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Who is Dropped and Why? Methodological and Substantive Accounts for Network Loss

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Abstract

High rates of egocentric network turnover are frequently observed but not well explained. About 1,000 respondents to the UCNets survey named an average of 10 names in each of two waves a year apart. Consistent with prior studies, respondents in wave 2 failed to relist about half of the names they provided in wave 1. Asked why, respondents explained that they had forgotten the alter for about 40 percent of the missing names. Other common answers, such as no "occasion... to be in touch," also suggest that the true rate of alters being dropped is probably under 20 percent. Multilevel logit models identified the predictors of alters being dropped (neither relisted nor forgotten) versus retained. Immediate kin were likeliest to be retained and roommates, coworkers, and acquaintances to be dropped. Alters who provided companionship, confiding, advice, and emergency help were especially likely to be retained, as were those to whom respondents felt close. Little about the respondents themselves affected drop rates: having moved recently, having a close friend die, or having had an important relationship break up. Results are consistent with the argument that a tie's degree of constraint (notably being close family) and its balance of rewards determine the likelihood of it being dropped or demoted.

Panel studies of egocentric networks commonly report a paradox: Respondents report much turnover among their alters–typically, about half of those named are not renamed–and yet respondents' repopulated networks display notable constancy in traits such as size, composition, supportiveness, and structure (see review below). Our purpose here is to expand our understanding of this phenomena by focusing on the first part of this process: whom respondents drop. We use two waves of UCNets, a survey that administered many name-eliciting questions to about 1,000 adult respondents. Methodologically, we found that (a) many apparently dropped alters were not really dropped, but were simply forgotten; (b) many alters whom respondents failed to re-list nonetheless remained "dormant" and available to the respondents; and (c) respondents positively dropped or demoted alters for several distinct reasons. Substantively, we found that (a) alters who were really dropped--neither re-listed nor simply forgotten--tended to be: extended kin, coworkers, or acquaintances; alters who had *not* been named as providing key support; and alters who

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were considered "difficult" (unless they were immediate kin). (b) Respondents who dropped many of their alters were particularly likely to have moved outside the region between waves.

These findings suggest, methodologically, that the "true" rate of dropped alters in an adult population is nearer to 20 percent than the conventional 50 percent (depending on how the analyst classifies dropped alters who seemed to have been moved toward the periphery of ego's network). Theoretically, the findings suggest that the likelihood of being dropped is a function, first, of context and changes in context. Most sharply, immediate kin are hard to drop—or to forget. And being dropped is a function, second, of the balance of support and burden that the relationship entails.

Framework

Perry, et al. (2018, 251) underline a "foundational issue" in studying egocentric network dynamics: "the ability to distinguish real network change from reporting error." So, the first task is to address matters of measurement before addressing matters of substance.

Measurement.

At the level of specific ties, we propose that two general sources of error generate "false" dropped alters in repeated name-eliciting surveys. One source is the usual noise of survey research, such as respondent distraction, satisficing, self-presentation, and fatigue, as well as recency and interviewer effects. The more interesting other source is variation in respondents' mental sampling. That is, when asked to name alters who meet a general category–such as "five best friends" or "people you could ask for advice"–respondents do not, indeed *cannot*, provide a complete inventory (unless the probe is very bounded, such as "List your brothers"). Respondents instead draw some names out of the relevant population on the spur of the moment. This non-random[1] sampling process would generate apparent "churn" from t1 to t2, but it would also generate apparent constancy because each sampling, if presumably elicited the same way, would on average represent, with similar distortion, the same underlying population of alters. Both sources of error imply that networks have substantially less real churn than apparent, because there are qualifying alters unnamed at either t1 or t2 who are in the network but are overlooked at one time or the other.

Other methodological issues also affect the probability that a t1 alter's absence at t2 is accurate: the instrument--how exhaustive the set of name-eliciting questions are, how many names it accepts, and how probing the interview is (Brewer 2000; Fischer and Bayham, 2019); the inclusion of what may have be fleeting ties (Desmond 2012; Small, 2017; Torres 2019);[2] selective attrition in the respondent sample; and possible panel conditioning (Silber et al., 2019). But the process respondents use to, in effect, "sample" the alters in their

[1]Logic and past research suggest that the sampling process would be systematically skewed toward more central alters and also toward more cognitively available alters–for example, people whom the respondent saw recently and people who are connected to one another in a "chunk" (Brashears and Quintane, 2015), such as coworkers, although there is a large random component (Marin, 2004).

[2]We found, for example, that occasionally respondents in wave 2 would not recognize the name of an alter from wave 1 whom they had listed as having helped them with a practical chore. Those people seemed often to be friends of friends or casual neighbors who happened to be on hand at the moment but otherwise out of mind (see Small, 2017).

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networks seems fundamental to the process and implies that real culling of alters–and thus the real level of "churn"--may be significantly less common than existing results imply.

Alter and Tie Differences.

Beyond measurement error and sampling variation, respondents fail to re-list some alters for substantive reasons. Those reasons vary in their implications for understanding the network. Whether a t1 alter goes unnamed at t2 because, say, the respondent has not seen her in a while is different than if she goes unnamed because of a bitter falling out. In the former case, the alter is most likely still available–a "dormant" tie (Marin and Hampton, 2019)–and in the latter, not. Thus, the bright line between being in or out of ego's network is better re-imagined as a broad gray area where alters remain with some degree of connection.

Certain types of *alters* and certain types of *relationships* may be prone to being dropped totally or being demoted into the gray zone. By alter types, we refer to their ages, genders, occupations, and the like. More often, however, analysis of turnover has focused on the qualities of the relationships: kinship, distance, duration, homophily, contact frequency, embeddedness, and the like. Two theoretical approaches to understanding these network dynamics inform our expectations.

One approach stresses the openness or constraint of the social contexts or "foci" within which relationships operate (Bidart et al., 2011; Blau and Schwartz 1984; Feld, 1982; Fischer 1982; Lazarsfeld and Merton 1954; Mollenhorst, et al., 2008, 2014). Contexts can constrain ties materially as in the case of workplaces, schools, and co-housing, and can constrain them normatively, as in the case of immediate family and old friendship circles. Other things be equal, relationships in more constraining contexts, such as immediate family and workplace, should dissolve less often than others.

