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Whom do we lose? The case of dissimilarity in personal networks

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ABSTRACT

Previous research finds that individuals tend to form ties with similar others much more often than with dissimilar others. However, we know relatively little about tie loss and to what extent this is driven by (dis)similarity. In this paper, we argue that ties to persons who are dissimilar with regard to gender, age, ethnicity, and education are lost faster than ties to similar persons – and we test three explanations for this faster decay of ties with dissimilar others: lack of meeting opportunities, preferences for similarity, and lower network embeddedness. To test these explanations, we analysed two waves of the *Survey on the Social Networks of the Dutch* (*SSND*, 2007, 2014). These *SSND*-waves contain comprehensive longitudinal panel data on ego networks of 441 respondents, who were interviewed about a wide range of relationships, their alters' sociodemographic characteristics, where and when they met their alters, as well as how and whether they maintain these relationships. We modelled tie loss by event history analyses. Results show that ties to persons who were dissimilar are more likely to be lost faster, and that tie loss occurs mostly in the early years of a relationship. However, meeting opportunities, preferences for similarity, and network embeddedness are unable to explain why ties to dissimilar others are lost faster. We conclude that dissimilarity is a powerful driver of tie loss, and that more arguments and research are needed to fully understand the underlying mechanisms.

Introduction

Social relationships come and go, and they do so in non-random ways. A central feature that structures the "coming" of social relationships is similarity in terms of relevant social characteristics, such as gender, age and ethnicity (McPherson et al., 2001; Marsden, 1987). Much less is known about the "going" of social relationships and the role that dissimilarity might play in this regard. Many ties are not created to last forever. If poorly maintained they are lost over time (Burt, 2002; Kleinbaum, 2017), and many social relationships dissipate within the course of a few years (Mollenhorst et al., 2014). What is not fully clear is to what extent this loss is also governed by mechanisms related to dissimilarity. Our research question for this paper therefore reads: What are the effects of dissimilarity on tie loss?

In the existing literature, the most detailed account of the link between dissimilarity and tie loss stems from studies on divorce. This work shows that partners who are dissimilar, for example in terms of ethnicity, are more likely to get divorced (Smith et al., 2012). The divorce literature provides three relevant arguments for explaining relational disruption because of dissimilarity: restricted number of shared activities, limited ability of understanding each other, and opposition of third parties in the network (Kalmijn, 1998). These three arguments can also be applied to tie loss of non-kin, albeit in a modified way. Shared activities translate to the broader idea of *meeting opportunities:* dissimilar network members are met at fewer opportunities, which hampers tie maintenance and might result in tie loss. The argument that dissimilar partners are less well-equipped to understand each other aligns with the literature on *preferences for similarity*. Individuals prefer similarity because it makes interactions smooth and rewarding (Homans, 1950; Kandel, 1978; Marks, 1994; McPherson et al., 2001), which enhances the feeling of being understood. Finally, the argument that third parties sanction choices for dissimilar others translates to *network embeddedness.* Dissimilar alters might have fewer indirect connections that tie them to ego.

We focus on two important types of non-kin social ties in adult personal networks: confidants and practical helpers. These ties cover different aspects of the network. Confidants are network members whom individuals turn to when they have a need to discuss important personal matters, and these are typically stronger ties of high trust. Practical helpers are network members whom individuals turn to when

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they need help with practical matters, like odd jobs in or around the house; they are typically weaker and made up of people who are easily available for practical help, like neighbors. We investigate whether these types of ties are lost *faster* when they are dissimilar in gender, age, ethnicity, and education, while considering tie loss as a process that occurs over time – the 'life' of a social tie from the moment the tie is formed till the moment it is lost. We test three explanatory arguments for a faster loss of ties to dissimilar others as compared to ties to similar others, i.e. meeting opportunities, preferences for similarity, and network embeddedness. Furthermore, we argue that the process of tie loss is dynamic and will become slower over time. A tie that has existed for long will probably last. This might hold in particular for ties to dissimilar others as the hurdles that cause their loss have been overcome through the years.

Theory and hypotheses

Our basic argument is that in general every tie a person has can be lost but that ties to dissimilar others are lost *faster* because their maintenance is more difficult than the maintenance of ties to similar others. Hereafter, we first briefly address existing seminal literature on tie dissolution and discuss hurdles for tie maintenance. Next, we argue that in the long run several of the initial hurdles may be overcome, which decreases the costs of tie maintenance.

Who is dropped by whom?

Interestingly, the studies that systematically inquire into the loss of social ties showed that although network members come and go, the composition of a network remains largely unchanged (Fischer and Offer, 2020; Mollenhorst et al., 2014). Furthermore, Fischer and Offer (2020) demonstrated that in particular ties that are non-kin or that do not involve particular exchanges (advice, companionship etc) are more likely to be dropped than other ties. Mollenhorst et al. (2014) established a path dependency in meeting places – ties in particular meeting places affect network dynamics – and showed that tie maintenance is moderated by such meeting places, e.g., the work context hampers maintenance, while the neighborhood context promotes stability. Importantly, in both studies, life events as well as other characteristics of an actor showed only little importance for explaining tie loss. This is also confirmed in the study by Marin and Hampton (2019), who focussed on dormant ties and underlined the importance of emotional and/or geographical closeness as well as similarity of ties for remaining active. Direct evidence for the importance of similarity has also been provided by Mollica et al. (2003) who found that (racially) heterogeneous friendships were less likely to persist than homogeneous ones. Further, Wellman et al. (1997) stressed that being kin or in a supportive relationship promotes tie stability. In this latter study, it was also found that turnover at the alter level (in a ten-year period) is about 70 % (Degenne and Lebeaux, 2005; McPherson et al., 2006; Mollenhorst et al., 2014; Shulman, 1975).

In a nutshell, the importance of meeting opportunities for tie maintenance was emphasized by all studies (see e.g. Feld (1997) for relevant theoretical arguments, see Small et al. (2015); see Rivera et al. (2010) for a general overview of arguments about opportunities and similarity preferences), next to the fact that people forget to mention alters in a second wave of measurement (see the series of studies by Russel et al., 1979.[1] Apart from this, the preference for similarity seems to be key for tie maintenance. Suitor and Keeton (1997), however, argue that it is not homophily per se that structures personal networks, but its salience for particular network functions. Also, Wimmer and Lewis (2010) demonstrate that not only homophily explains network homogeneity but also the tendency to reciprocate friendship as well as to befriend friends of friends. Morgan et al. (1997) reveal that the probability of being renamed depends on the typical core-periphery structure of ties in a network. Importantly, they argue that researchers have to take leave of the idea that it is possible to capture '*the*' network – networks are dynamic by nature and change is a substantive rather than a methodological problem.

Hurdles to tie-maintenance

From a resource theory perspective, losing a tie implies a potential loss of social capital. Therefore, it can be assumed that people actually hesitate to finally break a relationship. Only the restrictions for tie maintenance force people to make choices – to intensify ties to some network members, while letting others go. In the following we discuss in more detail the hurdles that have to be taken for tie maintenance.

While we are interested in the processes that are at play when ties have already formed, we argue that hurdles that were already present at the start of the relationship penetrate into the stage of tie maintenance and make it more difficult to nurture ties with dissimilar others. The three principles – meeting opportunities, preferences for similarity, and network embeddedness – constitute the general arguments on what makes it difficult to maintain a tie. We discuss these consecutively.

Meeting opportunities

A central finding in the literature on the homogeneity in personal networks is that the composition of meeting places provides contact opportunities, primarily with similar others (McPherson et al., 2001; McPherson and Smith-Lovin, 1987; Verbrugge, 1977). While this argument is typically applied to the stage of tie formation, it is also very applicable to the stage of tie maintenance. Once dissimilar alters have entered the network, keeping them in the network remains difficult because the interaction partners need to put more effort to create opportunities to meet each other. Social ties are at a constant risk of withering away if the contact is not renewed (Burt, 2002; Kleinbaum, 2017) and meeting opportunities help to maintain a relationship, once it is established (Mollenhorst et al., 2014). Importantly, the social environment tends to provide fewer contact opportunities for dissimilar others (McPherson, 2004), in other words, tie maintenance for dissimilar network members is harder (Stauder, 2014), because they are less likely to engage in shared foci of activities (Feld, 1981) due to their differences in tastes and preferences (Kalmijn, 1998). We expect this to hold even after meaningful ties have been established.

