Social Network Dynamics in the Context of Age: An Empirical Investigation

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Abstract

This paper explores patterns and motivations for social tie formation and dissolution in the context of age. It provides empirical tests of the social convoy model, socioemotional selectivity theory, and the differential investment of resources (DIRe) model. Data comes from a survey administered face-to-face to a large, representative sample of the population of Poland ($n = 1000$). Controlling for between-tie and between-ego differences, it is found that the intensity of forming and dropping new ties is a decreasing function of age, but the relationship becomes weaker among people aged 40 and older. The number of social ties people maintain (degree) is also a decreasing function of age. However, the number of social ties with family, as opposed to coworkers and other acquaintances, is roughly constant across age groups. Young women, but not men, tend to form fewer ties if they are married. Both expressive and instrumental motivations for social tie formation are relatively most active in middle adulthood. The data also reveal a "rich get richer" effect: people with relatively high degree and a more central position in a social network tend to form more new ties and enlarge their social network over time.

1 Introduction

Social networks provide people with resources and help pursue their goals. Although these networks gradually evolve as new ties are built and old ones are dropped, essential network properties such as the size, supportiveness, and structure of social networks are remarkably consistent over time (Fischer & Offer, 2020; Wrzus et al., 2013).

Why is this case? What drives or motivates individuals' decisions to drop social ties and form new ones, and what underlies the remarkable stability of network size and structure? The *convoy model of social relations* (Kahn & Antonucci, 1980) states that people live their lives surrounded by those who are emotionally close and important to them – who form "a convoy" around an individual. The purpose of the convoy is to provide the individual with aid, affect and affirmation. The convoy model predicts relative

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stability in convoy membership and size (Antonucci & Akiyama, 1987; Antonucci et al., 2004). In turn, the *socioemotional selectivity theory*, a lifespan theory of motivation (Carstensen, 1992), emphasizes that with age, people become more selective in their attachment relations and may intentionally reduce the number of social ties. According to this theory, individuals make discriminating choices during their life with regard to their social interactions in order to optimize a mix of emotional and informative gains from social contacts (Carstensen, 1992, 1995). With age, emotional gains become increasingly more important relative to informative ones, and therefore the number of social ties people maintain declines. Finally, the *differential investment of resources (DIRe) model* (Huxhold et al., 2022) puts social relations in the context of individual's capacities, motivations and skills, as well as available time and energy. It looks at motivations as characteristics of social ties in which an individual invests, such as among others closeness and kinship. Simultaneously, it underscores that the set of social ties one has depends also on the social opportunity structure, influenced by geographical factors, socioeconomic conditions, social structure of society, as well as cultural norms constraining individuals' investment (of time or energy) in social ties.

The associated empirical literature includes several tests of the convoy model and the socioemotional selectivity theory, focusing among other points on the consistency of selected social network characteristics over time and motivations involved when forming and dropping social ties (Fischer & Offer, 2020; Wrzus et al., 2013). Researchers have also studied social network dynamics in the context of age, gender, life transitions, socio-economic status, education, health, and psychological traits (e.g., Bidart & Lay-enu, 2005; Wrzus et al., 2013; Fischer & Beresford, 2015; Ajrouch et al., 2005; Fischer & Offer, 2020; Völker, 2022).

This paper offers three distinct contributions to this literature. First, it thoroughly tests a multiplicity of effects present in the recent DIRe model (Huxhold et al., 2022), including in particular the role of multiple between-tie and between-ego differences in social tie formation and dissolution. Second, it fills an important gap in the literature by carrying out empirical tests of the convoy model and socioemotional selectivity theory while simultaneously carefully controlling for the broader context, emphasized by the DIRe model. Third, it also identifies some important nonlinearities, unnoticed in the literature thus far: the size of individuals' social network, as well as the number of newly formed and dissolved ties, is not a steadily decreasing function of individuals' age (cf. the meta-analysis by Wrzus et al., 2013), but rather a convex function which steeply declines among young individuals but becomes much flatter among people aged 40 and older.

The objective of this paper is to provide a thorough empirical analysis of social network dynamics in the context of age. Based on a unique cross-sectional dataset including an extensive catalogue of questions about people's social networks and their dynamics, collected face-to-face and covering a representative sample of the population of Poland ($n = 1000$), I study how the patterns of social network dynamics (tie formation and dissolution) and motivations behind them (expressive vs. instrumental) vary according to individuals' age. Specifically, I verify whether the data are consistent with the predictions of the social convoy model, the socioemotional selectivity theory and the overarching DIRe model.

The research methodology used in this paper is based on multivariate linear regression models as well as nonparametrically estimated Generalized Additive Models (GAM) which allow to identify non-linear age profiles of social tie formation and dissolution.

2 Literature and Hypotheses

Social ties with family members, spouses, friends, coworkers, neighbors, society fellows, etc., help people pursue their goals by mobilizing resources embedded in their social networks (Field, 2010). However, people may be trapped by the limitations of their social ties when these resources are scarce or inadequate: "structure is always both enabling and constraining" (Giddens, 1984: 169). Social networks enable people to be better off (Field, 2010; McCarty et al., 2019) but may also limit their life chances and possibilities (Jackson, 2020; Perry et al., 2018). According to Cook and Emerson's (1978) structural dependence theory, exchange patterns between individuals are dictated by their structural parameters, even though individuals engage in the exchanges in order to maximize their resources (Lin, 2001). Variables such as age may also interfere with those exchange patterns (Cook & Emerson, 1978; Lin, 2001).

Social network characteristics are influenced, among other factors, by individuals' age (Smith et al., 2015), gender (Ajrouch et al., 2005; Burt, 1998; Moore, 1990), education (Cornwell, 2015; Fischer & Beresford, 2015) and personality (e.g., sociability and happiness) (Growiec, Growiec, 2014; Selden, Goodie, 2018). Patterns of social tie formation and dissolution change over people's life course (Fischer & Oliker, 1983; Kalmijn, 2012; Wrzus et al., 2013).

2.1 Social Convoy Model

According to the *social convoy model*, people live their lives surrounded by those who are emotionally close and important to them (Kahn & Antonucci, 1980). Convoy relationships are composed of attachment relationships (mother, father, partner) and other close relations (friends, coworkers). The convoy escorts the individual through time, circumstances, and events (Antonucci et al., 2004). Under ideal circumstances convoys provide aid, affect and affirmation (Kahn & Antonucci, 1980); otherwise, they can also constrain individuals' well-being and disturb coping with life challenges.

The social convoy model predicts relative stability in convoy membership – especially in the innermost circle of the convoy with the spouse and core family (Antonucci & Akiyama, 1987; Antonucci et al., 2013, 2019). Women have more intimate relations and feel more personally involved with their close relationships than men (Acitelli & Antonucci, 1994; Birditt & Fingerman, 2003; Walen & Lachman, 2000). The number of convoy members increases when reaching adulthood and gaining new roles, for example, a spouse, a parent or a coworker. Possible changes in the convoy are therefore induced by role changes and life events related to them (Gameiro et al., 2010; Guiaux et al., 2007; Wrzus et al., 2013). These changes tend to be concentrated during youth and middle adulthood; there are few age and gender differences in the number of convoy members among people over 50 years old. Antonucci and Akiyama (1987) show that older individuals have fewer relations providing them with support but the size of their network remains constant.

2.2 Socioemotional Selectivity Theory

In turn, according to the *socioemotional selectivity theory*, a lifespan theory of motivation (Carstensen, 1992, 1995; Carstensen et al., 1999; Shavit et al., 2023), with age people become more selective in their attachment relations and therefore reduce their number of relationships. Carstensen (1992) found that such a reduction takes place in early adulthood,

long before people tackle failing health (suggested by the activity theory) or intrapsychic distancing mechanisms attributed to the closeness to death (suggested by the disengagement theory). Rather, it is caused by regulation of emotions, focused on positive affect.

Generally, with age people focus more on interactions with close, well-known people, reduce interactions with acquaintances, and less frequently engage in new interactions. During the life course information gains from social interactions gradually lose importance. Regulating emotional states to increase subjective well-being becomes the most salient motivation among older adults – and in effect, they have relatively small but satisfying social networks. The key idea of the socioemotional selectivity theory – that individuals' intentionally build and maintain their social networks in order to pursue their goals and satisfy their needs – is also explicit in exchange theory (Homans, 1950) and social capital theory (Bourdieu, 1984; Lin, 2001). Furthermore, its focus on the gradual shift from agentic to communal goals with individuals' age is in line with the developmental task of generativity (Erikson, 1950).

The socioemotional selectivity theory also is congruent with Nan Lin's (2001) theory of social networks and social action, which identifies two primary motives for individual and group action: to protect existing valued resources and to gain additional ones.

The first leads to expressive action, such as confiding one's feelings. The second leads to instrumental action, such as searching for a job. Lin argues that the motivation to maintain and defend existing resources (leading to expressive action) is relatively more important because losing resources in one's possession poses a greater mental and physical threat to the ego's existence than not gaining additional resources (Lin, 2001; Wojciszke, Abele, 2019). Lin also highlights gender differences in the motives for social interactions: women more often use their social network resources for the sake of expressive motivation than men, while men use these resources more often for the sake of instrumental motivation. "Generations of differential selection pressures favoring males pursuing rank and females providing care could lead to sex-linked differences in social motives; and indeed, compared to men, women typically place more importance on communion and less importance on agency" (Locke, 2019: 70).

2.3 Differential Investment in Resources (DIRe) Model

The recent *DIRe model* (Huxhold et al., 2022) provides an overarching theoretical structure which builds on both above theories as well as integrates empirical findings about the formation and maintenance of social ties across adulthood into late life. It posits that individuals' capacities, motivations and skills influence time and energy investment in social ties, which is a core mechanism for formation and maintenance of social networks. Capacities, e.g. health, cognitive and emotional functioning, affect the amount of resources engaged in social ties formation and maintenance. Motivations, understood as characteristics of social ties in which an individual invests (e.g. close and emotional ties vs. weak and uncertain ties), depend on, e.g., time perspective or the individual's perception of aging. Specifically the DIRe model emphasizes two dimensions of social ties: closeness and kinship. Closeness is "the individual's evaluation of how central a specific tie is to their day-to-day quality of emotional experience" (Huxhold et al., 2022: 59) and kinship is "a mental construct encapsulating the expectation that a specific tie will provide support in times of need, stemming from relatedness, societally institutionalized processes and norms, and/or mutual discourse" (Huxhold et al., 2022: 59).

The DIRe model looks also at socioeconomic conditions that create an important context for social tie formation and dissolution, such as income, education, gender and marital status (potentially constraining time and energy investment in social ties; beneficial or hampering for individual characteristics such as health, cognitive or emotional functioning).

2.4 Empirical Research

The associated empirical literature either directly verifies the predictions of above theories or provides them with some important context. In line with the *convoy model*, empirical research based on social network data shows that despite the generally huge social network turnover – usually as much as 20% to 50% of those listed as members of one's social network in one wave of a study are not relisted in the next wave – the profiles of social networks in terms of size, composition, supportiveness and structure remain remarkably stable over individuals' lifetime (Fischer & Offer, 2020). The overall size of social network increases in adolescence and young adulthood, when people assume new roles in their lives, reaches a plateau in the mid-20 s to early 30 s, and decreases constantly thereafter (Fischer & Offer, 2020; Heydari et al., 2018). However, the size of family network, a sub-network within the social network understood as the core of the individual's convoy, does not change with age (Wrzus et al., 2013).

The aforementioned age profile of social ties is also consistent with predictions of the *socioemotional selectivity theory.* Namely, increases in the size of social network in adolescence and young adulthood can be associated with instrumental motivations for social tie formation among people who see a long perspective ahead of them (Rauvola & Rudolph, 2023; Wrzus et al., 2013). In contrast, expressive motivations become more important later in life as people's time perspective is shortened: social ties that provide individuals with companionship, emergency help, advice and confiding are kept, while ties with difficult people are dropped unless they are immediate kin (Fischer & Offer, 2020). Eventually, network inequalities tend to converge in very old age (Fischer & Beresford, 2015).

In turn, the recent *differential investment in resources (DIRe) model* provides an overarching frame integrating the findings of a variety of empirical studies. Specifically it highlights the role of between-tie and between-ego differences in shaping the formation and dissolution of social ties.