Another approach stresses that individuals strategically build and maintain networks. This is explicit in, for example, exchange theory (Homans 1950; Thibaut and Kelly 1959; Blau, 1964) and "social capital" theory (Bourdieu, 1984; Coleman, 1990). Such an agentic approach suggests that alters who support ego should be less likely and alters who burden ego should be more likely to be purposefully dropped.

This strategic approach is also consistent with a different, substantive, rather than methodological, interpretation for why the profiles of individuals' networks tend to remain stable even as membership in their networks "churns." The process is homeostatic: Individuals have distinct and stable preferences for networks—"signatures" is one term (Heydari, et al., 2018; Saramäki, et al., 2013) for this—and upon dropping or being dropped by alters, they form new ties so as to maintain the general character of their ego networks. "Continuity theory" in gerontology (Atchley, 1989; Badawy, et al., 2018; Cornwell, 2014) similarly stresses individuals' efforts to sustain or reconstruct familiar social connections.

Both contextual and strategic dynamics probably affect dropping and may interact, such that relatively unrewarding ties are nonetheless likely to be retained if they operate in contexts that are constraining (such as the immediate family).

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Ego and Network Traits.

Finally, at a higher level, we can ask what sorts of egos with what sorts of networks are likelier to drop alters, holding alter and tie traits constant. Approaches emphasizing contexts or foci suggest that life events that change ego's contexts–such as divorce, job starts, graduation, disability, and, in particular, moving (because it entails multiple context changes)–would increase the odds of alters being dropped. Network attributes that might affect retention or dropping include network size–presumably, egos with large networks have more alters to drop and less need to retain them–and also density–under the assumption that triadic connections make it harder to let alters go.

Overview.

In the remainder of this paper, we (1) review the research on network loss; (2) explain our data; (3) describe how many and what kinds of wave 1 alters respondents failed to re-list in wave 2 and (4) examine how respondents explained why they did not rename those alters. This analysis leads to the conclusion that purposeful drops are much less common than is apparent in the literature. (5) Further using respondents' explanations for the drops, we examine those deliberately unlisted alters, describing the roles that some of them still played in respondents' social lives or the nature of their "dormancy." (6) Using multivariate analyses, we determine what sorts of alters at wave 1 were likely to have been dropped at wave 2 and what sorts of respondents tended to drop alters for which reasons. (7) Discussion and conclusion.

What We Know About Dropping Ties

Researchers using some version of name-eliciting methods (Laumann, 1965; Wellman, 1979; Fischer 1982; Marsden, 1987; and many others) have generally found that there is much "churn" in network membership, but that the overall content of egos' networks–say, overall size, availability of support, or kin composition–remains stable. For examples: Wellman, et al's (1997) East Yorkers failed to rename two-thirds of their ties; van Duijin, et al's (1999) Dutch older sample failed to rename one-third; NSHAP's older Americans dropped about 43 percent of their few confidants (National Social Life, Health, and Aging Project (Badawy, et al., 2018; Cornwell, 2014; Cornwell et al., 2014); and Marin and Hampton's (2019) Boston respondents failed to rename about half of their alters. Burt (2000) and Suitor et al. (1997) summarized the studies up to about 20 years ago by estimating that one-third to two-thirds of nominated ties are dropped within a single year. Yet, Morgan et al. (1997) concluded that, except perhaps for most elderly (Lang 2000; Bowling and Farquhar, 1995), "the stability of the aggregate properties in personal networks is much greater than the stability of the membership in these networks" (see also Bidart et al., 2011; Bignami-Van Assche, 2005; Cornwell and Laumann, 2018; Lubbers 2010; Marin and Hampton 2019; Mollenhorst, et al., 2014; Saramäki 2013; Schwartz and Litwin, 2017; Vriens and Inge, 2017). Such alter-level churn plus network-level stability is, as noted earlier, consistent with a homoeostatic or personality-driven model of network formation: people seek alters like the alters they lost so as to sustain the kinds of networks they prefer. This pattern is, however, also consistent with our suggestion that respondents engage in

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"alter sampling" at each wave and in that way also maintain continuity in their networks, perhaps unconsciously.

Which alters are retained or dropped?

Many studies find that alters who were more central to egos' lives–as indicated by attributes such as being immediate kin, embeddedness, years known, role multiplexity, and some kinds of homophily –are *less* likely than others to be dropped between waves of interviews (e.g., Bidart, et al., 2011; Burt, 2000; Cornwell et al., 2014; Cornwell and Laumann, 2018; Degenne and Lebeaux, 2005; Lang, 2000; Lubbers et al., 2010; Marin and Hampton, 2019; O'Malley and Christakis, 2011; Schafer and Vargas, 2016; Suitor, et al., 1997; van Duijin et al., 1999; van Tilburg 1998). Similarly, alters' more active involvement with ego predicts persistence. The greater the volume and variety of material and emotional support, frequency of interaction, emotional closeness, and the lower the level of conflict, the higher the chances of an alter being retained (see, for example, in addition to many of the studies just cited, Bello and Rolfe, 2013; Ikkink and van Tilburg, 1999; Saramaki et al. 2013). We know much less about how alters' personal traits affect retention, although a couple of studies found that higher-status alters were less likely to be dropped (Burt, 2000; Suitor and Keeton, 1997). These findings are consistent with the general expectations we noted that both the context, particularly its degree of constraint, and the net value of a tie determines its chances of being dropped.

Which egos are likeliest to keep ties or drop ties?