Preferences for similarity

While meeting opportunities constrain who is available for tie creation and maintenance, the homophily literature shows that individuals make decisions according to their preferences for similar alters (Fischer, 1982; McPherson and Smith-Lovin, 1987). Individuals choose with whom to strike up a conversation, whom to invite to their birthdays, and to whom they lend an empathic ear. The observation that social networks tend to be more homogeneous than the contexts from which social ties are selected has led to the conclusion that individuals prefer similar others (McPherson et al., 2001).

While this logic is often applied to the phase of tie formation, it straightforwardly applies also to tie maintenance. Preferences for similarity play a role not only when people first befriend others, but also when they choose which friends to seek out for staying in contact. When they need someone to confide in, individuals choose those who are most likely to offer empathy, which tend to be individuals who have undergone similar experiences (Small, 2017). This might explain why bonds with similar others tend to be stronger and higher in trust than bonds with dissimilar others (Putnam, 2000). The point here is not that dissimilar others are absent in the network, but that these relationships are nurtured to a lesser degree, despite their presence.

[1] The fact that we cannot be sure whether alters are already forgotten in the first wave constitutes a serious complication of the study of network dynamics.

Structural embeddedness in social networks

Another obstacle to the maintenance of ties to dissimilar others is that these network members tend to be less well-embedded in existing networks (Granovetter, 1973; Louch, 2000; Mollenhorst et al., 2016). A dissimilar alter is less likely to have indirect connections to a focal individual via shared friends. This makes tie maintenance more costly, because tie maintenance requires time and energy and this burden is spread over fewer individuals (Burt, 2002). People by far do not only maintain their ties directly and one-on-one, but they meet in groups, they hear news of one friend via another, and they pass on their regards via shared friends. Accordingly, ties that are well-embedded in one's network have been found to be stronger and more stable over time (Feld, 1997).

Ties to dissimilar others might be less well-embedded because they lack meeting opportunities and because people generally prefer similarity (Mollenhorst et al., 2016). Because of their weaker structural embeddedness in existing networks, relationships with dissimilar others are maintained less actively, which increases their risk of tie loss.

All these theoretical arguments lead to the expectation that ties to dissimilar others are indeed lost more quickly than ties to similar others. While we acknowledge that there are several reasons why ties to dissimilar others are harder to maintain, our first and general hypothesis is that *ties to dissimilar others are lost faster than ties to similar others* (H1).

We furthermore expect that the three hurdles explain the association between dissimilarity and tie loss. Accordingly, the mediation hypothesis reads: *The faster loss of ties to dissimilar others is mediated by meeting opportunities, preferences for similarity, and network embeddedness. (H2)*

Are hurdles for tie-maintenance stable over time?

So far, we have argued that ties to dissimilar others are lost faster than ties to similar others because they face more hurdles for their maintenance. Next, we focus on the extent to which such hurdles still matter in the long run. Social relationships are the most fragile in their early stages, which has been termed the 'liability of newness' (Burt, 2002). New ties are typically not well-embedded in one's social environment, and only as individuals get more acquainted with each other, they gain a better understanding of their liking of the other person, and how valuable and compatible they are.

A lack of meeting opportunities, similarity preferences, and network embeddedness are hurdles that ties to dissimilar others could theoretically face at any stage in the relationship. However, these are also hurdles that ties to dissimilar others might overcome if they manage to stay in the network for a sufficient amount of time. With regard to meeting opportunities, we know that many ties are lost when meeting contexts change (Mollenhorst, et al., 2014). However, those ties that survived initial changes in social contexts will likely have sufficient other shared foci with the focal individual or were valuable enough to be carried over into new social contexts. Individuals also create new foci to jointly meet friends of different social circles (Feld, 1982). In other words, the hurdle of having too few meeting opportunities might be counteracted by the interaction partners; they create their places to meet. Regarding preferences for similarity, we argue that if a to a dissimilar tie has already existed for years, this network member has proven itself as a trustworthy and empathic companion. And regarding network embeddedness, a tie to a dissimilar other that has been in the network for years will likely have had the chance to meet many other network members and has gradually been embedded in the network. Hence, over time, ties to dissimilar others are expected to become less fragile, because they 'catch up' with the stronger network embeddedness of similar others.

Following these considerations, we expect that ties to dissimilar others that have survived the liability of newness, are those ties that managed to overcome the initial hurdles they typically face. If this is true, then we expect that over time the risk of tie loss will converge for ties to similar and dissimilar others. Consequently, our third hypothesis is as follows: *As relationship duration increases, the effects of meeting opportunities, preferences for similarity, and network embeddedness on the pace of tie loss decrease. (H3)*

Below, we test these hypotheses and examine the consequence of tie-dynamics for network homogeneity, thereby inquiring into the previously established finding of stability at the level of networks in spite of dynamics at the alter level.

Table 1
Descriptive statistics of respondents and alters in *SSND 2007*.

	Count	%	Mean	SD
Respondents				
Age	440		55.19	11.42
Gender				
Men	242	.55		
Women	199	.45		
Ethnicity				
Dutch	420	.96		
Turkish	0	0		
Indonesian	5	.01		
Moroccan	0	0		
Surinamese	0	0		
Western migrant	8	.02		
Non-Western migrant	2	.005		
Education				
Primary to lower vocational	13	.03		
General secondary to pre-university	131	.30		
Intermediate to higher vocational	113	.26		
University	184	.42		
Work status				
No paid job	174	.40		
Paid job	256	.60		
Number of alters	441		2.64	1.76
Alters				
Age	1102		51.74	12.69
Gender				
Men	773	.67		
Women	378	.33		
Ethnicity				
Dutch	1103	.97		
Turkish	3	.003		
Indonesian	8	.01		
Moroccan	1	.0003		
Surinamese	5	.004		
Western migrant	17	.01		
Non-Western migrant	5	.004		
Education				
Primary to lower vocational	184	.18		
General secondary to pre-university	202	.20		
Intermediate to higher vocational	390	.38		
University	244	.25		
Predictor variables				
Geographical distance				
< 1 km	176	.43		
1–9 km	149	.36		
10–19 km	40	.10		
20–100 km	35	.08		
> 100	14	.03		
No. of meeting opportunities	437		2.28	0.92
Preferences for similarity [a]	291		3.28	0.74
No. of indirect ties	441		1.84	2.62

Note: [a] Correlations between this measure and percentage of similar alters in 2007 are $r = 0.02$ for gender similarity, $r = -0.03$ for age similarity, $r = -0.02$ for ethnic similarity, and $r = .001$ for educational similarity.

Methods

Data

We used waves two and three of the *Survey on the Social Networks of the Dutch* (*SSND*, 2007; 2014), which contain comprehensive panel data on ego networks of Dutch residents. We focus on these two waves because these provide the detailed information about the continuation, respectively the loss of specific relationships that is needed for our

analyses. For the first wave of the *SSND* (collected in 1999/2000), a stratified random sample of 40 was drawn from approximately 500 municipalities in the Netherlands, accounting for the degree of urbanization and number of residents. Within each municipality, a random sample of four neighborhoods was drawn, and 25 addresses within those neighborhoods were randomly selected. Interviews were conducted at 8 of these addresses with the person who was to have his/her birthday next. The response rate was 40 %, which is a typical response rate for survey research in the Netherlands. The initial response rate for wave two (*SSND*, 2007) was 79 %, and the response rate for wave 3 (*SSND*, 2014) was 76 %. For every additional wave of the *SSND* panel data, a refreshment sample was added to account for attrition. The refreshment sample was selected such that new participants were similar with regard to place of residence, gender, and ethnicity. We focus on respondents who participated in both waves ($N = 441$). Table 1 shows descriptive statistics of all respondent characteristics.

