp. 181–201. <https://doi.org/10.1016/B978-0-12-417235-7.00009-3>.

- Cornwell, B., Schumm, L.P., Laumann, E.O., Kim, J., Kim, Y.-J., 2014. Assessment of social network change in a national longitudinal survey. *J. Gerontol. Ser. B Psychol. Sci. Soc. Sci.* 69 (2), S75–82. <https://doi.org/10.1093/geronb/gbu037>.
- De Bel, V., Snijders, T.A.B., Widmer, E.D., 2021. Modelling ambivalent triads in family research. *Soc. Sci. Res.* 98, 102577. <https://doi.org/10.1016/j.sresresearch.2021.102577>.
- Ellwardt, L., Van Tilburg, T.G., 2025. Relationship difficulty is associated with poorer mental health in later life. *J. Gerontol. Ser. B Psychol. Sci. Soc. Sci.* 80 (7), gbaf094. <https://doi.org/10.1093/geronb/gbaf094>.
- Ellwardt, L., Wittek, R.P.M., Hawkey, L.C., Cacioppo, J.T., 2020. Social network characteristics and their associations with stress in older adults: closure and balance in a population-based sample. *J. Gerontol. Ser. B Psychol. Sci. Soc. Sci.* 75 (7), 1573–1584. <https://doi.org/10.1093/geronb/gbz035>.
- Feld, S.L., 1991. Why your friends have more friends than you do. *Am. J. Sociol.* 96 (6), 1464–1477. <https://doi.org/10.1086/229693>.
- Folstein, M.F., Folstein, S.E., McHugh, P.R., 1975. Mini-mental state. *J. Psychiatr. Res.* 12 (3), 189–198. [https://doi.org/10.1016/0022-3956\(75\)90026-6](https://doi.org/10.1016/0022-3956(75)90026-6).
- Girardin, M., Widmer, E.D., Connidis, I.A., Castrén, A., Gouveia, R., Masotti, B., 2018. Ambivalence in later-life family networks: beyond intergenerational dyads. *J. Marriage Fam.* 80 (3), 768–784. <https://doi.org/10.1111/jomf.12469>.
- Harrigan, N., Yap, J., 2017. Avoidance in negative ties: inhibiting closure, reciprocity, and homophily. *Soc. Netw.* 48, 126–141. <https://doi.org/10.1016/j.socnet.2016.07.003>.
- Holt-Lunstad, J., 2018. Why social relationships are important for physical health: a systems approach to understanding and modifying risk and protection. *Annu. Rev. Psychol.* 69, 437–458. <https://doi.org/10.1146/annurev-psych-122216-011902>.
- Holt-Lunstad, J., Smith, T.B., Layton, J.B., 2010. Social relationships and mortality risk: a meta-analytic review. *e1000316 Plos Med.* 7 (7), e1000316. <https://doi.org/10.1371/journal.pmed.1000316>.
- Hoogendijk, E.O., Van Schoor, N.M., Qi, Y., Visser, M., Swinkels, J.C., Broese van Groenou, M.I., Kok, A.A.L., Holwerda, T.J., Pasman, H.R.W., Onwuteaka-Philipsen, B.D., Rummelzwaal, S., Van Ingen, E., Van Tilburg, T.G., Van Haaster, A.-C., Van der Horst, M., Poppelaars, J., Deeg, D.J.H., Huisman, M., 2025. The longitudinal aging study Amsterdam: design and cohort update 2025. *Eur. J. Epidemiol.* 40, 705–720. <https://doi.org/10.1007/s10654-025-01238-5>.
- Ito, T.A., Larsen, J.T., Smith, N.K., Cacioppo, J.T., 1998. Negative information weighs more heavily on the brain: the negativity bias in evaluative categorizations. *J. Personal. Soc. Psychol.* 75 (4), 1037–1047. <https://doi.org/10.1037/0022-3514.75.4.887>.
- Kim, K., Birditt, K.S., Zarit, S.H., Fingerman, K.L., 2020. Typology of parent-child ties within families: associations with psychological well-being. *J. Fam. Psychol.* 34 (4), 448–458. <https://doi.org/10.1037/fam0000595>.
- Klein Ikkink, K., Van Tilburg, T.G., 1999. Broken ties: reciprocity and other factors affecting the termination of older adults' relationships. *Soc. Netw.* 21 (2), 131–146. [https://doi.org/10.1016/S0378-8733\(99\)00005-2](https://doi.org/10.1016/S0378-8733(99)00005-2).
- Krackhardt, D., 1987. Cognitive social-structures. *Soc. Netw.* 9 (2), 109–134. [https://doi.org/10.1016/0378-8733\(87\)90009-8](https://doi.org/10.1016/0378-8733(87)90009-8).
- Kyeremeh, E., Schafer, M.H., 2024. Keep around, drop, or revise? Exploring what becomes of difficult ties in personal networks. *Soc. Netw.* 76. <https://doi.org/10.1016/j.socnet.2023.06.001>.
- Labianca, G., Brass, D.J., 2006. Exploring the social ledger: negative relationships and negative asymmetry in social networks in organizations. *Acad. Manag. Rev.* 31 (3), 596–614. <https://doi.org/10.5465/amr.2006.21318920>.
- Lee, H.J., Szinovacz, M.E., 2016. Positive, negative, and ambivalent interactions with family and friends: associations with well-being. *J. Marriage Fam.* 78 (3), 660–679. <https://doi.org/10.1111/jomf.12302>.