Research suggests that between-ego differences are much less significant contributors to patterns of alter loss than are between-tie differences (e.g., van Duijin et al. 1999; Marin and Hampton, 2019), but a few attributes do stand out. People undergoing life transitions–marriage, widowhood, graduation, moving, retirement and nearing the end of life–report more drops and more churn generally (e.g., Badawy, et al., 2018; Bidart and Cacciuttolo, 2013; Bidart and Lavenu, 2005; Bidart, et al., 2011; Bloem, et al., 2008; Carstensen, et al., 1999; Cornwell et al., 2014; Lang, 2000; Mollenhorst, 2014; Schafer and Vargas, 2016; Small, et al., 2015; van Dujian, et al., 1999; Wellman et al., 1997). Thus, both young and very elderly adults tend to have high drop rates. People with lower social standing appear to lose more ties (e.g., Cornwell 2014; Fischer and Beresford, 2015; Goldman and Cornwell 2018; van Dujian et al. 1999; van Tilburg 1998). The findings on ego's health are revealing. Illness can lead to more ties or more active ones because health crises mobilize dormant relationships and even generate new ones for a while (e.g., Badawy, 2018; Perry and Pescosolido, 2012; van Tilburg and van Groenou, 2002; vs. Cornwell, 2014), even if in the long term more peripheral ties are lost (as one reviewer noted). Finally, personality plays a role, particularly as extroverts are especially likely to get and keep ties (Asendorpf and Wipers, 1998; Mund, et al., 2018; Sasovova et al., 2010; Zhu et al., 2013).

People with larger networks seem to experience more drops, perhaps because large networks require more maintenance, or because losing any one tie matters less, or perhaps simply because of regression to the mean (van Tilburg, 1992). Dense networks and networks with many kin seem to retain ties more often (Lubbers et al., 2010; Martin and Yeung, 2006;

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Schafer and Vargas, 2016; versus Marin and Hampton, 2013), which is understandable in terms of constraining contexts.

Liminal Ties.

Rarely does the literature address a key question preliminary to that of who gets dropped by whom: In what sense are alters who are not renamed actually dropped from respondents' networks? Some studies show that many alters who are not re-listed nonetheless remain somehow connected or available. In Mollenhorst's (2014) large Dutch sample, 60 percent of alters who were not mentioned after a seven-year gap were nonetheless still in touch with ego. Yet others may not be in touch but remain "dormant" (Marin and Hampton, 2019), "latent" (Perry, et al., 2018, 249), or "weak" (Grannoveter, 1973) ties. It is important to establish a more nuanced understanding of what being unnamed at t2 means. Wave 2 of the current survey asked respondents to explain *why* they had not renamed an alter from wave 1.

One answer is "I forgot." Wright and Pescosolido (2001) found rates of forgetting to be trivial, accounting for only five percent of dropped names, and Mollenhorst (2014) reported eight percent, but Brewer's (2000, 40) conclusion from a review of studies was that "people forget a substantial proportion of their social contacts when asked to recall them. Even studies with relatively weak test–retest designs show noteworthy levels of forgetting" (see also Bell et al. 2007; Lang, 2000; on forgetting to list spouses, Stueve and Lein, 1979.) Forgotten alters, even if slighted, remain in the network. At the other end of the spectrum, some t1 alters die before t2. Between those extremes are ambiguous cases, such as egos and alters who have "drifted apart." The present study allowed respondents several ways to explain the status of the alter not renamed.

In addition to catching nuances in what dropping an alter means, UCNets' first two waves offer an unusually large scale of relevant data: many adult respondents, about 1,000, reporting twice on many ties (an average of about 10 with as many as 26 alters each time) generated by seven name-eliciting questions and describing those ties in many ways. The sample entails two specific age cohorts at distinct periods in the life cycle, allowing deep exploration of how life transitions affect ties. These UCNets features provide significant views of network loss.[3]

Data and Methods

UCNets Data.

The University of California Social Networks Study (UCNets)[4] is a longitudinal egocentric network survey on personal relationships, life events, and well-being. In 2015, we drew participants from two distinct age groups in the greater six-county San Francisco Bay Area: 50- to 70-year-olds and 21- to 30-year-olds. The study focused on these two relatively understudied cohorts in order to maximize the number and variety of key life events

[3]Other important large-scale studies have used just one or two name-eliciting probes or focused on only one slice of the population, or both (e.g., Cornwell and Laumann, 2018; Mollenhorst, 2014; Schafer and Vargas, 2016; Schwartz and Litwin 2017).
[4]UCNets data are available to researchers at ICPSR. Consult also the UCNets website, http://ucnets.berkeley.edu/researcher-resources/.

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respondents would likely experience between survey waves, as well as to test the robustness of results in two parts of the life cycle. We randomly drew households from 30 randomly-selected Bay Area census tracts. Solicitation letters invited a qualified member of the household to join the multi-year panel (for pay). Assessing the yield rate is difficult, because —in addition to the resistance to polling in the current era (National Research Council 2013)—UCNets required would-be panelists to reach out to its fieldwork center, enroll for three waves, and in most cases arrange an in-person interview. About five percent of potential older panelists contacted the field office and in the end about three percent of them completed the entire survey. This "cumulative completion rate" for a panel uptake is comparable to or higher than the yields of other contemporary panel studies (e.g., the Pew panel[5]; see also Callegaro and DiSogra, 2009; MacInnis et al., 2018, table 1). Household sampling sufficed to fill the 50-to-70 subsample, but not the younger one. We added a few dozen 21-to-30 year-olds by referral from existing panelists and 290 more through targeted Facebook advertisements. Thus, the 21-to-30 panel combines a probability sample plus an opt-in sample of Facebook users. Analysis indicates few differences between the young sample recruited in the household sample and those recruited through Facebook (Lawton and Wilson, 2018). In any event, we control for the recruitment procedure in all the multivariate analyses.

As part of a mode experiment (Fischer and Bayham, 2019), screeners randomly assigned non-Facebook respondents to either a face-to-face interview or to a web version of the survey at a 3:1 ratio. All Facebook-recruited respondents did the survey online. The online and in-person instruments are substantively identical and we control for any mode effects in all analyses (in-person: 625; web: 379). Roughly a year later, about 88 percent of the wave 1 respondents repeated the survey. All but one respondent who had done wave 1 online did so again; a mostly random 120 of those who had been interviewed in person in wave 1 were assigned to do the wave 2 survey online[6]; the remainder of the face-to-face wave 1 interviewees did in-person interviews again.