Measuring personal networks

Network information was collected in two steps: first, names and functions of network members were obtained using several name generating questions. To delineate the network, we focused on two specific questions, namely "With whom did you discuss important personal matters during the last six months?", capturing the core discussion network (e.g., Burt, 1984; Marsden, 1987, 1988), and "If you are doing an odd job at home and you need someone to give a hand, e.g., to carry furniture or to hold a ladder, whom do you ask for help?", capturing practical helpers. Next, follow-up questions were asked to obtain relational information and characteristics of alters. Because this paper focuses on non-kin ties, we excluded alters who were mentioned as family members or romantic partners.[2]

Characteristics of alters. Alter's gender was measured dichotomously (man, woman) with the question "What is the gender of [name]?", and age was assessed in years in response to the question, "What is the age of [name]?". Ethnicity was measured as the country of birth in seven categories capturing the largest ethnic groups in the Netherlands, namely Dutch, Turkish, Moroccan, Indonesian, Surinamese, other Western migrant, and other non-Western migrant. Alters' educational backgrounds were measured in four categories, namely 'primary education to lower vocational education', 'general secondary education to pre-university education', 'intermediate vocational education to higher vocational training', and 'university degree'. Relationship duration was measured in years as response to the question "For how long have you been knowing [name]?". Table 1 shows descriptive statistics of all alter characteristics.

Outcome variable

Our outcome of interest was *risk of tie loss*, which captured the risk of tie loss for ties to similar versus dissimilar others in any given year that alters were in the network. A tie was regarded as lost if the alter appeared in the *SSND2* but did not reappear in in the *SSND3*. A relationship was regarded as continued if the same alter appeared in both *SSND* waves. If an alter who was a confidant in the *SSND2* reappeared in the *SSND3* in the role of either practical helper or any other role[3], then we considered the relationship as continued. In other words, a tie was considered lost only if the alter did not reappear in response to any of the many name generator questions in the SSND3.

The SSND has a special feature that allowed checking whether alters who did not reappear in the SSND3 were indeed lost from the network or whether respondents did not mention them for other reasons. At the end of the interview in 2014, respondents were presented with a list of confidants and practical helpers whom they had named in 2007 but not in 2014. Respondents were asked why they had not mentioned these alters again. Possible reasons were because respondents had forgotten to mention them, because it was self-evident that they were still important, because the relationship had changed, because they no longer saw them, or other reasons. Respondents were then asked if they still had contact with these alters (yes, no). If respondents reported that they still had contact with these alters, then we considered the relationship to be continued. This was the case for only 15 alters.

Predictor variables

The main predictor variables captured similarity between ego and alter with regard to gender, age, ethnicity, and educational background. If the alter attribute matched the ego attribute (e.g., both alter and ego were women), the alter characteristic was coded as 1, if they differed the characteristic was coded as 0. Similarity in gender, ethnicity, and education were coded in the same way.

We treated similarity with regard to age differently, because age is measured continuously. We considered alters to be similar in terms of age if alter age was within a certain range around ego's age. One problem is that the same absolute age range (e.g., a range of five years) is likely to be experienced differently by people of different ages. For a 20-year old, an age difference of five years likely means that their social ties are in different life stages, while for a 40-year old the same absolute age difference might be experienced as negligible. To solve this problem, we constructed an age range that is relative to ego's age, namely 15 % above or below ego's age. If ego was 20 years old, then alters were considered similar if their age was in the range of 17–23 years, because 15 % of 20 years is 3 years. For a 40-year old ego, this range was 34–46 years, and for an 80-year-old it was 68–92 years. This measure accounted for the fact that the same age difference (in absolute terms) has a different meaning for younger versus older people.

Mediating variables

To explain why dissimilar alters differed from similar alters with regard to tie loss, we included a series of mediator variables (see H2). We included two measures of meeting opportunities, namely *geographical distance* capturing how far alter lived away from ego (< 1 km, $1-9$ km, $10-19$ km, $20-100$ km, > 100 km) as well as the *number of meeting contexts* where ego usually meets alter (home, family, school, work, club/association, via friends, public going-out place, neighborhood, other context). To this end, we summed across all meeting contexts where respondents indicated to typically meet the respective alter.

Preferences for similarity was measured on a 4-item scale asking respondents how important it was that their friends were similar to them regarding gender, age, ethnicity or education (1= very unimportant, 5 = very important; Cronbach's alpha = .72). We obtained this measure by averaging across the 4 items, and report its descriptive statistics as well as its correlations with ego-alter similarity in SSND2 in Table 1.

Structural network embeddedness was measured as the *number of ties*

[2] Kin ties tend to be very similar in terms of our key characteristics, most notably ethnicity. They are also very strong ties that are not readily dissolved. In line with this, our data on kin ties does not contain sufficient variation in key variables and produces non-estimable coefficients. We focus on non-kin ties because theoretically and empirically the relationship between homophily and tie loss seems to be more relevant to these types of ties.

[3] Other name generator questions asked respondents whom they asked for advice at work, whom they give advice at work, who their two closest colleagues are, who their boss is, whom they have quarrel with sometimes, who their two direct neighbors are, whom they spend leisure time with, whom they ask for help when they fall sick, who asks them for help, and who is important to them but not yet listed in response to any of the previous questions.

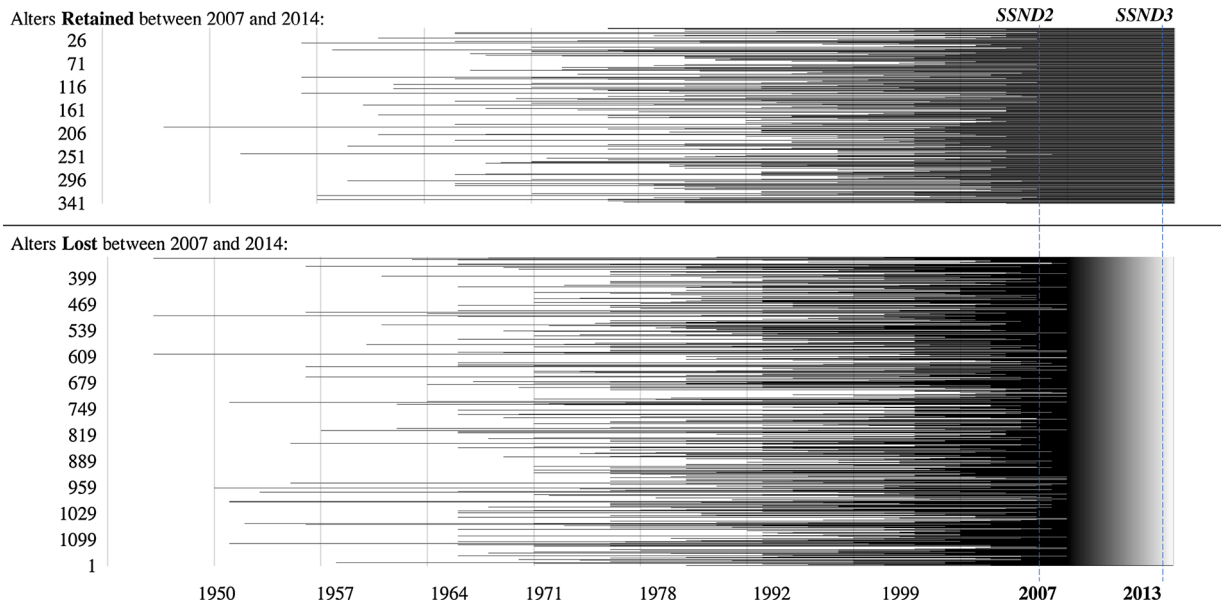

Fig. 1. Bars show relationship length per alter *N alter* = 1169. Y-Axis labels show Alter ID. Shaded area between 2006 and 2013 mean that the social tie was lost in the period between 2006/2007 and 2013/2014.

between alters. This information was available only for confidants. At the end of the interview, SSND2 respondents saw a list of the confidants they had named and answered how well their confidants knew one another (1 = they avoid each other, 5 = they know each other very well). We considered confidants to have a tie if the respondent indicated that they knew each other either well or very well.[4,5]

Control variables

To test the robustness of our findings, we report both unadjusted models and models controlling for respondent gender, age (linear and squared term), ethnicity, educational background, work status, marital status and number of alters (i.e., confidants and practical helpers) in wave 2. This was to account for the possibility that social groups differed with regard to their likelihood of discontinuing social relationships (e.g., migrants might dissolve ties at a lower rate than ethnic majority members). These variables were coded as shown in Table 1.