A number of *between-ego* differences have been found to affect the patterns of tie drop, such as life transitions, e.g., moving, graduation, marriage, nearing the end of life (Badawy et al., 2018; Bidart & Lavenu, 2005; Wrzus et al., 2013), socio-economic status – individuals with low social standing drop more ties and are more frequently dropped themselves (Burt, 2000; Cornwell, 2015), and age – the young and most elderly have higher drop rates (Cornwell, 2015; Fischer & Beresford, 2015). Gender and education also seem to be significant contributors. Late middle age women – in their 50s and 60s—have a higher frequency of contacts with others than men of the same age (Fischer & Beresford, 2015). This stands in opposition to the trend observed at younger ages, when men have more advantageous social networks (Bidart & Lavenu, 2005). Other studies point out that women experience a decline in social capital with age while men see an increase (McDonald & Mair, 2010; Völker, 2020). "Among women, age is associated with smaller networks that are older, less geographically proximal, and less frequently contacted. (…) Higher levels of education are linked to larger personal networks among men and women, but not to the number of individuals considered closest. Among women, higher levels of education are also associated with less proximal networks" (Ajrouch et al., 2005: 311). More educated individuals (e.g.,

college graduates compared to high school graduates) have a higher frequency of contacts with others (Cornwell, 2015; Fischer & Beresford, 2015). Health decline in old age leads to dropping ties (Badawy et al., 2018; Cornwell, 2015; Fischer & Offer, 2020). Being an extravert and open to experience promotes getting new ties while being agreeable help individuals keep their ties for longer (Pollet et al., 2011; Selden & Goodie, 2018; Wagner et al., 2014).

There are also important *between-tie* differences which increase the probability of certain patterns of network dynamics (Fischer & Offer, 2020). Network attributes like degree, centrality, or the position of a network bridge – which make the individual's position in a social structure advantageous – might affect positively both dropping ties and gaining new ties (Burt, 1998; Fischer & Offer, 2020; Leary & Downs, 1995; Leary et al., 1995; Mahadevan et al., 2016). Network density and a relatively high proportion of kin in one's social network leads to greater stability of social ties (a property also predicted by the convoy model). Furthermore, triadic structures and bridging ties break more frequently than non-redundant bonding ties (Burt, 1992). Heterogeneous social ties in terms of gender and education are dropped more often than homogeneous ones while people age (Völker, 2022). In sum, social contexts matter for social network dynamics (Blau & Schwartz, 1984; Fischer, 1982; Mollenhorst et al., 2008, 2014) – they may constrain dropping ties both materially (in case of workplaces, schools, and cohousing) and normatively (immediate family and friendships) (Fischer & Offer, 2020).

Finally, in some studies the *age profiles* of certain variables have also been shown to be non-monotonic and reverse in the middle age. Specifically, the relationship between age and subjective well-being is U-shaped (Blanchflower & Oswald, 2008; Cheng et al., 2015; Graham, 2009). Accordingly, an inverted U-shaped relationship holds for age and stress, mental illness, use of anti-depressants and both positive risk-taking and negative health risk-taking (Blanchflower & Oswald, 2016; Fryt et al., 2022; Graham & Ruiz Pozuelo, 2017). The Gallup World Poll data for the years 2004–2015 for 46 countries suggest that the turning point in the happiness U-curve (i.e., the age when subjective well-being is the lowest) ranges from 42 to 70 plus years old (Graham & Ruiz Pozuelo, 2017). The turning point in stress inverted U-curve is achieved typically a few years earlier than the lowest life satisfaction moment (Graham & Ruiz Pozuelo, 2017). Accordingly, I expect that social network dynamics may exhibit non-linear trends as well.

2.5 Hypotheses

In the current study I test the following hypotheses:

1. (DIRe model) *In a cross-section of individuals, between-tie differences (degree, centrality, intensity of heterophilous interactions in a social network) are significant predictors of dynamism of social tie formation and dissolution.*

2. (DIRe model) *Between-ego differences (sociability, positive affect toward others, income) also are significant predictors of dynamism of social tie formation and dissolution.*

3. (Socioemotional selectivity theory) *Controlling for between-tie and between-ego differences, the dynamism of social tie formation and dissolution, as well as the overall number of ties (degree), is a decreasing function of individuals' age.*

4. (Socioemotional selectivity theory) *Older people have more expressive and fewer instrumental motivations for both dropping and forming new ties.*

5. (Social convoy model) *The number of social ties with family, when compared to all other acquaintances, is relatively stable across age groups.*

The contextual framing of the DIRe model also provides a number of control variables to be included while testing Hypotheses 3–5.

3 Method

3.1 The Dataset

The dataset[1] covers a large, representative sample of the Polish population aged 15–75 years old. A multi-stage stratified sampling procedure was used, designed to maintain representation of the Polish population with regard to voivodship (16), size of town of residence (7), age cohorts (5), and gender (2). Post-stratification weights have been applied to correct for (minor) ex post discrepancies in the territorial, age and gender structure of sample and population (RIM weighting). The data has been gathered based on computer-aided personal interviews (CAPI) in May 2015 by Millward Brown SA.[2]

The survey questionnaire, designed by the author of the current study, consisted of 40 questions, some of which contained multiple items. Additionally, the respondents were asked about their basic demographics (such as age, gender, marital status, employment status, etc., altogether 22 items). It took approximately 15–20 min to complete the survey. The sample size is $n = 1000$ respondents. The full questionnaire is available online.[3]

The fact that the current study combines an extensive question-catalogue on social networks (e.g., including tie formation, dissolution and motivations) with a large sample size constitutes a contribution to the literature; elsewhere typically only a few questions on social networks were asked.

Although the dataset covers the Polish society, this paper's results may be nonetheless generalizable to other European or Western societies. There are no characteristic legal or institutional arrangements interfering with social tie formation and dissolution. As there was very little diversity in Polish society at the time of the data collection in terms of ethnicity, language or religious denomination, these variables were not included, while they could potentially turn out important in other societies.

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[1] https://osf.io/z79ce/?view_only=4ceefff51c074483a7dd8c7d836956d6

[2] First the population was stratified by the criterion of territorial location (divided into 16 voivodships) and the size of the town of residence. In the second phase of selection, the required number of addresses was drawn in the previously selected locations. Addresses were selected using the systematic sampling method from a sampling frame ordered by street names. In the third stage of sampling, a breakdown of the sample by gender and age cohorts was allocated to the previously drawn addresses, separately in each size of the town of residence and separately in each voivodship in the village stratum. In the realization phase the interviewer was obliged to arrive at the indicated address and start searching for people meeting the given demographic criterion (gender and age cohort). If no person meeting the given demographic criteria lived under that address or if the interviewer did not obtain permission to conduct the interview, further search for respondents was continued at the next address.

[3] https://osf.io/z79ce/?view_only=4ceefff51c074483a7dd8c7d836956d6 (original Polish version and English translation).

3.2 Construction of Variables

This study uses a specific definition of an *acquaintance*. At the beginning of each interview, the interviewers said:

I would like to talk about your relations with family, friends and acquaintances. As the term "acquaintance" may have different meanings to different people, I would like to adopt the following definition for the purposes of our conversation:

An ACQUAINTANCE is a person whom you know (and who knows you) by the name and whom you contact in person, over the phone or over the Internet (e-mail, social media, etc.) at least once a month. Household and family members also are acquaintances.

Such an inclusive empirical definition of an acquaintance puts an emphasis on direct involvement and mutual recognition between the individual and the partner of a social interaction (Baumeister & Leary, 1995; Fischer, 1982). Moreover, it adds a time constraint of one month in order to help the respondent adequately recall her social relationships with acquaintances during this time. An average individual in the sample contacted 5.0 family members, 4.3 acquaintances from work (current or previous), and 8.1 other acquaintances during the last month.[4]

Based on the answers to the survey questions, a number of summary scales were constructed, capturing the relevant theoretical concepts. I have carefully tested the reliability and validity of each scale. The definitions and empirical characteristics of the respective measures are discussed below.

I begin with my three dependent variables, capturing the dynamics of social network reconfiguration: new ties, dropped ties, and net new ties (new ties minus dropped ties). Next, I discuss the key characteristics of individuals' social networks (between-tie differences): degree, centrality, heterophilous interactions, and their immediate correlates: social trust and willingness to cooperate. I also comment on the important socio-demographic control variables (between-ego differences) and motivations for forming or dropping ties.

3.2.1 Dependent Variables

3.2.1.1 New ties (log_NT) The number of newly formed ties is based on the direct survey question "How many new acquaintances did you learn to know during the last 1 year?". The variable is transformed logarithmically as in $x \mapsto \ln(1 + x)$ to correct for the right skew of the distribution of the original variable.

3.2.1.2 Dissolved ties (dropped ties; log_DT) The number of recently dissolved ties is based on the direct survey question "With how many persons have you lost contact during the last 1 year?". The variable is transformed logarithmically as in $x \mapsto \ln(1 + x)$ to correct for the right skew of the distribution of the original variable.

3.2.1.3 Net new ties (log_NNT) The balance of ties formed and severed during the last year is computed as the difference between (logged) new ties and dissolved ties.

In order to verify whether the respondents are able to reliably recall the number of social ties formed or dissolved during the last year, they have also been asked about their ties

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[4] Considering people contacted during the last 7 days instead of one month does not change any of the results qualitatively.

formed and dissolved during the last 3 months and 3 years. Reassuringly, survey answers for the 3 years period are strongly correlated with their 1 year counterparts ($r = 0.85$ and $r = 0.86$ for new ties and dissolved ties, respectively). The variables for the 3 months period are somewhat less correlated (respectively $r = 0.71$ and $r = 0.56$), and also much less correlated with degree and centrality. This suggests that a 3 month window may be too short to record systematic reconfiguration of individuals' social networks, reinforcing the choice of 1 year as the default length of time window.

The numbers of new ties and severed ties are positively correlated in the cross section ($r = 0.48$), a statistic which is very much in line with the observation that despite constant reconfiguration of social networks they are quite constant in size, composition and structure (Fischer & Offer, 2020).

3.2.2 Between-tie Differences

3.2.2.1 Degree (Size of the Social Network) The number of social ties an individual holds is a fundamental characteristic of her social network because it directly determines access to network resources. Unfortunately, individuals often face troubles in recalling the exact number of acquaintances they have in their social network when asked directly (Fischer, 1982; Fischer & Offer, 2020). To resolve this problem, in the empirical operationalization of degree I combine its four proxy measures in a unique summary scale: (i) the reported number of acquaintances from all backgrounds (e.g. family, school, work – current or previous, political party, military, childhood) contacted during the last week (P2),[5] (ii) sum of reported total numbers of acquaintances from family, from work, and other acquaintances (P3_TOTAL), (iii) sum of total reported numbers of persons from family, work, and other acquaintances contacted during the last 7 days (P4_2ABC), (iv) sum of total reported numbers of persons from family, work, and other acquaintances contacted during the last month (P4_3ABC). The standardized Cronbach's alpha coefficient of the summary scale **Degree** (based on standardized items) is equal to 0.8588 and cannot be increased by removing any of its constituent items. I use log degree in my regressions to correct for the right skew of the distribution of the original variable.

3.2.2.2 Centrality Individuals forming a bridge between otherwise separated sub-networks (cliques) are crucial for the flow of information and resources in a social network and can therefore expect to draw certain advantages from their central location (Burt, 1992). In this study, individuals' network centrality is assessed based on their reported ability to act like a bridge between otherwise disconnected sub-networks. The measure can also be interpreted as having preferential access to valuable network resources (but not necessarily making use of them). It is based on a 7-item summary scale capturing whether the respondent knows people with valuable skills, people who can help "get things done", whether the respondent is a person who can help others get a job or solve a difficult work-related problem, whether he/she actually has helped someone get a job or solve a difficult work related problem, whether he/she often contacts his/her acquaintances with one another, whether he/she shares information obtained from other sub-networks (i.e., acts as a bridge in information diffusion), and whether he/she shares information on job seekers, vacancies, and business opportunities (**Bridge_Net**, based on P14_4567–P15_123). The standardized Cronbach's

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[5] This "code" refers to the respective question in the questionnaire. For example, "P2" refers to question P2, "P4_2ABC" is question P4a, P4b, P4c point 3, "P14_4567" refers to question P14 points 4–7, etc. All codes are included to allow reproducibility of the results.

alpha coefficient of this scale amounts to 0.7757 and scale reliability cannot be improved by removing any of its items. In my regressions, I use the log of **Bridge_Net**.