Table 1 below provides a full description of respondents' demographic and socioeconomic characteristics in each wave. All analyses use weights for wave 2 that adjust for combinations of gender, age, race, Hispanic ethnicity, marital status, and education to match the corresponding age-specific population of the region and in that way accounting for our modest attrition.

Measures.

UCNets used an extended egocentric name-eliciting method to draw a detailed map of respondents' personal networks and collect information about their social connections. The instrument asked respondents to name the people to whom they were connected in seven possible ways.[7] Research shows that multiple items yield greater reliability than do methods

[5]Pew (2015) estimates their cumulative response rate for participating in any given panel survey—that is, qualifying for and joining the panel and then qualifying for and joining a particular survey--as 3.5 percent. Some panels attain higher rates by recruiting all the teenage and adult members of a household, maximizing participation (Callegaro and DiSogra, 2009).

[6]Those who had moved out of the region were assigned to the online condition.

[7]Two other kinds of questions also elicited names (name spouse or partner; name co-residents), but they are not part of the battery analyzed here.

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that use one or just a few name-eliciting questions (Bernard et al. 1990; Marin 2004; Marin and Hampton 2007; McCallister and Fischer, 1978). The seven questions asked respondents to name the people with whom they were involved in various ways, including sociability, emotional support, material support, and being a burden (see appendix for full text). The instrument asked several name-interpreting questions to obtain descriptions of every alter and of every ties, including role relationship, felt closeness, geographic proximity, and homophily in gender, and age. (More details appear in the appendix to Fischer and Bayham, 2019.) The survey also measured respondents' demographic, socioeconomic, and health characteristics.

The wave 2 instrument was essentially identical except when identical repetition would not make sense,[8] but added a set of questions about what happened to each alters from wave 1 whom respondents did not name in wave 2.

Why Alter was Dropped.

The first key measure for this study is the simple dichotomy of whether an alter named in wave 1 was not named in wave 2. The other is the respondents' explanation. The instrument asks:

Before finishing our discussion of your social ties, we ask about people you named in the last interview but did not name in this one.

[For *each* name listed in wave 1 but not wave 2:]

1. You did mention *[name inserted]*, but gave a different name [this time];
2. You just forgot to mention *[name inserted]*;
3. *[Name inserted]* passed away;
4. There has not been any occasion for you to be in touch; or
5. Your relationship changed.

If respondents gave answer 1, the software joined the wave 2 record for that alter with the matching wave 1 record; the alter is considered retained. If respondents answered 5, "your relationship changed," the instrument asked them to choose an explanation:

1. One or both of you moved;
2. One or both of you went through a major life change, like graduation, parenthood, or retirement;
3. One or both of you had health issues;
4. You just drifted apart;
5. You had disagreements;
6. Other: [open-ended text]

[8]For example, the wave 2 survey did not re-ask respondents if their mothers were alive when respondents had answered "no" in wave 1, nor did it re-ask country of origin.

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These close-ended answers, combined with coded open-ended replies, generated 16 distinct accounts for the failure to rename, which we reduced to eight categories (see table 2). Our list is similar to that generated by coding of open-ended answers in the NSHAP study (Cornwell et al, 2014).

Interactions.

We measure the nature of respondents' interactions and interdependencies with alters through the specific name-eliciting questions that produced the alter. The seven questions (for full text, see Appendix) ask respondents to name the people they...

typically do social and leisure activities with (up to 9 names);

confide in about "personal matters" (up to 6 names for this and remaining questions);

seek out for advice in making important decisions;

recently received modest practical help from;

could ask for major help if seriously injured or ill;

help out in these sorts of ways; and

find especially demanding or difficult.

Respondents could provide up to nine names for the social activities question and up to six for each of the others.

Contexts.

Our basic measure of the contexts within which ties exist is the following question (as phrased for the in-person interview; the online version is a slight variant):

People can be connected to each other in a few different ways, even family members. Here is a list of the ways people can be connected. When I read a name to you, please tell me all the different ways that you are connected to that person nowadays. What are all the ways that you are connected to *[Name]*?

Family:

Spouse[9]

My parent

My step-parent

My child

My step-child

My brother/sister

My step-brother/step-sister

[9]Spouses, non-marital partners, and housemates were also identified, earlier in the interview, by specific name-eliciting questions.

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My half-brother/half-sister

Other relatives, including ex's (please specify):

Other connections:

Romantic partners

Housemate/roommate

Neighbor

Know at work

Know at school

Know at church, synagogue, temple, or mosque

Friend

Acquaintance

Know another way (please specify):

Alter Traits.

Presenting respondents with a list of all the names they had mentioned, the instrument asks them to indicate which of those on the list fit several criteria, of which we use: same gender as ego; same age as ego (+/− 6 years); older than ego; was first met in the previous year; is someone they feel "especially close to"; and lives over an hour's drive away.[10] Each alter has a dichotomous indicator for each measure.

Ego Traits.

Besides controlling for a standard list of demographic and social traits of the respondents at wave 1, we constructed measures of *life events* that could change the contexts of respondents' activities. We drew these from a series of questions about what had happened to the respondents between wave 1 and wave 2, such as a move, graduation, birth of a child, and so on (see Table 3 and see Appendix for texts).

Plan of Analysis.

We begin by presenting the descriptive data on dropped names–the numbers and the reasons given. From this, we draw some methodological points. After briefly discussing patterns of forgetting, we proceed to analyze the predictors of alters being actually dropped, counting those whom respondents said they simply forgot as *retained*. Those models will test our expectations that the odds of being dropped are largely a function of contextual constraints on respondents and on the rewardingness of the alter tie. We use multilevel models with ties nested within individuals, which allows us to properly attribute covariance with dropping to traits of the ties and alters versus to traits of the respondents. For clarity, we present analyses with 21-to-30 year-olds and the 50-to-70 year-olds pooled, because there were minor differences between cohorts in patterns, noting where appropriate any major differences.