Analytical strategy

For the main analyses, we estimated discrete-time event history models predicting tie loss. These analyses were based on complementary log-log models, which estimate binary outcomes (i.e., tie loss) similar to logit models[6] . We clustered standard errors within egos because of the nested nature of the data (i.e., alters are nested in egos). We first estimated the main effects of ego-alter similarity on the probability of tie loss (Model 1) and then added control variables (Model 2). We then added our mediating variables (Models 3–5). Because our models estimate hazard ratios, we cannot directly compare coefficients across models. For our mediation analyses, we therefore assessed the relative weight of the mediators applying the KHB method as suggested by Karlson et al. (2012). Finally, we interacted relationship duration with our mediating variables to understand if the strength of the mediation decreases as relationships grow older (Model 6–8).

To facilitate the result interpretation of our discrete-time event history models, we would like to highlight an important idiosyncrasy of the data. Based on the *SSND* data we know how long alters were in the network in 2007 (i.e. *SSND2*) and we know whether they were still present or not in 2014 (i.e. *SSND3*). However, there is no information for the years between the waves. This means that we do not know in which year between the two waves alters were lost. Our models thus estimate the risk of tie loss occurring at any point in the seven- year period between 2007 and 2014.

This has implications for the interpretation of our results. For example, if our results show that 10 % of the ties are lost after ego knew them for one year, then this needs to be interpreted as follows: 10 % of alters whom ego knew for one year are lost in the subsequent 7 years. Fig. 1 illustrates the data structure displaying the number of years that ego was connected to alters who stayed in the network between 2007 and 2014 (upper graph) and those who were lost (lower graph). The black bars show the relationship length in years and faded graphs indicate the period in which alters were lost. This illustration makes clear that, even though we do not know in which exact year alters were

Table 2
Relationships length (in years) by similarity between respondents and alters.

	Similar			Dissimilar			
	N	Mean	SD	N	Mean	SD	p
Age	693	20.42	12.88	406	13.47	10.39	< .001
Gender	835	18.65	12.74	309	14.94	10.93	< .001
Ethnicity	1064	17.85	12.45	61	14.90	11.59	.07
Education	358	17.89	12.88	644	18.09	12.30	.82

Note: p-values indicate results of two-samples t-tests testing whether relationship duration was longer for similar alters versus dissimilar alters.

[4] This is a network-level measure. An alternative measure is to account for the indirect ties that bind a specific alter to others in the network. However, this information was available only for confidants, and not practical helpers. When repeating analyses with this measure on a subset of alters (i.e., confidants), we found the same pattern of results.

[5] Ideally covariates would be measured throughout the 'lifetime' of a social tie, however, such fine-grained information is rarely available. In the case of our data, using covariates from wave 1 would significantly reduce our sample. Networks change a lot between wave 1 and 2, and for the many new ties that entered in wave 2, we do not have any information from wave 1.

[6] We opted for complementary log-log models over logit models because the former are more appropriate when an event is very likely or very unlikely to occur as is the case for our outcome of interest. Furthermore, the estimates are directly interpretable as hazard ratios. Logit models are more appropriate when the distribution of events occurred and not occurred is more symmetrical. As a robustness check, we did re-estimate all models as logit models and found almost identical results.

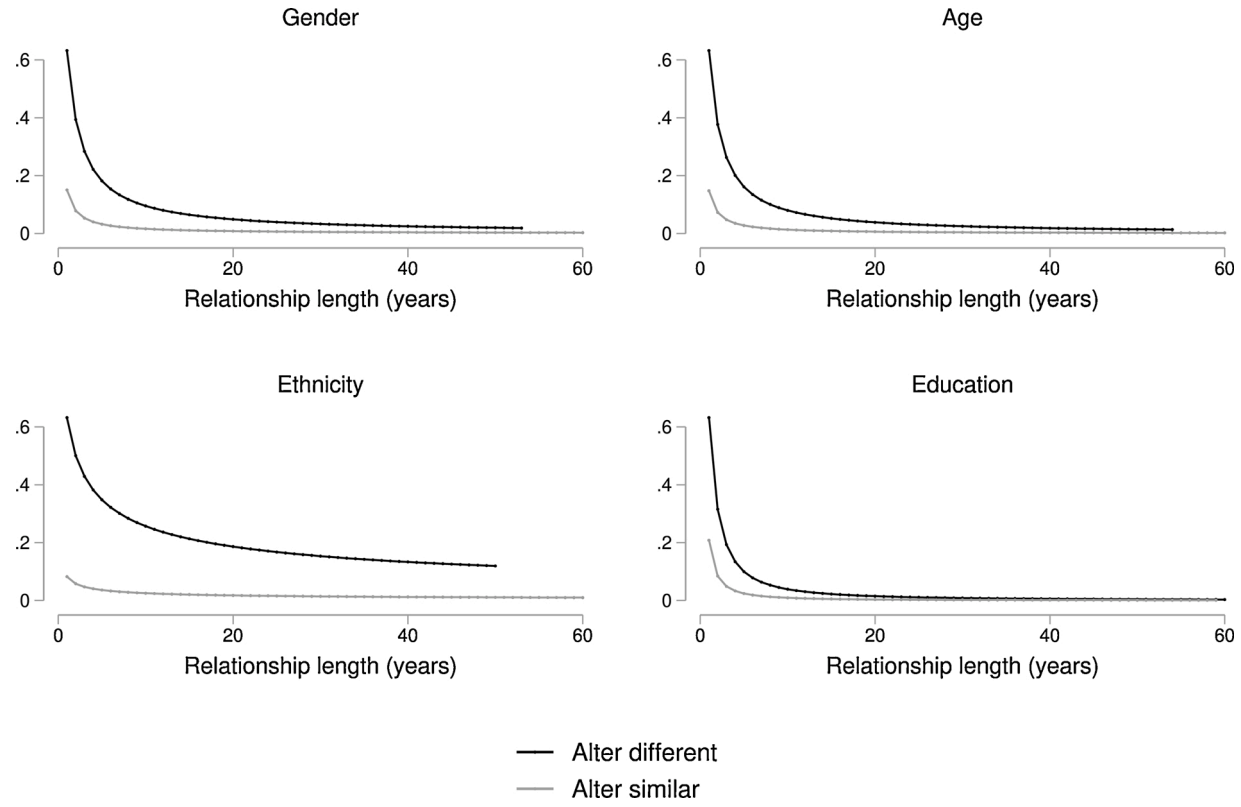

Fig. 2. Survival curves displaying the probability of tie loss by relationship length for alters who are similar versus different in terms of four characteristics. Models do not contain control variables. *N respondents* = 441.

Table 3
Results of event history models on tie loss. Sample sizes are the number of alters x years until tie loss occurred. $N_{respondents} = 441$.

	(1)	(2)[a]	(3) [a]	(4) [a]	(5) [a]
Time varying	0.86**	1.66***	1.68***	1.83***	1.65***
baseline hazard	[0.78,0.96]	[1.45,1.91]	[1.46,1.94]	[1.54,2.17]	[1.44,1.90]
Gender same	0.47***	0.73**	0.67***	0.69**	0.71**
	[0.37,0.58]	[0.59,0.90]	[0.54,0.83]	[0.53,0.90]	[0.57,0.88]
Age same	0.35***	0.45***	0.46***	0.45***	0.43***
	[0.28,0.42]	[0.37,0.54]	[0.38,0.57]	[0.36,0.56]	[0.36,0.52]
Ethnicity same	0.13***	0.53**	0.48**	0.33***	0.41***
	[0.10,0.17]	[0.33,0.86]	[0.29,0.80]	[0.18,0.60]	[0.27,0.64]
Education same	0.72**	1.07	1.06	0.98	1.10
	[0.57,0.92]	[0.88,1.31]	[0.86,1.30]	[0.76,1.28]	[0.90,1.35]
Mediator variables					
Geographical distance:					
< 1 km			Ref.		
1–9 km			1.03		
			[0.82,1.30]		
10–19 km			1.39*		
			[1.02,1.89]		
20–100 km			1.30		
			[0.88,1.93]		
> 100 km			1.08		
			[0.76,1.54]		
No. of meeting contexts			0.82**		
			[0.73,0.92]		
Preferences for similarity				1.03	
				[0.88,1.21]	
No. of indirect ties					0.97
					[0.93,1.00]
N	17,733	17,400	16,536	13,184	17,400

Note: Coefficients represent hazard ratios. If the hazard ratio is smaller than 1, the risk of tie loss is smaller compared to the reference group. The opposite applies if the hazard ratio is larger than 1. If the hazard ratio is 1, the groups are similar with regard to risk of tie loss. 95 % confidence intervals are presented in square brackets. * $p < .05$, ** $p < .01$, *** $p < .001$. [a] Models 2–5 are adjusted for ego-level characteristics. Varying *N* is due to missing values in predictor variables. Cases with missing values were deleted list-wise.

lost between the waves, a period of seven years is relatively short considering the long survival span of social ties.