3.2.2.3 Heterophilous Interactions The concept of heterophilous interactions, sometimes also called *bridging social capital*, refers to forming relations between two actors with dissimilar resources, which can include wealth, reputation, power, and lifestyle (Lin, 2001). Heterophilous interactions demand more effort than homophilous ones but can be highly beneficial in terms of access to network resources (Kadushin, 2012; Lin, 2001). I quantify heterophilous interactions using a measure of tie heterogeneity within one's network of acquaintances. It is a summary scale based on Curry et al. (2013) measure of possible similarities between interaction partners (Growiec, 2015), encompassing 7 items related to maintaining social ties with dissimilar others – of largely different age, with a different level of education, other interests, different worldview, living far away, or a lot poorer/wealthier (**Bridging**, based on P24.1–7). Its standardized Cronbach's alpha coefficient amounts to 0.8422 and scale reliability cannot be improved by removing any of its items.[6]

3.2.3 Between-Ego Differences

3.2.3.1 Sociability and Positive Affect Some individuals may maintain more social ties than others as well as spend more time socializing just because of their innate psychological traits such as sociability and positive affect towards others. Sociable and positively inclined individuals are typically more popular with other people and vice versa (Sloman & Dunham, 2004). Positively inclined individuals also live longer (O'Connor & Graham, 2019).

I construct a scale of sociability (**Sociability**, based on two items, P14_1–2), and a scale of general positive affect towards others (**Pos_Affect**, based on all 30 items in P8ABC). The former variable includes the assertions of respondents whether they are sociable (like spending time with others) and open, interested in the world. The standardized Cronbach's alpha coefficient of this scale is 0.7006. The latter variable, in contrast, sums the replies on whether the respondent is emotionally related with his/her acquaintances, knows them for a long time, behaves honestly towards them, thinks others behave honestly as well, offers his/her help, believes that he/she can count on help from others, can forgive a lot, has full trust, and believes others trust in him/her in return as well. The standardized Cronbach's alpha coefficient of this scale is 0.9407 and its reliability cannot be improved by removing items.

3.2.3.2 Scale of Perceived Incomes High-earning individuals may find it easier to form new social ties (e.g., others may regard them as attractive), and in order to maintain stability of their social network, they may be more willing to drop social ties which they find unsatisfactory.

Unfortunately, individual incomes are notoriously difficult to measure in survey data because often the respondents don't know their exact pay levels, deliberately modify it, or refuse to answer. One cause for concern is that missing observations tend to be disproportionately concentrated in the upper tail of the distribution. Another problem is that what matters more for individuals' subjective well-being than the raw amount of money earned is whether the earnings are sufficient to satisfy their needs and how they compare to a certain point of reference. For these reasons, I construct a scale of subjectively perceived, relative earnings. It consists of five items (**Income_Rel** based on P31–P35), measuring

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[6] For detailed justifications of the choice of specific items for this scale, see Growiec (2015).

whether the respondent considers his/her material situation (or, separately, incomes) as satisfactory and whether his/her material situation (or, separately, incomes) is better or worse when compared to the average material situation/incomes of the respondent's peers in Poland. It also includes the respondent's self-assessed income decile. The standardized Cronbach's alpha coefficient of this standardized scale is 0.8860 and its reliability cannot be improved by removing items.

3.2.3.3 Generalized trust (social trust) Trust and willingness to cooperate are known to be related to social network characteristics like, for example, degree or heterophilous interactions (Growiec et al., 2018). My measure of generalized trust is based on the standard, single survey question (**Trust**): should most people be trusted, or one cannot be too careful (with other people)? The answers are measured on a scale from 1 to 5.

3.2.3.4 Particularized Trust I also capture the degree of trust one holds specifically against one's acquaintances. Excluding social ties with kin,[7] I measure whether the respondent thinks his/her acquaintances always behave honestly with him/her, whether he/she can always count on their help, and whether he/she trusts them completely (**Trust_Net** based on P8BC_479). The standardized Cronbach's alpha coefficient of this scale amounts to 0.8492 and its reliability cannot be improved by removing items.

3.2.3.5 Generalized willingness to cooperate The measure of generalized willingness to cooperate is based on four items capturing whether the respondent (i) declares to always behave honestly with others, (ii) is convinced that others are honest with him/her as well as (iii) with themselves, and (iv) agrees that all rules should be obeyed (**Cooperation** based on P40_1237). The standardized Cronbach's alpha coefficient of this scale is not as high as the previous ones but remains acceptable – it amounts to 0.5982. Its reliability cannot be improved by removing any of the items or by adding further of the available items related to allowing for cheating in certain situations.

3.2.3.6 Particularized Willingness to Cooperate The measure of willingness to cooperate with one's own acquaintances is based on six items. Excluding social ties with kin, I measure whether the respondent declares that she always behaves honestly with his/her acquaintances and whether they can always count on the respondent's help, also when this would require substantial sacrifice (**Coop_Net** based on P8BC_356). The standardized Cronbach's alpha coefficient of this scale is 0.8210 and its reliability cannot be improved by removing items.

3.2.3.7 Motivation for Forming or Dissolving (dropping) Ties In some regressions a number of potential reasons for forming new ties or severing old ones were included, serving either expressive goals ("Contacting these people gives me pleasure, brings me in a good mood"; "Contact with these persons ceased to please me, started to bring me in a bad mood") or instrumental goals ("Contacting these people may help me in my work-related issues"; "Contacting these people may help me forge contacts with someone else"; "Forging new

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[7] I exclude social ties within family when computing the measures of social trust and willingness to cooperate because these ties are subject to different social norms, a higher degree of social control and are formed and dissolved based on different criteria. In the data, respondents are on average much more trustful and willing to cooperate with acquaintances from family than with acquaintances from work or other acquaintances.

Table 1 Summary statistics

Variable	Obs	Mean	Std.Dev	Min	Max
log_NNT	1,000	.5552923	.9379835	− 2.772589	4.61512
log_NT	1,000	1.06245	1.075096	0	4.795791
log_DT	1,000	.507158	.7847737	0	4.61512
lnDegree	1,000	− .131165	.4454248	− .7165689	2.727107
lnBridgeNet	1,000	1.11324	.2349029	0	1.609438
Bridging	1,000	3.133429	.7109696	1	5
Trust	1,000	2.645	1.074304	1	5
Trust_Net	957	3.688436	.6643674	1.333333	5
Cooperation	1,000	3.54175	.569995	1.25	5
Coop_Net	957	3.852839	.6017199	1	5
Sociability	994	3.932093	.749062	1	5
Pos_Affect	1,000	3.860067	.5491399	1.7	5
Education	997	2.425276	.9159908	1	4
Female	1,000	1.515	.500025	1	2
Age	1,000	42.963	16.72864	15	76
Age2	1,000	2125.387	1510.491	225	5776
Married	1,000	.478	.4997657	0	1
Widowed	1,000	.099	.2988115	0	1
Disabled	1,000	1.951	.215976	1	2
Ill	1,000	1.911	.2848862	1	2
Income_Rel	1,000	8.78e-09	.8477767	− 1.912651	2.795047

Table 2 Correlation matrix

	log_NNT	log_NT	log_DT	lnDegree	lnBridgeNet	Bridging
log_NNT	1.0000					
log_NT	0.7040*	1.0000				
log_DT	−0.2308*	0.5286*	1.0000			
lnDegree	0.2978*	0.4751*	0.2949*	1.0000		
lnBridgeNet	0.2022*	0.2835*	0.1466*	0.2095*	1.0000	
Bridging	0.1035*	0.2029*	0.1543*	0.2792*	0.2470*	1.0000

*$p < 0.05$

contacts is the easier, the greater is the number of people with whom you have already known because it provides more opportunities for common contacts"; "Keeping contacts with my acquaintances if financially beneficial for me").[8] It is a test of socioemotional selectivity theory that with age (or time limit perspective) individuals gradually focus their social ties on those who provide emotional rewards rather than instrumental gains.

3.2.3.8 Other control variables: age, age squared, gender (female = 1), education, marital status (married, widowed), disabled status, and chronic illness Summary statistics of the considered variables are presented in Table 1 below. In turn, correlations between the key

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[8] Motives for forming ties: P11_125, P12_4, P19_5; motive for dropping ties: P17_01.

social network variables are shown in Table 2. We see, in particular, that individuals' degree strongly (and statistically significantly) correlates positively with the balance of ties formed and dissolved within a given year ($r=0.30$) and even more strongly with new tie formation ($r=0.48$).

3.3 Empirical Methodology

The empirical methodology of the current study consists of:

a) running multivariate linear regressions explaining (log) new ties, dropped ties, and net new ties with individuals' social network characteristics and (expressive and instrumental) motivations for social tie creation/dissolution, controlling for a range of between-tie and between-ego differences. The regressions are run either over the entire cross-section ($n=1000$) or in subgroups stratified by age or gender;

b) fitting Generalized Additive Models (GAM), allowing to precisely identify nonlinear age profiles of (log) new ties, dropped ties and net new ties, also when controlling for a range of between-tie and between-ego differences. Age profiles are identified with local polynomial smooth curves estimated with an Epanechnikov kernel function. The models are fitted either for the entire cross-section ($n=1000$) or in subgroups stratified by age or gender. In addition, I also identify age profiles of individuals' degree as well as its components: contacts with acquaintances from family, work, and other acquaintances.

Research methods (a)-(b) are complementary and serve to address the hypotheses formulated in Sect. 2.5. Multivariate linear regression models allow to identify robust correlates of social tie formation or dissolution and quantify their relative importance. Thus, they are instrumental in testing Hypotheses 1, 2, 4 and 5. In turn, GAMs help visualize the nonlinear shifts in social network dynamics for people at different ages, while maintaining the ability to control for a range of important between-tie and between-ego differences among individuals. They are therefore instrumental in testing Hypotheses 3 and 5.

4 Results

4.1 Regression Results

4.1.1 Between-tie Differences

The dynamics of social network reconfiguration are strongly correlated with social network characteristics such as log degree, centrality and heterophilous interactions (Table 3). A person who has 10% more social ties is on average going to form 9.4% ties more and dissolve (drop) 4.5% more ties in any given year, leading on average to an overall 4.9% net increase in degree per year (other things equal). In turn, individuals who are located centrally in a network, acting as a network bridge between otherwise disconnected sub-networks, are significantly more likely to form new ties, dissolve (drop) old ones, and grow their network over time. A 10% increase in centrality leads on average, other things equal, to a 7.4% increase in the number of new ties per year, a 3% increase in dropped ties, and 4.3% increase in net new ties. Heterophilous interactions, by contrast, relate only to the intensity of social network reconfiguration

Table 3 Multivariate regression results: robust correlates of social tie creation and dissolution

VARIABLES	(1) log_NNT	(2) log_NT	(3) log_NT	(4) log_DT	(5) log_DT
lnDegree	0.495***	0.942***	0.934***	0.447***	0.451***
	[5.365]	[11.81]	[11.76]	[5.991]	[6.072]
lnBridgeNet	0.434***	0.737***	0.529***	0.303***	0.216**
	[3.216]	[5.639]	[3.856]	[2.857]	[1.985]
Bridging	0.00555	0.0946**	0.0712	0.0890**	0.0771**
	[0.130]	[2.145]	[1.610]	[2.579]	[2.218]
Education	0.0168	0.0777**	0.0701*	0.0609*	0.0546*
	[0.435]	[2.064]	[1.873]	[1.917]	[1.710]
Sociability	0.0747*	0.00783	0.00301	−0.0669	−0.0491
	[1.684]	[0.164]	[0.0614]	[−1.581]	[−1.125]
Pos_Affect	0.0757	−0.148	−0.149	−0.224**	−0.135
	[0.655]	[−1.203]	[−1.214]	[−2.206]	[−1.306]
Female	0.0238	0.111*	0.125**	0.0868*	0.0785
	[0.404]	[1.868]	[2.109]	[1.668]	[1.522]
Age	−0.0257**	−0.0503***	−0.0480***	−0.0246**	−0.0221**
	[−2.302]	[−4.343]	[−4.137]	[−2.570]	[−2.352]
Age2	0.000144	0.000402***	0.000390***	0.000258**	0.000229**
	[1.175]	[3.243]	[3.155]	[2.495]	[2.249]
Income_Rel	−0.0420	−0.0179	−0.0201	0.0241	0.0244
	[−1.060]	[−0.449]	[−0.514]	[0.686]	[0.704]
P11_1			0.0787*		
			[1.937]		
P17_01					0.115***
					[4.042]
Constant	−0.154	1.535***	1.161**	1.689***	1.307***
	[−0.321]	[3.032]	[2.277]	[4.123]	[3.147]
Controls	YES	YES	YES	YES	YES
Observations	950	950	950	950	950
R-squared	0.202	0.371	0.384	0.140	0.158
Adjusted R-sq	0.186	0.359	0.369	0.124	0.141

Robust t-statistics in brackets, *** p < 0.01, ** p < 0.05, * p < 0.1

Controls: Trust, Trust_Net, Cooperation, Coop_Net, Married, Widowed, Disabled, Ill. Regression (3) includes 4 additional motivations for social tie creation (see Table 10)

but not the net effect: all things equal a 1 point increase in the heterophilous interactions scale is associated with a 9% increase in both the number of new ties formed and dropped, with a zero net effect on the individual's degree.