[10]We explored other alter traits, but they ended up with insubstantial associations to being dropped.

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Results

Who Was Dropped and Why.

Table 2 presents the results of the question series posed to wave 2 respondents about why they failed to rename an alter from wave 1.[11] Using the open-ended answers as well as the closed-ended ones, we started with 16 categories of reasons and combined them into eight. The unit of analysis is the alter. (The numbers in Table 2 confound between-respondent and between-alter differences, which we do examine later, but they are within a few percentage points of those derived by calculating within-respondent averages.)

Note, first, the column for totals. About half of those named in wave 1 did not appear in wave 2. This finding is roughly comparable to the average of egocentric panel studies, despite its own particularities. However, according to the respondents, 41 percent of the *dropped* alters—19 percent of all alters named in wave 1--were ones whom they had simply forgotten. For most of this paper, we treat forgotten alters as still members of the network, but pause here to report some basic findings on forgetting. The older cohort was slightly likelier to report forgetting, by six points, which may (as a reviewer suggested) point to "senioritis," but the difference goes away in a multi-level, multivariate model predicting whether an alter was reported as forgotten rather than being re-listed. The model (not shown) reveals that immediate kin, romantic partners, alters deemed emotionally close, and alters living with an hour's drive were significantly ($p<.01$) *less* likely to be forgotten rather than relisted. Nothing about the respondents independently predicts forgetting an alter.

If we pool forgotten alters with re-listed alters as being still present in respondents' networks, the drop rate becomes *27 percent*, not the observed 46 percent, a major revision of preceding estimates. Then, there are the gray zone explanations for dropping, ones that vary in how definitively the ties were sundered. If we take the explanation "we had no occasion to get together" as also indicating that the tie persisted, then the estimated drop rate goes down to 19 percent. One might assume that other categories, aside from death and disagreement, include some ties that remain latent. Our first key finding, then, is methodological: These data suggest that *true rates of dropping are much lower than most past research suggests*, closer to 20 percent than 50 percent.

Although older and younger respondents dropped roughly the same proportion of wave 1 alters, 50 and 44 percent, the older ones were much likelier to report having forgotten the alters--49 percent compared to 30 percent for the young (data not shown), while the younger respondents were much likelier to have explained dropped names as the result of someone moving, 19 to 9 percent. Treating the forgotten as still in the network, the "real" drop-or-demote rate for the 21–30-year-olds was 35 percent compared to 22 percent for the 50-to-70-year-olds, an unsurprising difference considering their stages in the life cycle.

The remainder of Table 2 shows the sorts of contextual effects we will explore in detail later. It compares the fates of immediate kin, extended kin, and nonkin alters. Overall, immediate

[11]We exclude from analysis the small number of alters who, in wave 1, were named *only* in the household census. And we exclude (given limitations of a multilevel model) the ten respondents who named no or only one alter in wave 1.

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kin were less than half as likely to be dropped than were extended kin or than nonkin, 19 versus about 55 percent. Only nine percent of immediate kin were dropped compared to 24 percent of extended kin and 36 percent of nonkin. Immediate kin were notably likely to have been dropped (neither relisted nor forgotten) because of death (22 percent), extended kin by no occasion to get together (40 percent), and nonkin by literal moving or metaphorical "drifting apart" (both 23 percent).

In sum, by analyzing respondents' explanations for having not re-listed alters, we find, first, that many of those seemingly missing actually remained in the networks as far as ego was concerned; we don't know what the alters would have said. About 54 percent were re-listed. Adding back in those alters whom respondents said they had simply forgotten, 73 percent of alters remained presumably active members. (That is, respondents implied that they should have named the alter to one of the name-eliciting questions.) If we enter the gray zone and add back to the networks those missing because of no occasion to get together, about 80 percent were retained. And if we further consider those dropped because of life events–particularly, having moved–as latent ties many of which *might* be mobilized, we come to 90 percent as a high estimate for the year-to-year continuity.

Multivariate Analysis of Which Alters are Dropped.

We use HLM modeling to assess our theoretical expectations that–all else equal–the probability of being dropped is lower the more constraining the context of the tie and the more rewarding the tie. We control for many other attributes of the alter, the relationships, and ego.[12] We define as "retained" all alters who were *either* renamed in wave 2 *or*, if not renamed, whose absence respondents explained as forgotten; the rest of the wave 1 names are treated as having been explicitly dropped.

Table 3 shows the percentage of alters in each category of role context and each category of exchange context who were explicitly dropped and who were forgotten. There are major variations. For example, wave 1 romantic partners missing in wave 2 were almost always explicitly dropped and almost never forgotten (19 vs. 1 percent), while wave 1 sons missing in wave 2 were more likely to have been forgotten than explicitly dropped (11 vs. 7 percent). Emergency helpers, advisors, and confidants were likeliest to remain in the network, while alters whom respondents found difficult were likeliest to be explicitly dropped (30 percent).

Table 4 examines these predictors simultaneously, together with alter traits, ego traits, and ego life events that occurred between the waves, as well as controlling for any methods effects. First, we should note that between-ego variation is minor (see lower part of table 4). Nothing about respondents' sociodemographic profile is independently associated with dropping an alter. Nor does network size and nor do methods variations matter. A few life events do predict a higher probability of dropping ties. Most important of these is moving, especially out of the region (and especially for the younger cohort; data not shown). A respondent who had moved out of the region was about four times likelier to drop an alter than a respondent who had stayed put. (The effect of moving is also highlighted in

[12]We do *not* control for alter centrality or network density because, for practical reasons, UCNets measured those for only a subset of up-to-five alters in each network.

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other studies, such as Badawy et al., 2018; Bloem et al., 2008.)The alter of a respondent who reported the death of a *close* nonkin associate or who had reported a major break in a relationship was at about 67 percent elevated risk of being dropped.[13] (Examination of interaction effects—not shown—suggest that the death mattered only for the young and the relationship breakup only for the older respondents.)