Results

Descriptive results

Table 2 shows the relationship duration of similar versus dissimilar alters in 2007. Alters who were dissimilar in terms of age knew ego for almost 7 years shorter ($SE = 0.75$, $p < .001$) than alters who were similar in terms of age, and alters who were dissimilar in terms of gender knew ego for almost 4 years less ($SE = 0.82, p < .001$). Alters who were dissimilar in terms of ethnicity knew ego for 3 years less ($SE = 1.63, p = 0.07$), however this difference was only marginally significant. We found no significant difference in relationship duration between alters who were similar versus dissimilar in terms of education. These descriptive results suggest that ego-alter relationships have a shorter history if ego and alter are dissimilar with regard to gender and age. For ethnic similarity, the difference is smaller and does not reach conventional levels of significance. This is possibly because only ca. 5% of alters are dissimilar in terms of ethnicity, which makes predictions more uncertain.

The differences in relationship length for gender and age similarity provide some evidence with regard to tie loss, however, this evidence is indirect because the analyses are cross-sectional and based on alters who are present in the network in the *SSND2*. They do not yet consider who is lost over time.

Discrete-time event history models

In our main analyses, we estimated survival models showing the risk of tie loss by alter-ego similarity with regard to our four characteristics of interest. Fig. 2 displays the survival curves for alters who were similar versus dissimilar to ego in terms of four characteristics. Two findings stand out: First, the risk of tie loss was particularly high among alters who had been connected to ego for a shorter period of time. The majority of tie losses between the waves occurred after alters were in the network for up to 10 years, and the risk of tie loss steeply declined within this period. If alters were connected to ego for roughly 20 years, there was hardly any change in the risk of tie loss between the waves.

Second, the likelihood of tie loss was significantly higher for dissimilar alters than similar alters across all four characteristics. This difference was most pronounced in the early years of the social relationship, which is when most tie losses occurred. After 20 years only a small difference in the risk of tie loss remained for similar versus dissimilar alters with regard to most characteristics. The exception was ethnicity: For alters who were dissimilar in terms of ethnicity, the risk of tie loss remained profoundly higher than for ethnically similar alters, even if ego and alter had known each other for 50 years (which was the maximum relationship length between an ego and alter who were dissimilar in terms of ethnicity).

The above models show that ties to dissimilar others have a higher risk to be lost when modelling one characteristic at a time. Because certain characteristics were correlated, for example age similarity was correlated with similarity in terms of education and gender, we repeated the above analyses estimating all markers of dissimilarity in the same model (see Table 3, Model 1). This model allowed us to better understand the unique contributions of the single markers of dissimilarity, because it accounts for the contributions of all other variables in the model. This multivariate model produced a pattern of results that was similar to the univariate results in Fig. 2. Adding control variables resulted in a reduction of the effect of similarity in all similarity variables, and in the case of education, it rendered the effect no longer statistically significant (see Table 3, Model 2). Hypothesis 1, which stated that ties to dissimilar others are lost faster than ties to similar others is thus confirmed for alters who are dissimilar in terms of gender, age and ethnicity.

Mediation analyses

Next, we added our mediator variables (H2) and applied the KHB method to assess whether including mediator variables significantly reduced the effects of similarity. To test for the mediating role of meeting opportunities, we added geographical distance and number of social contexts where ego meets alters (Model 3).

Geographical distance showed a significant effect on tie loss. Alters who lived 10−19 km away were significantly more likely to be lost than alters who lived less than 1 km away. Number of meeting contexts was also significant such that sharing more meeting contexts was associated with a smaller chance of tie loss. More importantly, KHB analyses showed that neither geographical distance nor meeting opportunities significantly reduced the effects of similarity, meaning that we did not find evidence for mediation via these variables. When including these variables, ties that were dissimilar in terms of gender, age and education had the same risk of being lost as in Model 2. The effect of ethnic similarity does change, however, in the opposite direction. Contrary to our expectations, adding meeting opportunities and geographical distance increased the effect of ethnic similarity. As mentioned earlier, predictions for ethnic similarity are based on very few cases of alters who are dissimilar. As such, predictions for ethnic similarity need to be interpreted with caution. Either way, these results do not confirm our hypothesis that meeting opportunities explain some of the effect of similarity on tie loss.

Next, we tested for the mediating role of preferences for similarity (Model 4). The main effect of preferences for similarity was not significant, and we found no evidence that preferences for similarity mediate the relationship between ethnic similarity and tie loss.[7]

Finally, we tested for network embeddedness by including the number of ties between alters (Model 5). The main effect was not significant and including this measure did not reduce the effects of alter-ego similarity. We therefore conclude that we found no evidence for a mediating effect of structural network embeddedness as measured by the number of ties among confidants. Overall, we find no evidence for our mediation hypothesis. [8]

Overcoming initial hurdles

Our final hypothesis (H3) was that hurdles that are present at the beginning of the relationship will be overcome in the long run. The mediation analyses (see above) showed that meeting opportunities and

[7] In robustness checks, we tested whether specific items of preferences for similarity (e.g., preferences for gender similarity) mediated the effect of specific types of similarity (e.g., alter similarity in terms of gender). Results showed that this was not the case.

[8] We conducted a series of robustness checks varying the network delineation. First, we tested whether mechanisms for confidants and practical helpers differ by conducting analyses for confidants and practical helpers separately. As expected, coefficient magnitudes did change slightly, however the pattern of results was similar for helpers and confidants. One exception was that gender similarity was not related to tie loss among practical helpers once control variables were added (see Table A1 in Appendix), while among confidants, gender similarity and tie loss are significantly related (see Table B1 in Appendix), which is the same pattern we found in our main analyses. Second, we recoded alters who were only re-mentioned in the latter wave when explicitly asked. This concerned 15 alters. When coding these alters as not re-mentioned, the results show the same pattern of results as found in the main analyses (Table C1 in the Appendix). Coefficient magnitudes change only at the second decimal and do not change the conclusions drawn. Third, because of the surprising non-findings for educational similarity, we repeated the analyses on a younger sub-sample. We mean-split the sample and repeated all the analyses on the younger sub-sample. Results for educational similarity were still non-significant. Overall, these additional analyses lead us to conclude that our findings are robust across different model specifications.

Table 4
Results of moderation analyses based on event history models predicting tie loss.

	(6) [a]	(7) [a]	(8) [a]
Time varying baseline hazard	1.08 [0.86,1.36]	1.11 [0.85,1.45]	1.03 [0.84,1.28]
Relationship length (years)	1.02 [0.99,1.05]	1.08*** [1.04,1.13]	1.04*** [1.02,1.06]
Gender same	0.66*** [0.53,0.82]	0.67** [0.51,0.87]	0.70** [0.56,0.87]
Age same	0.45*** [0.37,0.56]	0.43*** [0.34,0.54]	0.42*** [0.34,0.51]
Ethnicity same	0.57 [0.32,1.00]	0.31*** [0.16,0.57]	0.45** [0.28,0.73]
Education same	1.07 [0.86,1.33]	1.01 [0.77,1.33]	1.10 [0.89,1.35]
Geographical distance: < 1 km	Ref.		
1–9 km	1.14 [0.77,1.70]		
10–19 km	1.22 [0.67,2.22]		
20–100 km	1.52 [0.76,3.06]		
> 100	0.79 [0.38,1.66]		
< 1 km X Relationship length	Ref.		
1–9 km X Relationship length	1.00 [0.98,1.01]		
10–19 km X Relationship length	1.01 [0.98,1.04]		
20–100 km X Relationship length	0.99 [0.96,1.02]		
> 100 X Relationship length	1.01 [0.98,1.04]		
No. of Meeting opportunities	0.71** [0.58,0.87]		
No. of Meeting opportunities X Relationship length	1.01 [1.00,1.02]		
Preferences for similarity		1.27 [0.97,1.66]	
Preferences for similarity X Relationship length		0.99 [0.98,1.00]	
Indirect ties between Alters			0.95 [0.90,1.01]
Indirect ties between Alter X Relationship length			1.00 [1.00,1.00]
N	16,536	13,184	17,400