All results for between-tie differences are in agreement with Hypothesis 1.

4.1.2 Between-ego Differences

When social network characteristics are factored in, most of between-ego differences become statistically insignificant (Table 3, Appendix Table 10). This happens, in
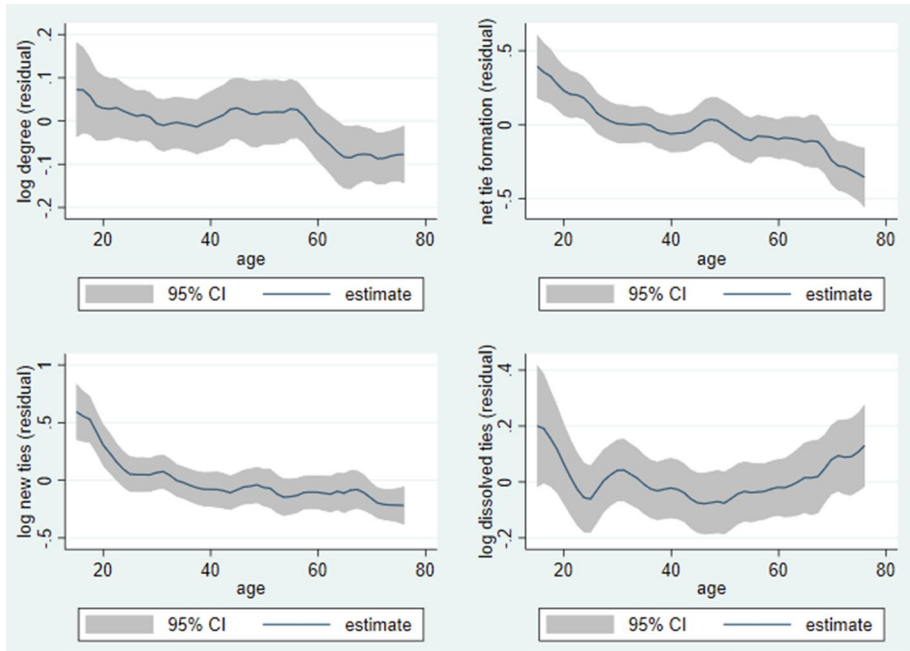
Fig. 1 Age profiles of log degree, net social tie formation, new ties, and dissolved ties. Age profiles without accounting for control variables are presented in Appendix Fig. 3

particular, to individual's sociability, positive affect towards others, and income. I conjecture that this is because the primary effect of these variables shows up also in individuals' degree. These results imply that Hypothesis 2 does not hold.

As regards the additional control variables, I find that generalized trust and willingness to cooperate are also statistically insignificant. Particularized trust turns out slightly negatively associated with new ties, whereas particularized willingness to cooperate is slightly positively associated with new and dropped ties, but not on net new ties. On average, married people find it relatively harder to form new ties than others, though the estimated difference is small. In turn, a higher level of education goes together with greater intensity of social tie formation and dissolution. Disability status and chronic illness are statistically insignificant.

Finally, the expressive motivation for social tie dissolution (P11_1: "Contact with these persons ceased to please me, started to bring me in a bad mood") is an important predictor of the number of dissolved ties. By the same token, albeit less strongly, the expressive motivation for social tie formation (P17_01: "Contacting these people gives me pleasure, brings me in a good mood") predicts that an individual would form more new ties. Instrumental motivations for social tie formation are statistically insignificant.

4.2 Age Profiles of Social tie Formation and Dissolution

As shown in Fig. 1, the average number of people's social ties (degree) tends to be lower for older people, in line with Hypothesis 3. On top of that, there seems to be an upswing in middle adulthood (roughly at ages 35–50), but it is not statistically significant. A similar age

profile repeats in the case of net social tie formation during a given year, implying that people's social network characteristics tend to be stable despite considerable turnover in terms of social ties formed and dissolved. This finding is robust to the inclusion of control variables.

The number of new ties an individual forms in a given year is a decreasing function of age, albeit when controlling for between-ego differences, beyond age 40 the relationship between individuals' age and the number of new social ties formed per year becomes essentially flat, that is, the number of new ties formed per year stabilizes. This suggests that around the age of 40, individuals reach their preferred constant number of new ties formed per year.

The number of social ties dissolved in a given year is also a decreasing function of individuals' age. However, after controlling for between-tie differences, the relationship between age and the number of social ties lost per year becomes U-shaped: after the age of 50, the profile appears to slowly slope upwards. However this visible upswing is too small to be statistically significant.

All above results are firmly in line with Hypothesis 3. They also weakly indicate at the possible unique character of middle adulthood (roughly the age 35–50), which I will investigate further below.

4.3 Differences Between Men and Women

I find that the age profiles of social tie formation and dissolution are similar for both genders (Appendix Fig. 4); both are well aligned with the general characterization spelled out above. Any observable differences are small, not homogenous across age, and above all not robust to the inclusion of control variables.

However, there are differences between men and women in terms of the most important correlates of social tie formation and dissolution (Appendix Table 5). Education is an important predictor of network turnover (both forming and dropping ties) only among men, and so are heterophilous interactions within one's network. These ego and network traits promote social networks' dynamics only among men. In turn, being married significantly reduces the number of new ties only among women. This means that being married is a constraining context when it comes to forming new ties for women. Finally, higher income goes together with greater intensity of tie dissolution among women and smaller intensity among men.

As far as motivations for social network reconfiguration are concerned (Appendix Table 6), among women the number of new ties strongly correlates with their expressive motivation ("Contacting these people gives me pleasure, brings me in a good mood"), whereas among men instrumental motivation is more important ("Contacting these people may help me in my work-related issues"; "Forging new contacts is the easier, the greater is the number of people with whom you have already known because it provides more opportunities for common contacts."). When it comes to social tie dissolution, expressive motivation ("Contact with these persons ceased to please me, started to bring me in a bad mood") is equally important for both genders.

4.4 Differences Between Age Groups

Social network dynamics are most turbulent during youth. However, it is the middle adulthood when most interesting findings emerge, as at this time some of the important lifecycle trends weaken or even reverse. This is confirmed in Appendix Table 7 which utilizes a split of the sample into three equally spaced age groups: 15–34, 35–54, and 55–75, which for convenience I call "young", "middle aged" and "old", respectively. Several results stand

out. First, education strongly and significantly correlates with social tie formation and dissolution only among the middle aged. Second, particularized willingness to cooperate is important for forming new ties among the middle aged and the old but not the young. Third, heterophilous interactions correlate (positively) with new ties only among the middle aged. Fourth, young women tend to get and drop more ties than men, but this tendency disappears already in middle age. Fifth, being married strongly reduces new ties, dropped ties, and net new ties among the young but ceases to exhibit any effect among older age categories.

Investigation of motivations for social network reconfiguration further demonstrates the uniqueness of middle adulthood (Table 4, Appendix Table 8). Variables capturing expressive or instrumental motivation for tie formation appear significant only for this age group, suggesting that network turnover may be relatively most congruent with inner motivations at this age. In turn, expressive motivation for dropping ties is a significant predictor among the young and middle aged but not the old, for whom probably contextual conditions matter more (Huxhold et al., 2022).

Finally, in Appendix Fig. 5 I show (without any controls) how the motivation for network turnover differs for each age group. I find that expressive motivation for social tie formation is most often mentioned among the young; then their incidence drops sharply in the middle age, particularly among men. Instrumental motivation, in turn, is frequently mentioned both by the young and middle aged, and more frequently by men. Expressive motivations for social tie dissolution do not vary significantly across age groups.

These results largely do not align with the predictions of the socioemotional selectivity theory spelled out in Hypothesis 4.

4.5 Social Ties with Acquaintances from Family, Work, and Other Backgrounds

As an empirical test of the convoy model, I checked whether the variability in the number of social ties (degree) over the life course is smaller in the case of acquaintances from family (core of the convoy), compared to acquaintances from work and other backgrounds (periphery of the convoy). Unfortunately, I can only study the data on degree and not social network dynamics in this context because tie formation and dissolution is not broken down by type (family, coworkers, other acquaintances) in the data.

The number of ties with acquaintances from family is indeed relatively constant across age groups, compared to acquaintances from work, who are frequently contacted only during individuals' working age (about 25–55 years old), and other acquaintances, whose circle is wide when the individual is young, but then these ties are gradually dropped, at least up to the point when the individuals reach middle adulthood (Fig. 2). This result is robust to controlling for between-tie and between-ego differences. Hypothesis 5 is thus confirmed.

I also confirm (Appendix Table 8) that women, compared to men, have relatively more contacts with family and fewer contacts with acquaintances from work; that individuals who are well educated and central in the network have a particularly high number of work-related social ties; and that a larger number of ties with family goes together with lower particularized trust and willingness to cooperate.

5 Discussion and Conclusions

The above results constitute an empirical test of the social convoy model, socioemotional selectivity theory and the differential investment of resources (DIRe) model, as well as provide some additional insights. Specifically, in line with socioemotional selectivity theory,

Table 4 Correlates of social tie formation and dissolution, including expressive vs. instrumental motivations. Comparison across three age groups

Variables	(1) log_NT 15–34	(2) log_NT 35–54	(3) log_NT 55–75	(4) log_DT 15–34	(5) log_DT 35–54	(6) log_DT 55–75
lnDegree	1.055***	0.814***	0.939***	0.566***	0.277***	0.543***
	[9.257]	[5.765]	[5.489]	[5.053]	[2.794]	[3.031]
lnBridgeNet	0.438	0.894***	0.502**	0.183	0.513**	0.0227
	[1.621]	[3.448]	[2.420]	[0.919]	[2.434]	[0.122]
Bridging	− 0.0280	0.173**	0.0719	0.0511	0.0813	0.0857
	[− 0.338]	[2.327]	[1.086]	[0.837]	[1.442]	[1.314]
Education	− 0.0819	0.233***	0.0710	0.0307	0.0942*	0.0330
	[− 1.386]	[3.343]	[1.074]	[0.559]	[1.736]	[0.604]
Female	0.342***	− 0.0620	0.104	0.162*	0.0144	0.0679
	[3.219]	[− 0.628]	[0.992]	[1.657]	[0.169]	[0.819]
Married	− 0.601***	0.00416	− 0.274	− 0.245**	− 0.0367	− 0.177
	[− 5.138]	[0.0366]	[− 1.453]	[− 2.474]	[− 0.404]	[− 1.266]
P11_1	0.0181	0.140**	0.0615			
	[0.186]	[2.078]	[1.198]			
P11_2	0.0948	− 0.0731	0.0420			
	[1.586]	[− 1.109]	[0.881]			
P11_5	− 0.0345	0.125*	0.0465			
	[− 0.477]	[1.817]	[0.793]			
P12_4	0.0498	− 0.000403	0.0695			
	[0.861]	[− 0.00743]	[1.485]			
P19_5	0.00697	0.104*	0.0111			
	[0.119]	[1.949]	[0.198]			
P17_01				0.187***	0.0980**	0.0651
				[3.557]	[2.412]	[1.196]
Constant	0.347	− 1.357*	0.307	1.138	0.381	1.099*
	[0.434]	[− 1.836]	[0.473]	[1.215]	[0.692]	[1.830]
Controls	YES	YES	YES	YES	YES	YES
Observations	346	328	262	346	328	262
R-squared	0.323	0.375	0.360	0.206	0.140	0.191
Adjusted R-squared	0.281	0.332	0.304	0.168	0.0930	0.134

Robust t-statistics in brackets, ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Controls: Trust, Trust_Net, Cooperation, Coop_Net, Sociability, Pos_Affect, Widowed, Disabled, Ill, Income_Rel (see Table A4)

P11_1 – "Contacting these people gives me pleasure, brings me in a good mood"

P11_2 – "Contacting these people may help me in my work-related issues"

P11_5 – "Contacting these people may help me forge contacts with someone else."