Much more important in predicting which alters were dropped are the alters' relationships to ego, as displayed in the top part of table 4. Immediate kin were far less likely than extended kin to be dropped, ranging from one-twenty-fifth as likely for husbands to one-half as likely for brothers. This certainly is evidence–given that other attributes of the actual ties, such as their supportiveness and emotional closeness, are held constant in this model–of the importance of the structural and normative constraints against sundering ties with close relatives.

All sorts of nonkin were likelier to be dropped than extended kin, substantially so for roommates, workmates, and acquaintances (double or more the odds of being dropped as extended kin). We expected workmates to be less vulnerable to being dropped, but they were more vulnerable. Open-ended responses suggest that this may be explained by a change of contexts, that either the respondent or the workmate changed jobs or work sites. Respondents volunteered such explanations for four percent of the dropped workmates and, more generally, respondents more often explained the dropping of workmates as the result of "life events" or of moving rather than having cut off those workplace ties.[14]

The results for relationship content show the importance of receiving support for retaining ties. All else held constant, providing social companionship, a confidant's ear, advice, or availability in an emergency reduced the odds of being dropped by about 30 to 40 percent. (Recently having provided practical help mattered as well, but not as much because, close examination suggests, many of these helpers were casual acquaintances or even previously unknown ties who just happened to be available [cf. Small, 2017].) Receiving help *from* ego and being demanding of ego seemed not to affect retention, although that has to be qualified: When the object of ego's help or the person named as difficult was an immediate relative, then they were much less likely to be dropped than an alter in that situation who was *not* close kin (data not shown). Finally, the alter descriptors section of table 4 shows, everything else equal, that alters whom respondents marked as emotionally close carried, for that alone, two-thirds the risk of being dropped than did other alters. (An indirect indicator of closeness, suggested by a reviewer, is whether an alter is listed early in answer to the questions. That modestly predicts, all else equal, retention.[15]) These findings reflects in another way the importance of how rewarding the tie is to ego in determining retention.

[13]It could be that these effects are mechanical in that the differences simply reflect the specifically dropped alters–the close nonkin who died or the estranged friend. But we suspect that they reflect more: the disruption of triadic ties when one edge disappears. That the death of a close relative does not have the same effect suggests as much, because connections to close kin are redundant.

[14]Forty-eight percent of dropped nonkin workmates (neither re-listed nor forgotten) were explained by life events or moving versus only 31 percent of non-workmate alters who were dropped (and versus 34 percent of *nonkin* non-workmates).

[15]We created an indicator of whether an alter was named first of second to *any* name-eliciting question. That indictaor, added to the model in table 4, is significant at $p < .03$, OR = 0.83.

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Discussion

High rates of network churn have long been a concern and puzzle for network analysts. By surveying a large and diverse sample of adults twice asked to answer a large and diverse set of name-eliciting and name-describing questions, the UCNets data provide a rich view of which alters are dropped from one year to another and why. About half of wave 1 names did not appear on wave 2 lists. Respondents chose from a range of explanations to account for each of the missing wave 1 alters. We took the answer "I forgot to name X" to mean that the missing alter X remained roughly in the same place in the respondents' networks. Other accounts, such as "we had no occasion to get together" or "we drifted apart," suggest that many dropped alters remained at least on the periphery of respondents' networks. Depending on how analysts choose to interpret these other explanations, the percentage of truly sundered ties could be as high as 27 percent (all those neither relisted nor forgotten) or as low as four percent (dropped only by death or disagreement) or nine percent (adding in those who "drifted" away).

The methodological implications of this analysis include the suggestion that researchers ought, given time and resources, at least find out whether dropped names were simply forgotten. A second is to appreciate even more the difficult task we pose to respondents (and interviewers [Paik and Sanchagrin, 2013]) when we ask them to recall lists of names. The recall process, as some researchers have described (e.g., Brashears, 2013; Brashears et al. 2016), is subject to all sorts of influences. If, as we suggested earlier, each question prompts a partly-random draw from a pool of qualifying ties, then there is greater stability in network membership than previously presumed. And such a process helps account, along with other processes such egos trying to sustain their individual network "signatures," for the over-time constancy in general network features. A third methodological implication is, as others have suggested, that networks have zones of ambiguity in which alters may be disfavored but yet remain latently connected and perhaps available. It is not clear that network analysts have good tools to deal with such ambiguity. Antonucci's depiction of networks as concentric circles of greater to lower involvement (e.g., Antonucci et al. 2010) is relevant, but even there, specific alters are either in or out of a circle. Perhaps, like Schrödinger's cat, many ties both exist and do not exist until egos look at them.

The substantive implications of these findings are, first, that contexts matter considerably, with constraining contexts–notably the immediate families of descent and of procreation–reducing the odds of ties being dropped. Changing contexts–notably moving–increases the odds of dropping ties. (We anticipated that the workplace would also constrain ties to persist, but the reverse seemed true, probably because egos and alters often change work sites.) Other studies discussed earlier reported rates of dropping ties to other life events such as marriage, widowhood, and retirement. Perhaps we did not because of the one-year lag did not allow us to cumulate enough such events. By one calculation, in our data about 60 percent of the drops resulted from contextual change of one kind or another–a move, a death, or the lack of an occasion to meet. Unanticipated by us, but consistent with much network literature on triadic structures and bridging ties, we found some evidence that losing a non-redundant tie by death or break-up led to losing connection with further nonkin alters.

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The second general substantive implication of the findings is that retaining a tie depended on the net balance of support versus burden the tie entailed. Alters who were confidants, advisers, social partners, likely helpers in an emergency, or considered emotionally "close" were likelier to be retained. Alters who got help from ego or who were demanding of ego were either no likelier to be kept or were likelier to be dropped. Finally, these two general factors–context and exchange quality–conditioned one another. Notably, respondents kept ties to alters who received their help or who were difficult *if* those burdensome people were close kin. Normative context seemed to matter more than the quality of the tie.