Note: Coefficients represent hazard ratios. If the hazard ratio is smaller than 1, the risk of tie loss is smaller compared to the reference group. The opposite applies if the hazard ratio is larger than 1. If the hazard ratio is 1, the groups are similar with regard to risk of tie loss. 95 % confidence intervals are presented in square brackets. * $p < .05$, ** $p < .01$, *** $p < .001$. [a] Models 6–8 are adjusted for ego-level characteristics. Varying *N* is due to missing values in predictor variables. Cases with missing values were deleted list-wise. $N_{respondents} = 441$.

network embeddedness did not mediate the relationship between alter similarity and tie loss. It is possible that we were unable to detect mediation effects because our analyses showed the effects of meeting opportunities and network embeddedness at one 'random' point in the life of a social tie, rather than how their effects vary over time. Lack of meeting opportunities and network embeddedness might be particularly detrimental in early stages of the relationship, but they might dissipate over time. To test this hypothesis, we conducted a moderation analyses by interacting meeting opportunities, preferences for similarity and network embeddedness with relationship length (see Table 4). We expected that with increasing relationship length, the coefficients of these variables would decrease.

Model 6 in Table 4 shows the results for meeting opportunities measured as geographical distance and meeting contexts. We did not find that relationship length moderated the link between geographical distance and tie loss. Regarding the number of contexts where ego meets alter, the results did also not support the prediction. Regarding both preferences for similarity (Model 7) and network embeddedness (Model 8), we found no evidence for hurdles dissipating over time.

Table 5
Similarity Between Egos and Alters (i.e., Confidants and Helpers) in SSND2.

	Wave 2			Wave 3			*t*-test
	N	*Mean*	*SD*	*N*	*Mean*	*SD*	*p*
Gender same	1151	0.73	0.44	1250	0.72	0.45	.71
Age same	1101	0.63	0.48	1224	0.59	0.49	.18
Ethnicity	1130	0.95	0.22	1248	0.93	0.26	.17
Education same	1026	0.35	0.48	1114	0.35	0.48	1

Note: Results are based on paired samples t-tests at the network-level. The *N* displayed in the table shows the number of alters that calculations of network homogeneity were based on. The sample size of t-tests is the number of networks, namely 441.

Network dynamics and homogeneity

Finally, we show how the loss of dissimilar alters affects homogeneity at the network-level. Table 5 displays the percentage of similar confidants and practical helpers at the two time points. Paired-samples t-tests show that homogeneity is not significantly different at time points 1 and 2. Even though alters that are dissimilar in terms of gender, age and ethnicity are lost faster (see Model 1 and 2 in Table 3), at the network-level homogeneity remains stable. This suggests that dissimilar alters might have a higher turn-over rate: they are not only lost, but also replaced faster than similar alters. The rationale behind this replacement might be that dissimilar alters bear social capital which ties to similar alters cannot provide (Volker 2020). Further research on network dynamics is needed to substantiate this finding.

Discussion

The aim of this paper was to better understand how dissimilarity affects the loss of social ties. Our central argument was that ties are more difficult to maintain if associates are dissimilar and that they therefore dissolve at a faster pace than other ties. We examined three well-established hurdles for tie maintenance, i.e. lack of meeting opportunities, preferences for similarity and lower network embeddedness. We also tested to what extent these hurdles mattered across the 'lifetime' of a social tie while predicting that these hurdles would be most pronounced in early stages of the relationship and become less pronounced as the relationship grows older.

Several findings accrue from this study that partly support and partly refute predictions derived from previous research. First of all, we found strong evidence for ties being more likely to be lost if they were dissimilar in terms of gender, age, and ethnicity. Dissimilarity in education also predicted tie loss, but this effect disappeared after accounting for ego-level characteristics.

Second, when exploring three explanations for a faster loss of ties to dissimilar others, our mediators were unable to account for the effect of dissimilarity on tie loss. We found no evidence that meeting opportunities, preferences for similarity or network embeddedness explained why ties to dissimilar others were lost faster. This is unexpected, given that the three explanations tested are well-established in the literature on homogeneity in personal networks. A difference between that literature and our study is that these explanations are typically discussed in the context of tie formation, and less so in the phase of tie maintenance or dissolution. While we expected that meeting opportunities, preferences for similarity and network embeddedness would matter not only for tie formation, but also for tie maintenance, our results clearly challenge this expectation.

Third, we tested the hypothesis that meeting opportunities, preferences for similarity, and network embeddedness matter more in the beginning of the relationship than in its later years. If it is true that these hurdles matter during tie formation, then they might also matter in the very early phases of

the relationship. We did not find evidence for this prediction.

Taking together the results of this study, it seems that there is a strong and consistent tendency for a faster loss of ties to dissimilar others in terms of gender, age and ethnicity, and that three well-established explanations are unable to account for this. This leaves us with the question why ties to dissimilar others are lost faster. Answering this question might require other measurements and/or other arguments.

Considering the first possibility, perhaps the theory is correct, but we need to test the mechanisms differently. It is undeniable that ties require maintenance and that meeting each other is necessary to maintain social ties. Indeed, previous work that measured meeting opportunities in the same way as we did in our study, found that a lack of meeting opportunities is an important explanation for why ties are lost (Mollenhorst et al., 2014). In line with this work, we did find that living further away from each other and sharing fewer meeting contexts predicted tie loss. However, this effect was the same for ties to similar and dissimilar others, and as such it could not account for why ties to dissimilar others were lost faster. It seems that having fewer meeting opportunities equally weakens ties to similar as well as to dissimilar others. It is possible that we need more fine-grained measures of meeting opportunities to better understand the dissimilarity effect on tie loss. Perhaps we would get a clearer idea of how meeting opportunities matter for the maintenance of ties to dissimilar others by not considering broad social contexts that individuals happen to enter or circumstantially exit, but by studying foci of interactions that individuals create themselves. The difficulty of meeting dissimilar others may not so much lie in the social contexts that one enters anyways, like work, school or neighborhoods, but in deliberately creating meeting opportunities when one would not meet otherwise (Feld, 1981). Also, geographical distance might be a relatively poor measurement for opportunities to meet in times of the Internet and social media: geographical distance currently is hardly an obstacle, since it can rather easily be mitigated by technology. Future research could explore the ease of arranging to meet similar versus dissimilar others by examining more closely the specific foci of activities that people create and the hurdles they face in doing so.

With regard to preferences for similarity and network embeddedness, we also consider the possibility that the theories are correct, but we need to measure them differently. Preferences for similarity are difficult to measure in explicit ways, because people might not be aware of their own biases or they are unwilling to report them. Indeed, we observed that our measure of preferences for similarity did not correlate with similarity in personal relationships, even when we distinguished between the four similarity dimensions (i.e., by correlating ego's preference for age similarity with the actual ego-alter age similarity, etc.). But even with a better measure, the causal link would remain unclear. We argued that preferences for similarity would affect whom individuals associate with, but it is also possible that whom one associates with shapes one's preferences for similarity. This reversed link might explain why we do not observe the hypothesized effect for preferences for similarity.

Regarding network embeddedness, it is possible that individual perceptions are clouded by an ego-centric bias. Respondents might overrate the extent to which their dissimilar friends are friends with other network members. Because the respondent is close to a dissimilar alter, they might erroneously assume that others are also close to them. This might lead respondents to report a higher number of indirect ties than there are in reality. In addition, our measure of network embeddedness is based on information from confidants, but not from practical helpers. As such, it serves as a proxy for overall network density, and a more refined measure would capture the number of ties per alter. We provided robustness checks for this type of analysis for a subset of alters that we do have this information for (i.e., confidants; see Model 6 in Table B1 in the Appendix). The results show that a more refined measure of network embeddedness is also unable to explain the relationship between tie dissimilarity and tie loss.