P12_4 – "Forging new contacts is the easier, the greater is the number of people with whom you have already known because it provides more opportunities for common contacts."

P19_5 – "keeping contacts with your acquaintances if financially beneficial for you"

P17_01 – "Contact with these persons ceased to please me, started to bring me in a bad mood"
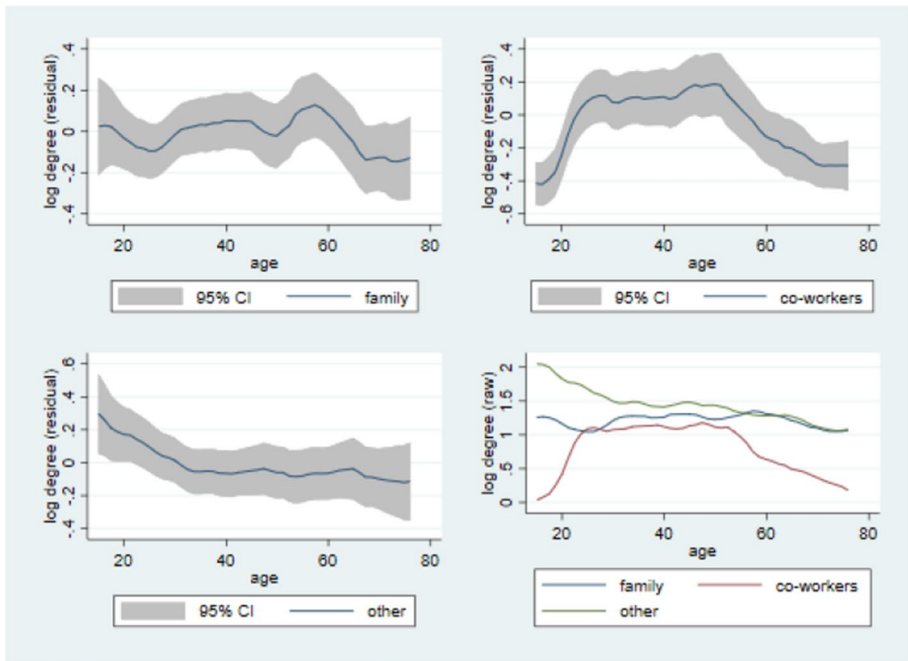
Fig. 2 Age profiles of the number of social ties with acquaintances from family, work, and other acquaintances

it was found that the middle aged cohort (35–54 years old) more willingly follows expressive and instrumental motivations for social ties formation or dissolution than the younger one (15–34 years old). However, neither expressive nor instrumental motivations were found to be significant predictors of social tie formation/dissolution among the older cohort (55–75 years old). In line with Lin's (2001) theory of social capital and social action, in the case of women the expressive motivation for social tie formation and dissolution is stronger, while in the case of men – the instrumental motivation is relatively more prevalent. The fact that the predictions of both Carstensen's socioemotional selectivity theory and Lin's social capital theory are confirmed among women but not men, might be caused by men's relatively strong and constant focus on status, achievement and hierarchy (Lin, 2001).

When it comes to the social convoy model, this study confirms the relative stability of convoy size. The number of social ties with family is less variable across age groups than the number of social ties with coworkers and other acquaintances (Antonucci & Akiyama, 1987; Wrzus et al., 2013).

As regards the DIRe model, this study has confirmed that the intensity of social tie formation and dissolution depends on the ego's degree and centrality in the social network. However, other individuals' characteristics, such as sociability and positive affect towards others, are not robustly correlated with social tie formation or dissolution.

When people with relatively high degree and a more central position in a social network manage to form more new ties and enlarge their social network over time, the "rich get richer" effect, or Matthew effect, emerges (Sloman & Dunham, 2004): with each new tie in a social network or more central position in it the individual becomes more socially attractive, she gets better access to valuable resources and gains competence in managing social

relationships effectively (Baumeister & Leary, 1995; Leary & Downs, 1995; Leary et al., 1995; Mahadevan et al., 2016; Sloman, 2008). This process is an example of how structure (here: degree or centrality) is both enabling and constraining (Giddens, 1984). For some people structure is enabling (those with initially higher degree or a central position) while for others (those with low degree or a peripheral position) structure is constraining. However, there is an upper bound to the Matthew effect due to time and energy constraints and cognitive limitations. Moreover, factoring in the life transitions (e.g., beginning and end of working age) the structure of social networks is found to be quite stable across age groups, while the size of social networks is a decreasing function of individuals' age (congruent with, e.g., Cornwell, 2015; Fischer & Beresford, 2015; Mollenhorst et al., 2014; Fischer & Offer, 2020).

An interesting unexpected finding of this study is that middle adulthood distinguishes itself from other age groups in terms of social network dynamics. First, the intensity of forming new ties relates negatively with individuals' age but this relationship becomes weaker among people aged 40 and older. Second, the relationship between the intensity of tie dissolution and age is approximately U-shaped with fewest ties being dissolved among people around 50 years old (albeit the visible increase in social tie dissolution among older individuals is not statistically significant). Third, while the number of social ties people maintain (degree) is a declining function of age, which is a well-studied phenomenon (Wrzus et al., 2013), this relationship becomes weaker among people in their middle age (particularly at ages 35–50). This is a new finding that requires further investigation. For example, this effect might be related to the new meaning and significance of the middle age in culture as a new beginning (Settersten & Hagestad, 2015; Hagestad & Settersten, 2017). However, this may also be a cohort effect unrelated to the lifecycle. Finally, I also identify interesting variation within the middle-aged group, absent in other age groups. Namely, only in this age group it was found that the dynamism of social ties formation and dissolution significantly positively correlates with the education level and people's willingness to cooperate, and negatively – with their income (particularly among men). People in their middle age appear to be least constrained in their choices. Both expressive and instrumental motivations for social tie formation are relatively most active in this period of life.

While the results of the current study are generally congruent with the meta-analysis by Wrzus et al. (2013), I also provide several new insights thanks to a dedicated dataset with an extensive question-catalogue on social networks – including not only degree, but also the intensity of social tie formation and dissolution across different age groups. First, I demonstrate that although degree is a decreasing function of age both in young adulthood and in old age, in the middle adulthood it is at least flat if not slightly increasing. A similar age profile is found also for net social tie formation. Second, I confirm that family networks are stable in size from adolescence to old age, compared to acquaintances from work and other acquaintances. Third, I shed new light on the generally inconclusive relation between being married and social network size: I find that the effect is neutral for men but definitely negative for women. Fourth, by using nonlinear Generalized Additive Models (GAM) in the current paper, I am able to study age differences with greater scrutiny than before. While Wrzus et al. (2013) focused almost exclusively on data for two age groups, young and old, I estimate full age profiles for people aged 15 to 75.

However, interpreting the current results as life course effects requires caution: because the data are cross-sectional, identified differences between age groups can also reflect cohort effects, not necessarily developmental changes that come with age (Fung, 2013). Generation or cohort specificity can emerge as a by-product of a specific historical and economic situation in which people lived their formative years, that is, principally the schooling period.

Researchers have also pointed at the importance of the phase of the business cycle during which people first entered the job market (Duffy, 2021; Elder, 1974): those who entered the job market in times of economic crisis, inflation and unemployment, will be on average more focused on instrumental goals later in life than people entering job market during a more prosperous period. That said, network size, gender composition and tie duration have been found to be similar across different adult cohorts (Antonucci et al., 2019), allowing to hypothesize that the major part of the identified effects probably represents lifecycle variation rather than cohort effects. However, only longitudinal studies could resolve this ambiguity.

Caution is also needed when generalizing the results to other societies, as there may exist cross-cultural differences in, e.g., network size or socioemotional ageing (Ajrouch et al., 2018; Fung, 2013). Social network dynamics may be sensitive to cross-cultural contexts, warranting that more cross-cultural research on this issue is needed.

Appendix

See Figs. 3, 4, 5.
See Tables 5, 6, 7, 8, 9, 10.
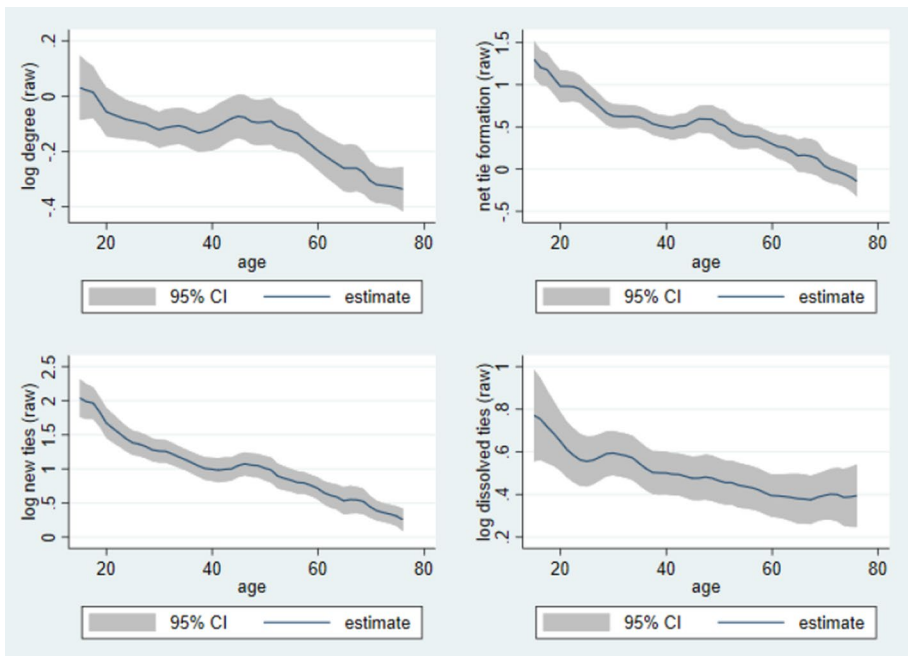
Fig. 3 Age profiles of log degree, net social tie formation, new ties, and dissolved ties. Raw measures without controls
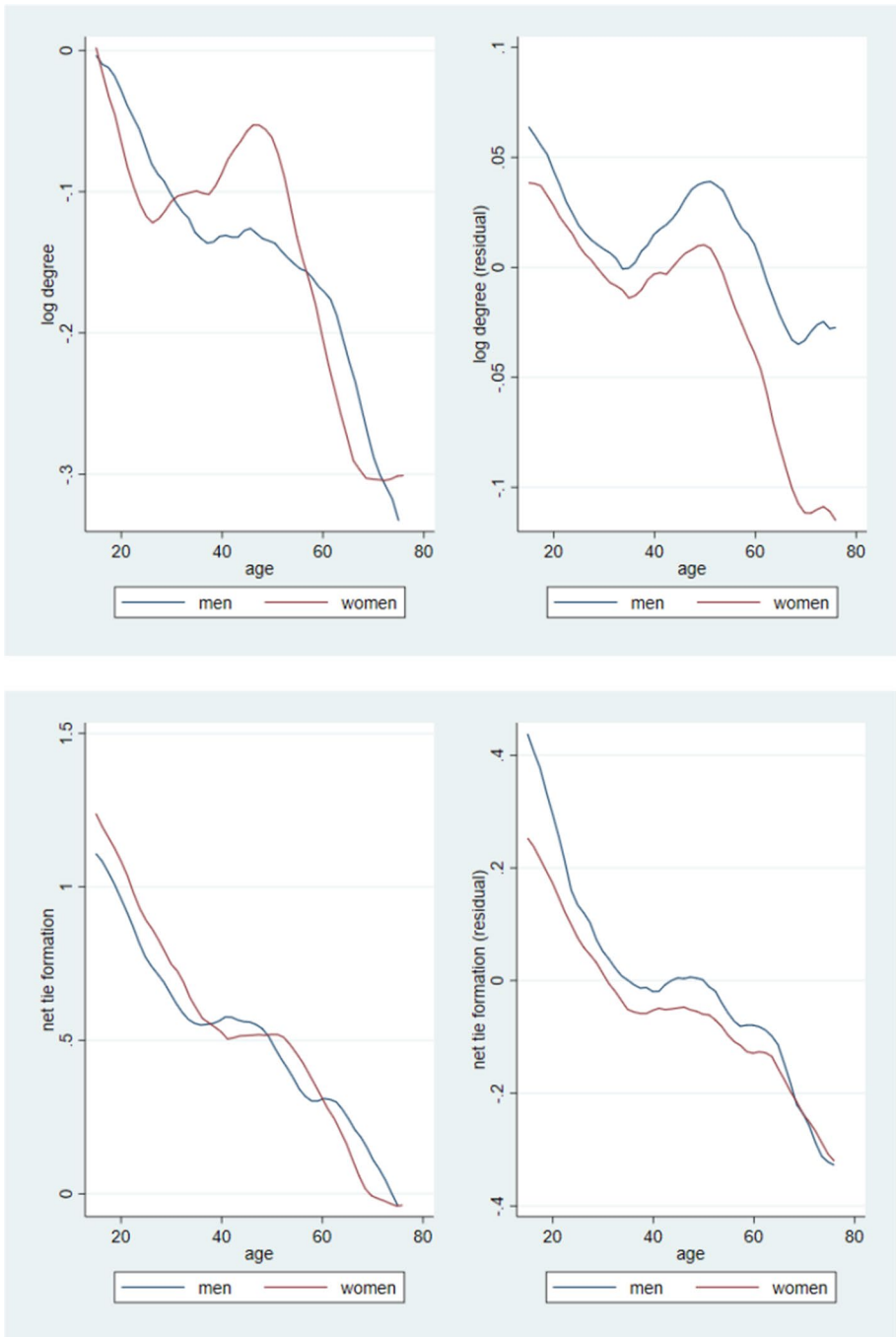
Fig. 4 Age profiles of log degree, net social tie formation, new ties, and dissolved ties. Comparison between men and women