This study contributes to our understanding of the dynamics of personal networks by analyzing which ties are likely to disappear from the network lists, dropped by whom, and why. Understanding who is dropped is only one part of understanding network change. Feld, et al. (2007) point out that network change entails several dimensions, not only in membership turnover, for example, but also change in what continuing members do and who is added (see, e.g., Cornwell, et al., 2014). We can only cover member losses in this space. In future research, we plan to examine who was added to networks in waves 2 and 3 and to what extent dropped alters reappeared and why.

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APPENDIX

Name-Eliciting Questions

Please think about people you typically do these sorts of things [referring to sharing meals or other social activities] with – or other social things as well, such as going shopping, out for drinks, to the park, or just hanging out. Who are the people you usually do these sorts of things with?

Sometimes personal matters come up that concern people, like issues about relationships, important things in their lives, or difficult experiences. Do you ever confide in someone about these sorts of things or do you never confide in anyone? [IF YES:] Who do you confide in about these sorts of things?

When you have to make important decisions – for example, about taking a job, family issues, or health problems – are there any people whose advice you seek out or would seek out in making those decisions? They can be family, friends, or professional advisors. [IF YES:] Whose advice do you or would you seek out?

In the last few months, have any friends, relatives, or acquaintances[(who do not live with you)] given you any practical help like moving furniture, doing repairs, picking up something at the store, looking after a child, giving you a ride, or things like that? [IF YES:]

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Please give us the names of people who have done things like this for you in the last few months.

If you were seriously injured or sick and needed some help for a couple of weeks with things such as preparing meals and getting around, who would you ask? Would you ask particular people you know personally for help, ask a group for help, pay for help, or get help some other way? Or would you do more than one of these? [IF ASK PARTICULAR PERSON:] Who would those people be? These can be people you have named before or new people. [IF NOT:] But if you needed to, are there particular people you could ask for help? [IF YES:] Who would those people be? These can be people you have named before or new people.

We have been asking about people who help you out in different ways. Now, let's turn things around. Who are the people that you help out practically, or with advice, or in other kinds of ways at least occasionally? They can be people you've already named or new people.

There are sometimes people we know who ask a lot of us, who are sometimes demanding or difficult. Who are the people that you sometimes find demanding or difficult? They can be people you've already named or new people.

Life Events Between Wave 1 and Wave 2

Moving Near, Far: Respondents who answered yes to "Have you moved since the previous interview in [*month, year*]?" then answered "How far is where you live now from where you lived at the time of the previous interview? Is it...1 In the same neighborhood; 2 In a different neighborhood but in the same town; 3 In a different town but still in the Bay Area; 4 Out of the Bay Area, but still in California; 5 Out of California; 6 Other." Near was defined as answers 1, 2, and 3.

New job or started school: Respondents reported how long they had been at their current job and, for students, current school. If less than two years, they were coded as having a new job or school.

Stopped working (retirement and unemployment): Respondents who were retired or unemployed in wave 2 but not in wave 1 were coded as having stopped working since wave 1.

Graduated or left school: If respondents were in school in wave 1 but not wave 2; if they had advanced a degree.

Financial, work or school problems: Respondents who answered affirmatively to "Since the last interview in [*month, year*], have you had any major problems at work?" or a similar question about school.

Change in marital or partnered relationship: Respondents answered affirmatively to "Since the last interview in [[*month, year*]], has there been any important change in [*your marriage/your relationship/any romantic relationship you might have had*[16]]?

[16]The instrument applied the correct wording depending on whether the respondent was married or partnered or neither.

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New child or grandchild: Respondents who answered affirmatively to "Since the last interview in [*month, year*], have you [*had a child/had a child or a grandchild*]?"

Close kin died, Close nonkin died: Respondents answered affirmatively to "Since the last interview in [*month, year*], did anyone you felt close to pass away?" Follow-up questions determined whether the deceased included kin and/or nonkin.

Major break in relationship or friendship: Respondents who answered affirmatively to "Since [*month, year*], has there been any major break in a relationship between yourself and a relative or close friend?"

Health issue: Respondents who answered affirmatively to any of these options (besides "none"): "Did any of these happen to you since the last interview in [*month, year*]? Tell me all of the ones that apply: 1 Diagnosed with a serious illness; 2 Disabled by an illness or injury; 3 Hospitalized 4 Had or have another serious health issue 5 None -- no serious health issues."

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Table 1.

Sample's sociodemographic characteristics and prevalence of life events (weighted).

Demographics at wave 1 (n = 1,152)	**%**
Male	48.1
Age	
21–30	38.0
50–70	62.0
Race/ethnicity	
White	51.1
Asian	23.5
Latino	15.7
Black and other	9.6
Married	46.3
Education	
Less than BA degree	54.4
BA degree	28.1
More than BA degree	17.6
Poor health	17.3
Mode: web survey (vs. in-person interview)	37.7
Sample: Facebook recruit (vs. household sample, referred)	20.3
Experience of life event between wave 1 and wave 2	
Moved but nearby (in Bay area)	14.4
Moved far (outside Bay area)	7.5
New job or started school	12.7
Stopped working (retirement and unemployment)	6.4
Graduated or left school	9.3
Financial, work or school problems	30.9
Change in marital or partnered relationship	11.1
New child or grandchild	13.9
Close kin died	25.0
Close nonkin died	17.1
Major break in relationship or friendship	28.0
Health issue	26.0
Other Attributes (mean / SD)	
Extraversion	−2.31 / 2.77
Neuroticism	−3.83 / 2.40
Network size	10.2/4.3

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Table 2.

Wave 1 Alters by Fate in Wave 2: Listed and Dropped, and by Reason for Drop (weighted).