Another possibility is that the measures are accurate, but we need to change our arguments for understanding the faster loss of dissimilar others from personal networks. Perhaps tie formation is indeed a fundamentally different process than tie maintenance, at least when it comes to ties to dissimilar others. We have already suggested that to understand the maintaining of ties to dissimilar others, we might need to rethink meeting opportunities as foci of activities rather than broad social contexts where people circumstantially meet. Circumstantially meeting is what creates the possibility to form a tie, but it is not what builds lasting relationships. To build a lasting relationship, individuals need to make an effort. They need to arrange to meet, carve out time for each other and balance each other's interests. We can assume that if dissimilar others have made it into the network, there will be social contexts where people circumstantially meet their dissimilar alters. In other words, circumstantially meeting is a condition that we can assume to be fulfilled. Likewise, we can assume that preferences for similarity are not a hurdle, because the dissimilar alters have already made it into the networks, suggesting that ego is sufficiently tolerant of dissimilarity or appreciate it.

However, what might not be fulfilled is that egos have managed to build up foci around which they deliberately nurture their ties to dissimilar alters. Whether they manage to create such foci will depend, among others, on the efforts they are willing to make and the extent to which their interests sufficiently overlap. Future research could substantiate these suggestions by disentangling the different hurdles that ties to dissimilar others need to overcome in the phase of tie formation versus tie maintenance. One suggestion is that – broadly speaking – tie formation is more circumstantial and dependent on whom individuals get to meet, while tie maintenance is more dependent on ego's and alters' willingness to make an effort to meet. This might depend on the type of relationship, such that meeting co-workers or neighbors is more circumstantial while meeting friends depends more on making an effort to meet.

An important point to note is that this study focused on why ties to dissimilar others are more difficult to maintain, thereby implicitly problematizing dissimilarity. In contrast to this, we would like to acknowledge that having dissimilar network members can also be considered a potentially valuable source of social resources. Ties to dissimilar others are more likely to provide non-redundant resources that can help an individual to reach important aims. And consciously or unconsciously, this might be a motivation to keep them. For the conclusions of this paper, this matters in so far as it might explain why we find only limited evidence that preferences for similarity explain the loss of dissimilar network members. If it is true that dissimilar alters are usually undesirable because people have a fundamental bias towards similarity, but dissimilar alters are simultaneously seen as desirable because they provide unique resources, then we would be left with null findings, because two opposing forces cancel each other out. A resource-perspective could also produce more nuanced predictions and findings. For example, including a more in-depth measure of dissimilarity could capture whether individuals with fewer resources prefer individuals with more resources but not vice versa. While it was beyond the scope of the current paper to consider how the provision of resources might help us understand the loss of dissimilar network members, we believe that this is a fruitful avenue for future research.

Furthermore, networks are dynamic and mechanisms other than tie loss are likely at play. In our paper, we did not inquire into all possible dynamics, because we sought to write a theoretically inspired paper on who is dropped, and this can be done with just two waves. Future research could consider a life-course perspective in order to uncover additional mechanisms.

To conclude, we find that ties are more likely to be lost faster if associates are dissimilar in terms of gender, age and ethnicity. Overall, we find no evidence that this can be explained meeting opportunities, preferences for similarity or network embeddedness. More research is needed that studies the hurdles that individuals face when maintaining their ties to dissimilar others in order to understand the persistent finding that dissimilar alters are lost more easily.

Appendix A

Table A1
Results for only practical helpers.

	(1)	(2)[a]	(3) [a]	(4) [a]	(5) [a]
Time varying	0.88	1.70***	1.76***	1.66***	1.66***
baseline hazard	[0.75,1.02]	[1.41,2.04]	[1.41,2.21]	[1.38,1.99]	[1.38,1.99]
Gender same	0.61***	1.00	0.95	0.93	0.91
	[0.45,0.81]	[0.66,1.54]	[0.58,1.58]	[0.62,1.41]	[0.60,1.39]
Age same	0.33***	0.49***	0.52***	0.46***	0.46***
	[0.25,0.44]	[0.37,0.64]	[0.37,0.74]	[0.35,0.61]	[0.34,0.60]
Ethnicity same	0.09***	0.54	0.22**	0.30**	0.29**
	[0.06,0.12]	[0.18,1.66]	[0.08,0.61]	[0.13,0.68]	[0.13,0.64]
Education same	0.90	1.21	1.06	1.19	1.21
	[0.66,1.22]	[0.86,1.68]	[0.71,1.57]	[0.85,1.67]	[0.86,1.69]
Mediator variables					
Geographical distance:					
< 1 km			Ref.		
1−9 km			1.43		
			[0.93,2.20]		
10−19 km			1.07		
			[0.37,3.12]		
20−100 km			1.68		
			[0.87,3.23]		
>100 km			1.06		
			[0.86,1.31]		
No. of meeting contexts			1.43		
			[0.93,2.20]		
Preferences for similarity				0.96	
				[0.77,1.20]	
No. of indirect					0.97
ties					[0.92,1.02]

Note: Results are based on $N = 10{,}307$ (645 alters x relationship years). Number of respondents: 347. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. [a] Models 2–5 control for the following ego characteristics: gender, age (linear and squared term), ethnicity, educational background, work status, marital status and number of alters in wave 2.

Appendix B

Table B1
Results for only confidants.

	(1)	(2)[a]	(3) [a]	(4) [a]	(5) [a]	(6) [a, b]
Time varying	0.89	1.65***	1.90***	1.63***	1.65***	1.67***
baseline hazard	[0.78,1.01]	[1.36,1.99]	[1.49,2.44]	[1.34,1.96]	[1.37,2.00]	[1.38,2.03]
Gender same	0.39***	0.70*	0.77	0.71*	0.67**	0.67**
	[0.29,0.52]	[0.53,0.94]	[0.52,1.13]	[0.53,0.96]	[0.50,0.90]	[0.49,0.90]
Age same	0.34***	0.42***	0.39***	0.41***	0.39***	0.39***
	[0.26,0.43]	[0.32,0.54]	[0.27,0.55]	[0.31,0.52]	[0.31,0.51]	[0.30,0.50]
Ethnicity same	0.16***	0.63	0.44	0.54	0.55*	0.57*
	[0.12,0.23]	[0.36,1.13]	[0.16,1.21]	[0.27,1.08]	[0.32,0.95]	[0.34,0.96]
Education same	0.71*	1.15	1.09	1.16	1.19	1.17
	[0.52,0.96]	[0.89,1.47]	[0.77,1.54]	[0.90,1.49]	[0.92,1.52]	[0.92,1.49]
Mediator variables						
Geographical distance:			1.00			
< 1 km			[1.00,1.00]			
1−9 km			0.92			
			[0.64,1.33]			
10−19 km			1.33			
			[0.85,2.08]			
20−100 km			1.33			
			[0.74,2.41]			
>100 km			1.17			
			[0.66,2.06]			
No. of meeting contexts			0.88			
			[0.74,1.04]			
Preferences for similarity				0.94		
				[0.79,1.12]		
No. of indirect ties (network-level)					0.96	
					[0.92,1.00]	
No. of indirect ties (tie-level)						0.88**
						[0.80,0.96]

Note: Results are based on $N = 11{,}612$ (617 alters x relationship years). Number of respondents: 303. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. [a] Models 2–5 control for the following ego characteristics: gender, age (linear and squared term), ethnicity, educational background, work status, marital status and number of alters in wave 2. [b] In this model, network embeddedness was measured as the number of ties the respective confidant has with other confidants.

Appendix C

Table C1
Drop Alters who were only re-mentioned in wave 3 when explicitly asked.