Fig. 4 (continued)

Fig. 5 Age profiles of expressive vs. instrumental motivations for social tie formation and dissolution. Comparison between men and women
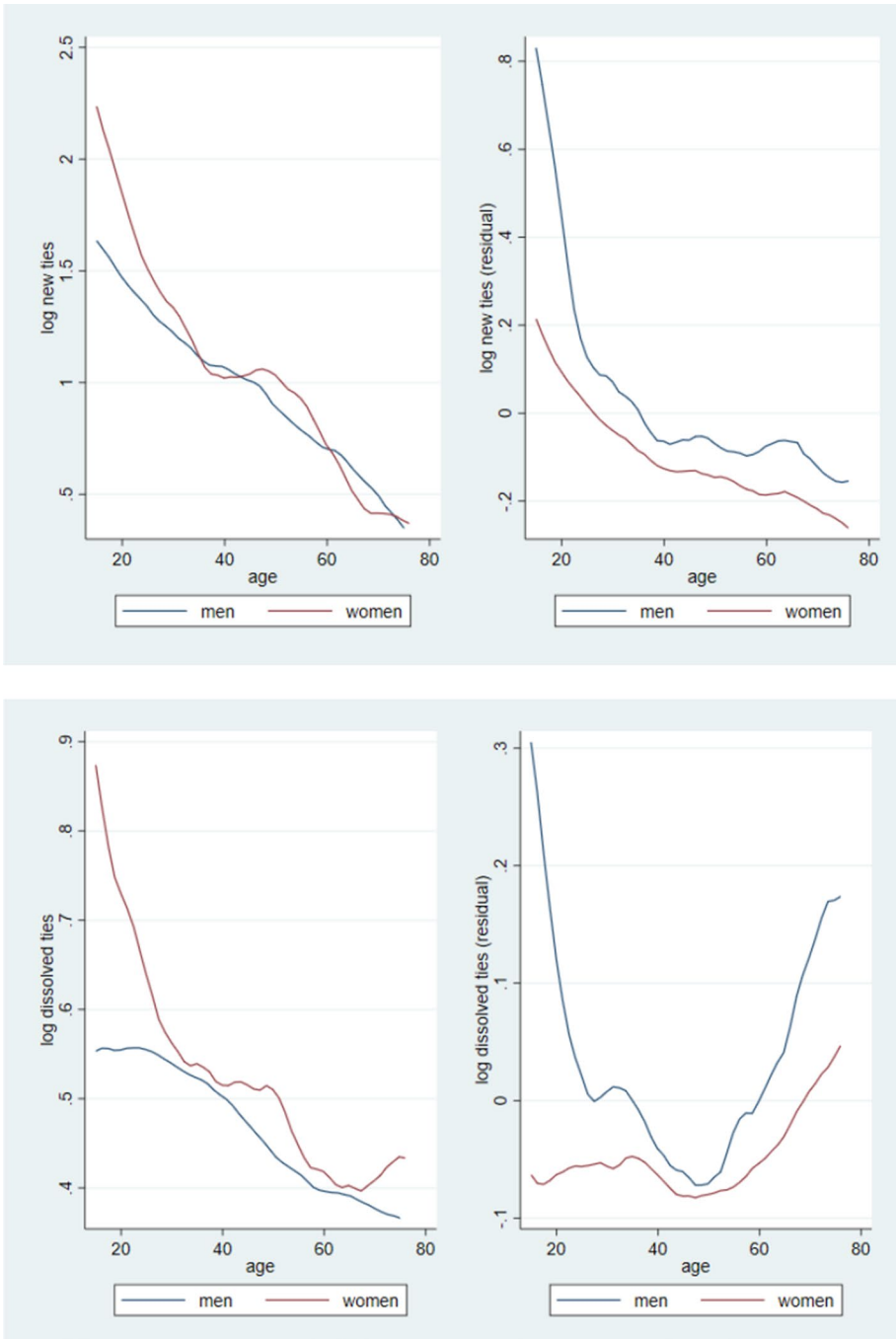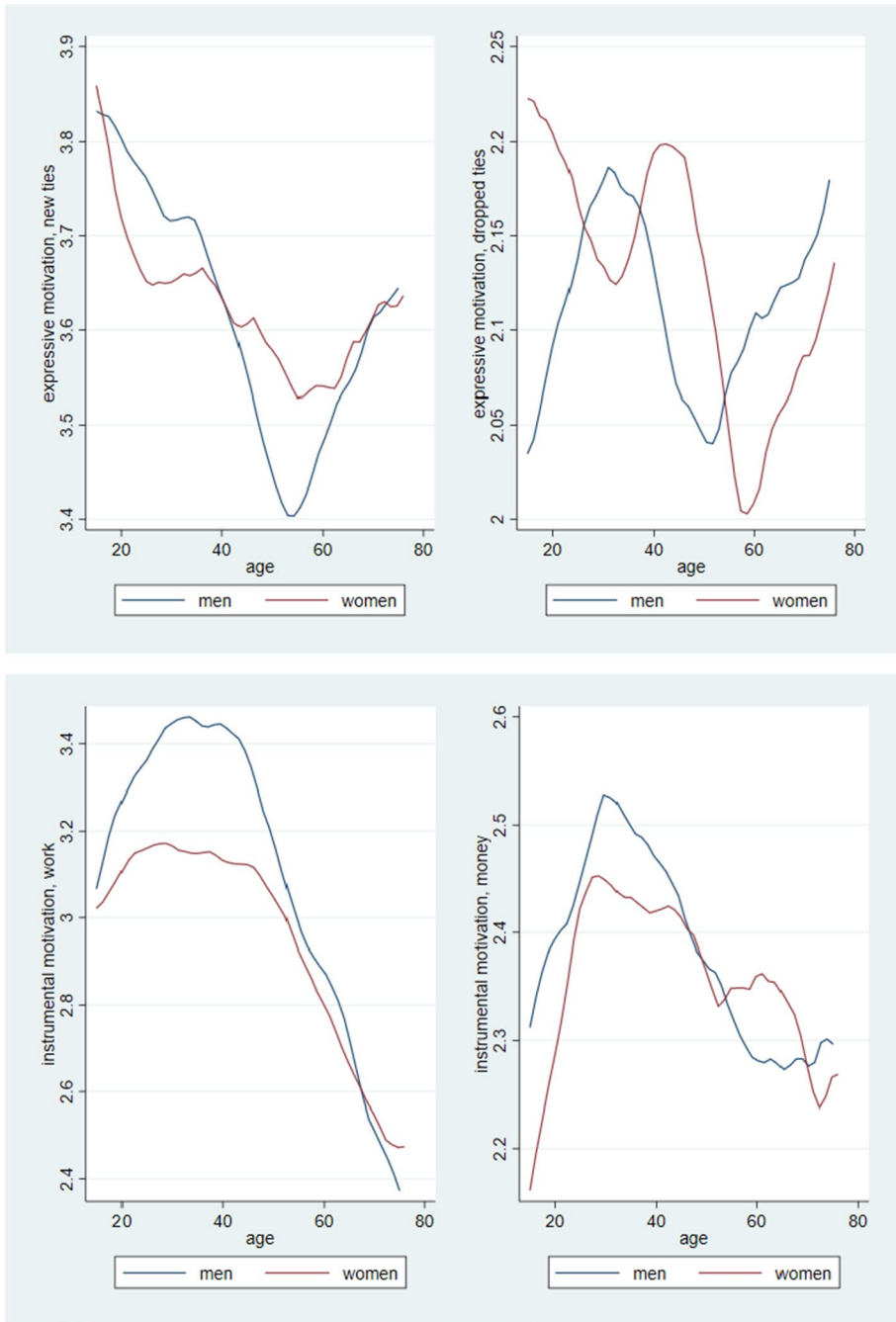
Table 5 Multivariate regression results. Robust correlates of social tie formation and dissolution. Comparison between men and women