Fate of Alters Listed in W1	**TOTAL**	**Immed. Kin**[c]	**Extended Kin**	**Non-Kin**
Listed in W2	.537	.806	.451	.437
Not Listed in W2	.463	.194	.549	.563
Total of W1 Alters	9678	2609	1032	5985
Reason W1 Alter Not in W2				
Forgotten[a]	.412	.623	.571	.355
Died	.022	.085	.035	.011
Disagreement / Breakup	.055	.039	.063	.057
Drifted Apart	.125	.063	.028	.150
Someone Moved	.128	.043	.069	.150
Other Life Event[b]	.071	.026	.034	.085
No Occasion to Get Together	.166	.101	.173	.175
Miscellaneous Answers	.020	.020	.026	.018
Total of w1 Alters Not in W2	4477	507	567	3370
Treating Forgotten as Retained				
Died	.038	.225	.082	.017
Disagreement / Breakup	.094	.105	.160	.088
Drifted Apart	.212	.168	.066	.233
Someone Moved	.219	.115	.160	.233
Other Life Event[b]	.121	.068	.078	.131
No Occasion to Get Together	.283	.267	.403	.272
Miscellaneous Answers	.034	.052	.062	.027
Total of W1 Alters Not in W2 and Not Forgotten	2631	191	243	2175

Notes:

[a.] Includes 11 alters for whom respondents said that there were not enough spaces to list them.

[b.] Includes 51 alters with “someone’s health” as the answer.

[c.] Spouse, parent, child, or sibling.

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Table 3.

Alters dropped and forgotten from network by role relationship and interaction in the network (weighted).

	N	% Dropped	% Forgotten
Role relationship reported in wave 1			
Immediate kin			
Wife	215	3.8	2.0
Husband	228	0.8	1.6
Mother	454	7.3	14.9
Father	286	10.8	16.5
Adult daughter	343	2.3	10.0
Adult son	278	6.7	10.7
Sister	493	12.1	14.1
Brother	295	16.0	18.8
Extended Kin	1,012	22.9	30.7
Non-kin			
Nonkin Romantic partner	210	18.9	1.0
Nonkin Housemate	310	45.9	5.4
Nonkin Neighbor	489	29.6	26.1
Nonkin Workmate	833	44.3	18.1
Nonkin Schoolmate	487	40.9	18.5
Nonkin Churchmate	487	28.4	26.4
Nonkin Acquaintance	309	59.3	17.3
Nonkin Friend (Labeled *only* as friend)	2,500	32.3	19.9
Type of interaction in wave 1			
Social companionship	5,416	23.6	15.7
Confide	2,903	17.4	11.6
Advise	2,595	15.4	13.3
Provided recent practical help	1,847	23.4	15.1
Would provide emergency help	2,871	16.8	11.0
Receives support from respondent	3,832	23.6	13.2
Demanding or difficult alter	1,277	29.7	13.1

Notes:

All percentages are calculated at the alter level.

Kin categories include step- and half-relationships. Nonkin categories exclude kin.

Significance: All comparisons between alters in vs. out of a category are $p<.001$.

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Table 4.

Multilevel results predicting the log-odds an alter would be dropped from the network (weighted)

	b (SE)		Odds Ratio
Intercept	−.882***	(.252)	.41
Alter-level variables			
Role relationship in Wave 1			
Kin			
Wife	−1.145	(.764)	.32
Husband	−3.204**	(1.049)	.04
Mother	−1.731***	(.311)	.18
Father	−1.357***	(.340)	.26
Adult daughter	−2.264***	(.360)	.10
Adult son	−1.307***	(.341)	.27
Sister	−.900***	(.258)	.41
Brother	−.666*	(.309)	.51
[Extended kin, ref.]			
Nonkin			
Roommate	.689***	(.189)	1.99
Neighbor	.257	(.150)	1.29
Workmate	.648***	(.139)	1.99
Schoolmate	.235	(.164)	1.26
Churchmate	.224	(.214)	1.25
Romantic partner	.023	(.282)	1.02
Friend (labeled *only* as friend)	.347**	(.117)	1.42
Acquaintance	1.078***	(.198)	2.94
Type of interaction in Wave 1			
Socialize	−.478***	(.083)	.62
Confide	−.332***	(.104)	.72
Advise	−.330**	(.110)	.72
Recent practical help	−.228*	(.104)	.83
Available for emergency help	−.365***	(.089)	.69
Respondent provides support to alter	−.088	(.083)	.92
Difficult alter	−.002	(.119)	1.00
Alter descriptors in Wave 1			
Female (for non-kin)	−.006	(.086)	.99
Same age	−.052	(.123)	.95
Older	.045	(.149)	1.05
Met in last year	.333*	(.170)	1.40

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	b (SE)		Odds Ratio
Emotionally close	−.406***	(.092)	.67
Live over one hour away	.060	(.109)	1.06
Ego-level variables			
Life events between wave 1 and wave 2			
Moved away but nearby (in Bay area)	.500**	(.162)	1.65
Moved far (outside Bay area)	1.460***	(.191)	4.31
New job or started school	.140	(.151)	1.15
Retired or became unemployed	.049	(.207)	1.05
Graduated or left school	−.124	(.224)	.88
Financial, work or school problems	.222	(.119)	1.25
Change in marital or partnered relationship	−.074	(.148)	.93
New child or grandchild	−.249	(.159)	.78
Close kin died	−.017	(.120)	.98
Close nonkin died	.570***	(.147)	1.77
Major break in friendship or relationship	.493***	(.120)	1.64
Health issue	−.125	(.138)	.88
Sociodemographic variables in wave 1			
Male	−.100	(.123)	.90
Age 50–70	−.312	(.176)	.73
Asian	.238	(.153)	1.27
Latino	.059	(.151)	1.06
Black and other	.120	(.200)	1.13
Married	.019	(.124)	1.02
Education less than BA	.201	(.142)	1.22
Education BA	.147	(.130)	1.16
Poor health	.122	(.157)	1.13
Extroversion	.020	(.018)	1.02
Neuroticism	.033	(.021)	1.03
Network size in wave 1	−.023	(.014)	.98
Web survey in wave 1	.049	(.125)	1.05
Personal reference or Facebook recruit	−.025	(.175)	.98
N alters in wave 1	10,138		
N respondents in waves 1 and 2	997		
Variance components			
Between-ego variance	.581		
Chi-square (intercept)	1959.710***		

* $p < .05$.

** $p < .01$.

*** $p < .001$ (two-tailed tests)