- Litwin, H., 2011. The association between social network relationships and depressive symptoms among older Americans: what matters most? *Int. Psychogeriatr.* / IPA 23 (6), 930–940. <https://doi.org/10.1017/S1041610211000251>.
- MacLeod, S., Musich, S., Hawkins, K., Alsgaard, K., Wicker, E.R., 2016. The impact of resilience among older adults. *Geriatr. Nurs.* 37 (4), 266–272. <https://doi.org/10.1016/j.gerinurse.2016.02.014>.
- Marineau, J.E., Labianca, G., 2021. Positive and negative tie perceptual accuracy: pollyanna principle vs. negative asymmetry explanations. *Soc. Netw.* 64, 83–98. <https://doi.org/10.1016/j.socnet.2020.07.008>.
- Offer, S., 2020. They drive me crazy: difficult social ties and subjective well-being. *J. Health Soc. Behav.* 61 (4), 418–436. <https://doi.org/10.1177/0022146520952767>.
- Offer, S., 2021. Negative social ties: prevalence and consequences. *Annu. Rev. Sociol.* 47 (16), 1–20. <https://doi.org/10.1146/annurev-soc-090820-025827>.
- Offer, S., Fischer, C.S., 2018. Difficult people: who is perceived to be demanding in personal networks and why are they there? *Am. Sociol. Rev.* 83 (1), 111–142. <https://doi.org/10.1177/0003122417737951>.
- Peng, S., Roth, A.R., 2025. Quality over quantity: the association between daily social interactions and loneliness. *Int. J. Environ. Res. Public Health* 22 (9), 1411. <https://doi.org/10.3390/ijerph22091411>.
- Perry, B.L., Pescosolido, B.A., Borgatti, S.P., 2018. *Egocentric Network Analysis: Foundations, Methods, and Models*. Cambridge University Press, Cambridge.
- Perry, B.L., Roth, A.R., 2021. On the boundary specification problem in network analysis: an update and extension to personal social networks. In: Small, M.L., Perry, B.L., Pescosolido, B., Smith, E.B. (Eds.), *Personal Networks: Classic Readings and New Directions in Egocentric Analysis*. Cambridge University Press, pp. 431–443. <https://doi.org/10.1017/9781108878296.031>.
- Piolatto, M., Bianchi, F., Rota, M., Marengoni, A., Akbaritabar, A., 2022. The effect of social relationships on cognitive decline in older adults: an updated systematic review and meta-analysis of longitudinal cohort studies. *BMC Public Health* 22, 278. <https://doi.org/10.1186/s12889-022-12567-5>.
- Rook, K.S., 1984. The Negative Side of Social-Interaction – Impact on Psychological Well-being. *J. Personal. Soc. Psychol.* 46 (5), 1097–1108. <https://doi.org/10.1037/0022-3514.46.5.1097>.
- Rook, K.S., 2015. Social networks in later life: weighing positive and negative effects on health and well-being. *Curr. Dir. Psychol. Sci.* 24, 45–51. <https://doi.org/10.1177/0963721414551364>.
- Rook, K.S., Luong, G., Sorkin, D.H., Newsom, J.T., Krause, N., 2012. Ambivalent versus problematic social ties: Implications for psychological health, functional health, and interpersonal coping. *Psychol. Aging* 27 (4), 912–923. <https://doi.org/10.1037/a0029246>.
- Rosenberg, M., 1965. *Society and the Adolescent Self-Image*. Princeton University Press, Princeton.
- Ross, K.M., Rook, K., Winczewski, L., Collins, N., Dunkel Schetter, C., 2019. Close relationships and health: The interactive effect of positive and negative aspects. *Soc. Personal. Psychol. Compass* 13 (6), e12468. <https://doi.org/10.1111/spc3.12468>.
- Roth, A.R., 2020. Social networks and health in later life: a state of the literature. *Sociol. Health Illn.* 42 (7), 1642–1656. <https://doi.org/10.1111/1467-9566.13155>.
- Thoits, P., 2011. Mechanisms linking social ties and support to physical and mental health. *J. Health Soc. Behav.* 52 (2), 145–161. <https://doi.org/10.1177/0022146510395592>.
- Uchino, B.N., Cawthon, R.M., Smith, T.W., Light, K.C., McKenzie, J., Carlisle, M., Gunn, H., Birmingham, W., Bowen, K., 2012. Social relationships and health: is feeling positive, negative, or both (ambivalent) about your social ties related to telomeres? *Health Psychol.* 31 (6), 789–796. <https://doi.org/10.1037/a0026836>.
- Umberson, D., Karas Montez, J., 2010. Social relationships and health: a flashpoint for health policy. *J. Health Soc. Behav.* 51 (1 suppl), S54–S66. <https://doi.org/10.1177/0022146510383501>.
- Van Tilburg, T.G., 1998. Losing and gaining in old age: Changes in personal network size and social support in a four-year longitudinal study. *J. Gerontol. Ser. B Psychol. Sci. Soc. Sci.* 53 (6), S313–S323. <https://doi.org/10.1093/geronb/53B.6.S313>.
- Van Vegchel, N., De Jonge, J., Bosma, H., Schaufeli, W., 2005. Reviewing the effort–reward imbalance model: drawing up the balance of 45 empirical studies. *Soc. Sci. Med.* 60 (5), 1117–1131. <https://doi.org/10.1016/j.socscimed.2004.06.043>.
- Widmer, E.D., Girardin, M., Ludwig, C., 2018. Conflict structures in family networks of older adults and their relationship with health-related quality of life. *J. Fam. Issues* 39 (6), 1573–1597. <https://doi.org/10.1177/0192513X17714507>.