	(1)	(2)[a]	(3) [a]	(4) [a]	(5) [a]
Time varying	0.88**	1.73***	1.79***	1.70***	1.70***
baseline hazard	[0.80,0.96]	[1.58,1.90]	[1.60,2.00]	[1.56,1.86]	[1.56,1.86]
Gender same	0.52***	0.79***	0.85*	0.80***	0.78***
	[0.45,0.61]	[0.71,0.89]	[0.74,0.98]	[0.72,0.90]	[0.70,0.88]
Age same	0.42***	0.54***	0.53***	0.52***	0.51***
	[0.37,0.48]	[0.47,0.61]	[0.45,0.62]	[0.46,0.59]	[0.45,0.58]
Ethnicity same	0.15***	0.53***	0.36***	0.43***	0.39***
	[0.12,0.19]	[0.37,0.76]	[0.22,0.57]	[0.29,0.64]	[0.28,0.55]
Education same	0.76**	1.09	1.03	1.11	1.11
	[0.64,0.90]	[0.98,1.22]	[0.89,1.18]	[0.99,1.24]	[0.99,1.24]
Mediator variables					
Geographical distance:					
< 1 km			Ref.		
1−9 km			1.02		
			[0.86,1.21]		
10−19 km			1.23		
			[0.95,1.59]		
20−100 km			1.15		
			[0.90,1.46]		
>100 km			1.00		
			[0.71,1.40]		
No. of meeting contexts			0.94		
			[0.87,1.02]		
Preferences for similarity				0.91	
				[0.82,1.01]	
No. of indirect ties					0.98
					[0.95,1.00]

Note: Results are based on $N = 23{,}190$ (1151 alters x relationship years). Number of respondents: 572. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. [a] Models 2–5 control for the following ego characteristics: gender, age (linear and squared term), ethnicity, educational background, work status, marital status and number of alters in wave 2.

References

Burt, R.S., 1984. Network items and the general social survey. Soc. Networks 6 (4), 293–339.

Burt, R.S., 2002. Bridge decay. Soc. Networks 24 (4), 333–363.

Degenne, A., Lebeaux, M.-O., 2005. The dynamics of personal networks at the time of entry into adult life. Soc. Networks 27 (4), 337–358. https://doi.org/10.1016/j.socnet.2004.11.002.

Feld, S.L., 1981. The focused organization of social ties. Am. J. Sociol. 86 (5), 1015–1035.

Feld, S.L., 1982. Social structural determinants of similarity among associates. Am. Sociol. Rev. 47 (6), 797–801. https://doi.org/10.2307/2095216.

Feld, S.L., 1997. Structural embeddedness and stability of interpersonal relations. Soc. Networks 19 (1), 91–95. https://doi.org/10.1016/S0378-8733(96)00293-6.

Fischer, C.S., 1982. To Dwell Among Friends: Personal Networks in Town and City. University of Chicago Press.

Fischer, C.S., Offer, S., 2020. Who is dropped and why? Methodological and substantive accounts for network loss. Soc. Networks 61, 78–86. https://doi.org/10.1016/j.socnet.2019.08.008.

Granovetter, M.S., 1973. The strength of weak ties. Am. J. Sociol. 78 (6), 1360–1380.

Homans, G., 1950. The Human Group. Harcourt, Brace & World.

Kalmijn, M., 1998. Intermarriage and Homogamy: Causes, Patterns, Trends. Annu. Rev. Sociol. 24, 395–421.

Kandel, D.B., 1978. Similarity in real-life adolescent friendship pairs. J. Pers. Soc. Psychol. 36 (3), 306–312. https://doi.org/10.1037/0022-3514.36.3.306.

Karlson, K.B., Holm, A., Breen, R., 2012. Comparing regression coefficients between same-sample nested models using logit and probit: a new method. Sociol. Methodol. 42 (1), 286–313. https://doi.org/10.1177/0081175012444861.

Kleinbaum, A.M., 2017. Reorganization and tie decay choices. Manage. Sci. https://doi.org/10.1287/mnsc.2016.2705.

Louch, H., 2000. Personal network integration: transitivity and homophily in strong-tie relations. Soc. Networks 22 (1), 45–64. https://doi.org/10.1016/S0378-8733(00)00015-0.

Marin, A., Hampton, K.N., 2019. Network instability in times of stability. Sociol. Forum 34 (2), 313–336. https://doi.org/10.1111/socf.12499.

Marks, S.R., 1994. Intimacy in the public realm: the case of Co-workers. Soc. Forces 72 (3), 843–858. https://doi.org/10.1093/sf/72.3.843.

Marsden, P.V., 1987. Core discussion networks of americans. Am. Sociol. Rev. 52 (1), 122. https://doi.org/10.2307/2095397.

McPherson, J.M., 2004. A blau space primer: prolegomenon to an exology of affiliation. Ind. Corp. Chang. 13 (1), 263–280. https://doi.org/10.1093/icc/13.1.263.

McPherson, J.M., Smith-Lovin, L., 1987. Homophily in voluntary organizations: status distance and the composition of face-to-Face groups. Am. Sociol. Rev. 52 (3), 370–379. https://doi.org/10.2307/2095356.

McPherson, J.M., Smith-Lovin, L., Cook, J.M., 2001. Birds of a feather: homophily in social networks. Annu. Rev. Sociol. 27, 415–444.

McPherson, J.M., Smith-Lovin, L., Brashears, M.E., 2006. Social isolation in America: changes in core discussion networks over two decades. Am. Sociol. Rev. 71, 23.

Mollenhorst, G., Volker, B., Flap, H., 2014. Changes in personal relationships: how social contexts affect the emergence and discontinuation of relationships. Soc. Networks 37, 65–80. https://doi.org/10.1016/j.socnet.2013.12.003.

Mollenhorst, G., van Duijn, M., Rydgren, J., Edling, C., 2016. Triadic closure in core networks: disentangling the effects of social distance, national origin similarity and shared contexts. Int. Rev. Soc. Res. 6 (4), 146–162. https://doi.org/10.1515/irsr-2016-0018.

Mollica, K.A., Gray, B., Treviño, L.K., 2003. Racial homophily and its persistence in newcomers' social networks. Organ. Sci. 14 (2), 123–136. https://doi.org/10.1287/orsc.14.2.123.14994.

Morgan, D.L., Neal, M.B., Carder, P., 1997. The stability of core and peripheral networks over time. Soc. Networks 19 (1), 9–25. https://doi.org/10.1016/S0378-8733(96)00288-2.

Putnam, R.D., 2000. Bowling Alone: The Collapse and Revival of American Community. Simon and Schuster.

Rivera, M.T., Soderstrom, S.B., Uzzi, B., 2010. Dynamics of dyads in social networks: assortative, relational, and proximity mechanisms. Annu. Rev. Sociol. 36 (1), 91–115. https://doi.org/10.1146/annurev.soc.34.040507.134743.

Russel, B.H., Killworth, P.D., Sailer, L., 1979. Informant accuracy in social network data IV: a comparison of clique-level structure in behavioral and cognitive network data. Soc. Networks 3 (2), 191–218.

Shulman, N., 1975. Life-cycle variations in patterns of close relationships. J. Marriage Fam. 37 (4), 813. https://doi.org/10.2307/350834.

Small, M.L., 2017. Someone to Talk to. Oxford University Press.

Small, M.L., Deeds Pamphile, V., McMahan, P., 2015. How stable is the core discussion network? Soc. Networks 40, 90–102. https://doi.org/10.1016/j.socnet.2014.09.001.

Smith, S., Maas, I., van Tubergen, F., 2012. Irreconcilable differences? Ethnic intermarriage and divorce in the Netherlands, 1995–2008. Soc. Sci. Res. 41 (5), 1126–1137. https://doi.org/10.1016/j.ssresearch.2012.02.004.

Stauder, J., 2014. Friendship networks and the social structure of opportunities for contact and interaction. Soc. Sci. Res. 48, 234–250. https://doi.org/10.1016/j.ssresearch.2014.06.004.

Suitor, J., Keeton, S., 1997. Once a friend, always a friend? Effects of homophily on women's support networks across a decade. Soc. Networks 19 (1), 51–62. https://doi.org/10.1016/S0378-8733(96)00290-0.

Verbrugge, L.M., 1977. The structure of adult friendship choices. Soc. Forces 56 (2), 576. https://doi.org/10.2307/2577741.
Wellman, B., Wong, R.Y., Tindall, D., Nazer, N., 1997. A decade of network change: turnover, persistence and stability in personal communities. Soc. Networks 19 (1), 27–50. https://doi.org/10.1016/S0378-8733(96)00289-4.
Wimmer, A., Lewis, K., 2010. Beyond and below racial homophily: ERG models of a friendship network documented on facebook. Am. J. Sociol. 116 (2), 583–642. https://doi.org/10.1086/653658.