Variables	(1) log_NNT Men	(2) log_NNT Women	(3) log_NT Men	(4) log_NT Women	(5) log_DT Men	(6) log_DT Women
lnDegree	0.562***	0.448***	0.955***	0.936***	0.393***	0.488***
	[4.381]	[3.350]	[8.270]	[8.480]	[3.726]	[4.540]
lnBridgeNet	0.285	0.538***	0.782***	0.677***	0.497***	0.139
	[1.455]	[2.965]	[4.059]	[3.848]	[3.234]	[0.954]
Bridging	0.0223	− 0.00882	0.122*	0.0699	0.1000**	0.0787
	[0.344]	[− 0.152]	[1.894]	[1.120]	[2.194]	[1.535]
Trust	− 0.0216	0.0331	0.0371	0.0331	0.0587	− 6.80e− 06
	[− 0.493]	[0.803]	[0.868]	[0.805]	[1.624]	[− 0.000198]
Trust_Net	− 0.106	− 0.0777	− 0.130	− 0.161	− 0.0242	− 0.0834
	[− 0.884]	[− 0.692]	[− 1.067]	[− 1.562]	[− 0.240]	[− 0.733]
Cooperation	0.0604	0.108	0.00755	0.0427	− 0.0529	− 0.0656
	[0.787]	[1.365]	[0.0846]	[0.540]	[− 0.789]	[− 0.824]
Coop_Net	− 0.0148	0.0508	0.200	0.188	0.215**	0.137
	[− 0.120]	[0.390]	[1.635]	[1.543]	[2.433]	[1.084]
Sociability	0.170**	− 9.82e− 05	0.0875	− 0.0682	− 0.0823	− 0.0681
	[2.575]	[− 0.00167]	[1.251]	[− 1.116]	[− 1.343]	[− 1.220]
Pos_Affect	− 0.00886	0.117	− 0.276	− 0.115	− 0.268*	− 0.232*
	[− 0.0498]	[0.778]	[− 1.604]	[− 0.715]	[− 1.849]	[− 1.661]
Education	0.0730	− 0.0306	0.202***	− 0.0235	0.129***	0.00710
	[1.273]	[− 0.584]	[3.730]	[− 0.449]	[2.880]	[0.161]
Age	− 0.0181	− 0.0309*	− 0.0330*	− 0.0635***	− 0.0148	− 0.0326**
	[− 1.165]	[− 1.942]	[− 1.937]	[− 4.005]	[− 1.148]	[− 2.272]
Age2	6.76e− 05	0.000185	0.000236	0.000513***	0.000168	0.000328**
	[0.385]	[1.089]	[1.299]	[2.997]	[1.188]	[2.156]
Married	− 0.0824	− 0.136	− 0.120	− 0.280**	− 0.0378	− 0.144
	[− 0.818]	[− 1.330]	[− 1.090]	[− 2.567]	[− 0.451]	[− 1.647]
Widowed	0.117	− 0.163	− 0.0697	− 0.248	− 0.187	− 0.0849
	[0.660]	[− 1.066]	[− 0.420]	[− 1.533]	[− 1.146]	[− 0.691]
Disabled	− 0.0247	0.194	− 0.0468	− 0.0398	− 0.0221	− 0.234
	[− 0.123]	[0.693]	[− 0.214]	[− 0.152]	[− 0.135]	[− 1.346]
Ill	0.124	0.226	0.0119	0.0535	− 0.112	− 0.172
	[0.676]	[1.321]	[0.0646]	[0.359]	[− 0.698]	[− 1.149]
Income_Rel	− 0.00536	− 0.0654	− 0.116*	0.0700	− 0.111**	0.135***
	[− 0.0903]	[− 1.235]	[− 1.905]	[1.369]	[− 2.029]	[3.179]
Constant	0.176	− 0.511	0.755	2.450***	0.579	2.961***
	[0.270]	[− 0.661]	[1.098]	[3.015]	[1.051]	[4.651]
Observations	462	488	462	488	462	488
R-squared	0.216	0.217	0.376	0.409	0.148	0.176
Adjusted R-sq	0.186	0.188	0.352	0.388	0.115	0.147

Robust t-statistics in brackets

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6 Correlates of social tie formation and dissolution, including expressive vs. instrumental motives. Comparison between men and women

Variables	(1) log_NT Men	(2) log_NT Women	(3) log_DT Men	(4) log_DT Women
lnDegree	0.926***	0.933***	0.391***	0.499***
	[8.186]	[7.988]	[3.690]	[4.669]
lnBridgeNet	0.502**	0.494***	0.421***	0.0459
	[2.410]	[2.742]	[2.618]	[0.314]
Bridging	0.103	0.0449	0.0857*	0.0714
	[1.583]	[0.733]	[1.848]	[1.393]
Trust	0.0264	0.0185	0.0467	− 0.00925
	[0.615]	[0.464]	[1.287]	[− 0.266]
Trust_Net	− 0.133	− 0.183*	− 0.0476	− 0.104
	[− 1.099]	[− 1.740]	[− 0.473]	[− 0.913]
Cooperation	− 0.00264	0.0446	− 0.0394	− 0.0522
	[− 0.0304]	[0.571]	[− 0.584]	[− 0.662]
Coop_Net	0.201	0.177	0.202**	0.102
	[1.628]	[1.417]	[2.308]	[0.834]
Sociability	0.108	− 0.101	− 0.0645	− 0.0549
	[1.533]	[− 1.620]	[− 1.012]	[− 0.972]
Pos_Affect	− 0.303*	− 0.107	− 0.204	− 0.130
	[− 1.750]	[− 0.665]	[− 1.399]	[− 0.908]
Education	0.188***	− 0.0338	0.117***	0.00804
	[3.490]	[− 0.652]	[2.597]	[0.182]
Age	− 0.0337**	− 0.0604***	− 0.0127	− 0.0301**
	[− 1.971]	[− 3.849]	[− 1.010]	[− 2.131]
Age2	0.000269	0.000483***	0.000142	0.000301**
	[1.467]	[2.849]	[1.030]	[2.000]
Married	− 0.129	− 0.262**	− 0.0381	− 0.146*
	[− 1.182]	[− 2.413]	[− 0.461]	[− 1.691]
Widowed	− 0.0914	− 0.266*	− 0.184	− 0.0988
	[− 0.541]	[− 1.657]	[− 1.124]	[− 0.799]
Disabled	0.0255	− 0.0801	0.000259	− 0.262
	[0.114]	[− 0.322]	[0.00155]	[− 1.449]
Ill	0.00496	0.0499	− 0.119	− 0.178
	[0.0266]	[0.352]	[− 0.718]	[− 1.142]
Income_Rel	− 0.105*	0.0619	− 0.0992*	0.125***
	[− 1.766]	[1.207]	[− 1.844]	[2.950]
P11_1	0.000950	0.158***		
	[0.0142]	[3.212]		
P11_2	0.0825*	0.0139		
	[1.679]	[0.318]		
P11_5	0.0213	0.0569		
	[0.337]	[1.160]		

Table 6 (continued)

Variables	(1)	(2)	(3)	(4)
	log_NT	log_NT	log_DT	log_DT
	Men	Women	Men	Women
P12_4	0.105**	− 0.0342		
	[2.325]	[− 0.850]		
P19_5	− 0.0240	0.0674		
	[− 0.488]	[1.524]		
P17_01			0.102***	0.112***
			[2.591]	[2.822]
Constant	0.470	2.164***	0.256	2.603***
	[0.693]	[2.641]	[0.466]	[3.970]
Observations	462	488	462	488
R-squared	0.392	0.432	0.162	0.193
Adjusted R-squared	0.362	0.405	0.128	0.162

Robust $t-$statistics in brackets, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

P11_1 – "Contacting these people gives me pleasure, brings me in a good mood"

P11_2 – "Contacting these people may help me in my work−related issues"

P11_5 – "Contacting these people may help me forge contacts with someone else."

P12_4 – "Forging new contacts is the easier, the greater is the number of people with whom you have already known because it provides more opportunities for common contacts."

P19_5 – "keeping contacts with your acquaintances if financially beneficial for you"

P17_01 – "Contact with these persons ceased to please me, started to bring me in a bad mood"

Table 7 Correlates of social tie formation and dissolution. Comparison across three age groups

Variables	(1) log_NNT	(2) log_NNT	(3) log_NNT	(4) log_NT	(5) log_NT	(6) log_NT	(7) log_DT	(8) log_DT	(9) log_DT
Age group	15–34	35–54	55–75	15–34	35–54	55–75	15–34	35–54	55–75
InDegree	0.503***	0.544***	0.416*	1.071***	0.815***	0.961***	0.568***	0.271***	0.542***
	[4.138]	[3.622]	[1.863]	[9.315]	[6.093]	[5.475]	[4.894]	[2.722]	[3.073]
InBridgeNet	0.392*	0.471**	0.659***	0.633**	1.077***	0.689***	0.241	0.606***	0.0749
	[1.655]	[1.990]	[2.616]	[2.552]	[4.455]	[3.343]	[1.191]	[3.008]	[0.413]
Bridging	– 0.109	0.104	0.0211	– 0.0255	0.195***	0.106	0.0836	0.0905	0.0854
	[– 1.477]	[1.466]	[0.268]	[– 0.311]	[2.632]	[1.585]	[1.363]	[1.615]	[1.308]
Trust	– 0.0613	0.0616	0.0140	0.0183	0.0340	0.0521	0.0796*	– 0.0277	0.0262
	[– 1.226]	[1.256]	[0.245]	[0.338]	[0.704]	[1.003]	[1.695]	[– 0.643]	[0.598]
Trust_Net	0.0916	– 0.118	– 0.141	– 0.0685	– 0.158	– 0.171	– 0.160	– 0.0406	– 0.0125
	[0.618]	[– 0.866]	[– 1.127]	[– 0.473]	[– 1.134]	[– 1.407]	[– 1.026]	[– 0.329]	[– 0.108]
Cooperation	0.125	0.00513	0.111	0.115	– 0.0167	– 0.0173	– 0.00961	– 0.0219	– 0.130
	[1.269]	[0.0604]	[1.165]	[0.975]	[– 0.183]	[– 0.176]	[– 0.0946]	[– 0.251]	[– 1.459]
Coop_Net	– 0.160	0.102	0.187	0.116	0.309**	0.250**	0.276	0.207*	0.0547
	[– 0.890]	[0.706]	[1.553]	[0.623]	[2.168]	[2.106]	[1.628]	[1.710]	[0.555]
Sociability	0.248***	0.0783	– 0.135*	0.142	0.00866	– 0.117	– 0.106	– 0.0697	0.0169
	[3.714]	[0.969]	[– 1.737]	[1.481]	[0.123]	[– 1.564]	[– 1.350]	[– 0.865]	[0.280]
Pos_Affect	0.0751	– 0.00255	– 0.0643	– 0.166	– 0.336	– 0.202	– 0.241	– 0.333*	– 0.182
	[0.374]	[– 0.0117]	[– 0.376]	[– 0.761]	[– 1.544]	[– 1.094]	[– 1.263]	[– 1.848]	[– 1.095]
Education	– 0.102*	0.149**	0.0309	– 0.0745	0.257***	0.0589	0.0279	0.108**	0.0360
	[– 1.913]	[2.065]	[0.401]	[– 1.274]	[3.737]	[0.878]	[0.496]	[2.011]	[0.670]
Female	0.155	– 0.104	0.0367	0.333***	– 0.0750	0.111	0.178*	0.0285	0.0668
	[1.557]	[– 1.019]	[0.359]	[3.136]	[– 0.779]	[1.081]	[1.776]	[0.332]	[0.804]
Married	– 0.373***	– 0.00933	– 0.0480	– 0.602***	– 0.0474	– 0.269	– 0.230**	– 0.0381	– 0.179
	[– 3.224]	[– 0.0841]	[– 0.277]	[– 5.146]	[– 0.418]	[– 1.421]	[– 2.284]	[– 0.416]	[– 1.267]

Table 7 (continued)

Variables	(1) log_NNT	(2) log_NNT	(3) log_NNT	(4) log_NT	(5) log_NT	(6) log_NT	(7) log_DT	(8) log_DT	(9) log_DT
Widowed		-0.0795	-0.136		0.176	-0.311		0.256	-0.149
		[-0.258]	[-0.784]		[0.571]	[-1.624]		[1.022]	[-1.002]
Disabled	-0.395	0.0687	0.0653	0.148	-0.258	-0.0104	0.544	-0.327*	-0.0685
	[-0.855]	[0.173]	[0.319]	[0.267]	[-0.693]	[-0.0545]	[0.960]	[-1.837]	[-0.428]
Ill	0.782	0.317	0.0395	-0.376	0.478*	-0.0346	-1.158**	0.161	-0.0790
	[1.610]	[1.076]	[0.273]	[-0.601]	[1.756]	[-0.274]	[-2.276]	[0.916]	[-0.639]
Income_Rel	0.0152	-0.110*	-0.0202	0.0528	-0.113*	-0.0214	0.0376	-0.00263	0.0246
	[0.231]	[-1.657]	[-0.279]	[0.704]	[-1.755]	[-0.304]	[0.548]	[-0.0430]	[0.434]
Constant	-1.127*	-1.708**	-0.585	0.628	-1.088	0.623	1.755**	0.619	1.323**
	[-1.799]	[-2.150]	[-0.946]	[0.811]	[-1.509]	[0.976]	[2.102]	[1.155]	[2.228]
Observations	346	328	276	346	328	262	346	328	262
R-squared	0.189	0.181	0.118	0.315	0.344	0.334	0.170	0.125	0.184
Adjusted R-squared	0.153	0.139	0.0634	0.283	0.310	0.291	0.132	0.0795	0.131

Robust t-statistics in brackets

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 8 Correlates of social tie formation and dissolution, including expressive vs. instrumental motivations. Comparison across three age groups. Full version of Table 4

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	log_NT	log_NT	log_NT	log_DT	log_DT	log_DT
	15–34	35–54	55–75	15–34	35–54	55–75
lnDegree	1.055***	0.814***	0.939***	0.566***	0.277***	0.543***
	[9.257]	[5.765]	[5.489]	[5.053]	[2.794]	[3.031]
lnBridgeNet	0.438	0.894***	0.502**	0.183	0.513**	0.0227
	[1.621]	[3.448]	[2.420]	[0.919]	[2.434]	[0.122]
Bridging	− 0.0280	0.173**	0.0719	0.0511	0.0813	0.0857
	[− 0.338]	[2.327]	[1.086]	[0.837]	[1.442]	[1.314]
Trust	0.00959	0.0229	0.0439	0.0627	− 0.0388	0.0199
	[0.174]	[0.453]	[0.864]	[1.352]	[− 0.897]	[0.444]
Trust_Net	− 0.109	− 0.180	− 0.172	− 0.219	− 0.0641	− 0.0161
	[− 0.717]	[− 1.327]	[− 1.425]	[− 1.406]	[− 0.518]	[− 0.141]
Cooperation	0.110	− 0.0223	− 0.0314	0.0188	− 0.00520	− 0.134
	[0.938]	[− 0.242]	[− 0.337]	[0.188]	[− 0.0590]	[− 1.517]
Coop_Net	0.130	0.235	0.204*	0.223	0.206*	0.0311
	[0.676]	[1.633]	[1.711]	[1.367]	[1.724]	[0.316]
Sociability	0.154	− 0.00108	− 0.115	− 0.103	− 0.0440	0.0269
	[1.447]	[− 0.0153]	[− 1.538]	[− 1.292]	[− 0.523]	[0.442]
Pos_Affect	− 0.149	− 0.297	− 0.184	− 0.0773	− 0.282	− 0.120
	[− 0.666]	[− 1.453]	[− 0.994]	[− 0.400]	[− 1.524]	[− 0.696]
Education	− 0.0819	0.233***	0.0710	0.0307	0.0942*	0.0330
	[− 1.386]	[3.343]	[1.074]	[0.559]	[1.736]	[0.604]
Female	0.342***	− 0.0620	0.104	0.162*	0.0144	0.0679
	[3.219]	[− 0.628]	[0.992]	[1.657]	[0.169]	[0.819]
Married	− 0.601***	0.00416	− 0.274	− 0.245**	− 0.0367	− 0.177
	[− 5.138]	[0.0366]	[− 1.453]	[− 2.474]	[− 0.404]	[− 1.266]
Widowed		0.213	− 0.312		0.262	− 0.157
		[0.705]	[− 1.628]		[1.016]	[− 1.061]
Disabled	0.132	− 0.300	0.0279	0.630	− 0.350**	− 0.0621
	[0.232]	[− 0.880]	[0.146]	[0.938]	[− 2.010]	[− 0.383]
Ill	− 0.308	0.476*	− 0.0444	− 1.183**	0.174	− 0.0834
	[− 0.485]	[1.926]	[− 0.345]	[− 2.054]	[1.004]	[− 0.666]
Income_Rel	0.0595	− 0.111*	− 0.0238	0.0410	0.00121	0.0246
	[0.778]	[− 1.702]	[− 0.351]	[0.632]	[0.0196]	[0.439]
P11_1	0.0181	0.140**	0.0615			
	[0.186]	[2.078]	[1.198]			
P11_2	0.0948	− 0.0731	0.0420			
	[1.586]	[− 1.109]	[0.881]			
P11_5	− 0.0345	0.125*	0.0465			
	[− 0.477]	[1.817]	[0.793]			
P12_4	0.0498	− 0.000403	0.0695			
	[0.861]	[− 0.00743]	[1.485]			

Table 8 (continued)

Variables	(1) log_NT 15–34	(2) log_NT 35–54	(3) log_NT 55–75	(4) log_DT 15–34	(5) log_DT 35–54	(6) log_DT 55–75
P19_5	0.00697	0.104*	0.0111			
	[0.119]	[1.949]	[0.198]			
P17_01				0.187***	0.0980**	0.0651
				[3.557]	[2.412]	[1.196]
Constant	0.347	− 1.357*	0.307	1.138	0.381	1.099*
	[0.434]	[− 1.836]	[0.473]	[1.215]	[0.692]	[1.830]
Observations	346	328	262	346	328	262
R-squared	0.323	0.375	0.360	0.206	0.140	0.191
Adjusted R-squared	0.281	0.332	0.304	0.168	0.0930	0.134

Robust t−statistics in brackets, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

P11_1 – "Contacting these people gives me pleasure, brings me in a good mood"

P11_2 – "Contacting these people may help me in my work−related issues"

P11_5 – "Contacting these people may help me forge contacts with someone else."

P12_4 – "Forging new contacts is the easier, the greater is the number of people with whom you have already known because it provides more opportunities for common contacts."

P19_5 – "keeping contacts with your acquaintances if financially beneficial for you"

P17_01 – "Contact with these persons ceased to please me, started to bring me in a bad mood"

Table 9 Correlates of degree, broken down between acquaintances from family, work, and other acquaintances

VARIABLES	(1) lnDegree	(2) lnDeg (family)	(3) lnDeg (work)	(4) lnDeg (other)
lnBridgeNet	0.166***	−0.152	0.557***	0.321*
	[2.584]	[−0.899]	[3.530]	[1.829]
Bridging	0.143***	0.148***	0.141***	0.246***
	[6.403]	[2.847]	[2.867]	[4.665]
Trust	0.0210	0.0244	0.00537	−0.0184
	[1.489]	[0.716]	[0.159]	[−0.503]
Trust_Net	−0.100***	−0.482***	−0.0872	−0.118
	[−2.737]	[−5.382]	[−0.998]	[−1.173]
Cooperation	0.00527	−0.0256	−0.0435	0.0610
	[0.205]	[−0.393]	[−0.673]	[0.931]
Coop_Net	−0.00820	−0.360***	0.179*	0.132
	[−0.227]	[−3.664]	[1.842]	[1.176]
Sociability	0.0577***	0.119**	0.0741	0.110**
	[3.033]	[2.262]	[1.428]	[2.111]
Pos_Affect	0.101*	0.994***	−0.0392	0.165
	[1.892]	[6.818]	[−0.289]	[1.084]
Education	−0.0264	−0.0304	0.189***	−0.0226
	[−1.514]	[−0.712]	[4.834]	[−0.500]
Female	0.0231	0.139**	−0.229***	0.0597
	[0.845]	[1.985]	[−3.346]	[0.833]
Age	0.00326	0.0239*	0.0814***	−0.0251*
	[0.586]	[1.727]	[7.017]	[−1.760]
Age2	−6.52e−05	−0.000259*	−0.000938***	0.000190
	[−1.087]	[−1.717]	[−7.323]	[1.198]
Married	−0.0190	0.0612	0.0502	−0.0972
	[−0.536]	[0.687]	[0.567]	[−1.078]
Widowed	−0.110**	−0.280*	0.162	−0.345**
	[−2.142]	[−1.911]	[1.213]	[−2.119]
Disabled	−0.0111	−0.0262	0.293*	−0.336*
	[−0.178]	[−0.159]	[1.807]	[−1.776]
Ill	0.0218	0.0143	0.0378	0.144
	[0.402]	[0.106]	[0.290]	[0.901]
Income_Rel	0.0134	−0.0260	0.0464	0.0209
	[0.748]	[−0.583]	[1.027]	[0.435]
Constant	−1.012***	−0.788	−2.838***	0.188
	[−4.290]	[−1.382]	[−5.549]	[0.311]
Observations	950	950	950	950
R−squared	0.138	0.094	0.183	0.118
Adjusted R−squared	0.122	0.0771	0.168	0.102

Robust t-statistics in brackets, *** p<0.01, ** p<0.05, * p<0.1

Table 10 Multivariate regression results: robust correlates of social tie creation and dissolution (full version of Table 3)

	(1)	(2)	(3)	(4)	(5)
VARIABLES	log_NNT	log_NT	log_NT	log_DT	log_DT
lnDegree	0.495***	0.942***	0.934***	0.447***	0.451***
	[5.365]	[11.81]	[11.76]	[5.991]	[6.072]
lnBridgeNet	0.434***	0.737***	0.529***	0.303***	0.216**
	[3.216]	[5.639]	[3.856]	[2.857]	[1.985]
Bridging	0.00555	0.0946**	0.0712	0.0890**	0.0771**
	[0.130]	[2.145]	[1.610]	[2.579]	[2.218]
Trust	0.0115	0.0415	0.0278	0.0300	0.0190
	[0.382]	[1.395]	[0.932]	[1.184]	[0.746]
Trust_Net	−0.0833	−0.169**	−0.189**	−0.0854	−0.108
	[−1.020]	[−2.074]	[−2.292]	[−1.107]	[−1.394]
Cooperation	0.0704	0.00535	0.00669	−0.0651	−0.0499
	[1.269]	[0.0880]	[0.111]	[−1.230]	[−0.949]
Coop_Net	0.00456	0.179**	0.162*	0.175**	0.148**
	[0.0503]	[1.976]	[1.750]	[2.316]	[2.007]
Sociability	0.0747*	0.00783	0.00301	−0.0669	−0.0491
	[1.684]	[0.164]	[0.0614]	[−1.581]	[−1.125]
Pos_Affect	0.0757	−0.148	−0.149	−0.224**	−0.135
	[0.655]	[−1.203]	[−1.214]	[−2.206]	[−1.306]
Education	0.0168	0.0777**	0.0701*	0.0609*	0.0546*
	[0.435]	[2.064]	[1.873]	[1.917]	[1.710]
Female	0.0238	0.111*	0.125**	0.0868*	0.0785
	[0.404]	[1.868]	[2.109]	[1.668]	[1.522]
Age	−0.0257**	−0.0503***	−0.0480***	−0.0246**	−0.0221**
	[−2.302]	[−4.343]	[−4.137]	[−2.570]	[−2.352]
Age2	0.000144	0.000402***	0.000390***	0.000258**	0.000229**
	[1.175]	[3.243]	[3.155]	[2.495]	[2.249]
Married	−0.111	−0.198**	−0.193**	−0.0865	−0.0884
	[−1.548]	[−2.540]	[−2.500]	[−1.434]	[−1.483]
Widowed	−0.102	−0.190	−0.203*	−0.0880	−0.0935
	[−0.860]	[−1.618]	[−1.758]	[−0.895]	[−0.947]
Disabled	0.0612	−0.0439	−0.0250	−0.105	−0.104
	[0.361]	[−0.267]	[−0.154]	[−0.887]	[−0.850]
Ill	0.181	0.0102	0.0119	−0.171	−0.172
	[1.448]	[0.0868]	[0.103]	[−1.519]	[−1.467]
Income_Rel	−0.0420	−0.0179	−0.0201	0.0241	0.0244
	[−1.060]	[−0.449]	[−0.514]	[0.686]	[0.704]
P11_1			0.0787*		
			[1.937]		
P11_2			0.0480		
			[1.436]		
P11_5			0.0379		
			[0.978]		
P12_4			0.0404		

Table 10 (continued)

	(1)	(2)	(3)	(4)	(5)
			[1.333]		
P19_5			0.0262		
			[0.778]		
P17_01					0.115***
					[4.042]
Constant	−0.154	1.535***	1.161**	1.689***	1.307***
	[−0.321]	[3.032]	[2.277]	[4.123]	[3.147]
Observations	950	950	950	950	950
R-squared	0.202	0.371	0.384	0.140	0.158
Adjusted R-sq	0.186	0.359	0.369	0.124	0.141

Robust t-statistics in brackets, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

P11_1 – "Contacting these people gives me pleasure, brings me in a good mood"

P11_2 – "Contacting these people may help me in my work-related issues"

P11_5 – "Contacting these people may help me forge contacts with someone else."

P12_4 – "Forging new contacts is the easier, the greater is the number of people with whom you have already known because it provides more opportunities for common contacts."

P19_5 – "Keeping contacts with your acquaintances if financially beneficial for you"

P17_01 – "Contact with these persons ceased to please me, started to bring me in a bad mood"

Declarations

Conflict of interest No conflict of interests has been declared.

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