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The Longitudinal Association between Social Network Composition and Episodic Memory in Older Adulthood: The Importance of Contact Frequency with Friends

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Abstract

Objectives.—The composition of one's social network has been associated with cognitive functioning such that a greater proportion of family is associated with worse cognitive functioning compared to a greater proportion of friends. It is not clear whether this association between network composition and cognitive aging is driven by potential negative effects of family interactions or positive effects of interactions with friends. Thus, this longitudinal study examined whether the relationship between network composition and episodic memory was driven by contact frequency with friends or family.

Methods.—Using 3 waves from the Health and Retirement Study (T1: 2006/2008, T2: 2010/2012, T3: 2012/2014; n=10,803; M_{age}=68.48, SD=10.89 at T1), a longitudinal mediation model was conducted to test the direct and indirect effects of composition on episodic memory and latent change in memory through contact frequency with friends and family.

Results.—Analyses revealed indirect effects of T1 composition on both T2 memory and latent change in memory from T2 to T3 through contact frequency with friends at T2. Specifically, a greater proportion of family in one's network was prospectively associated with lower contact frequency with friends and in turn, lower memory. Composition was also prospectively associated with higher contact frequency with family; however, contact frequency with family was not associated with memory.

Conclusions.—These findings suggest that spending time with family may not affect episodic memory in older adulthood, but spending time with friends may be beneficial. Potential mechanisms and implications regarding the importance of friendships in later life are discussed.

Keywords

Social Networks; Contact Frequency; Cognitive Aging

Cognitive decline represents a major contributor to disability and reduced quality of life among older adults. Identifying protective resources that help to sustain cognitive function in later life may help to inform future interventions to reduce late life cognitive morbidity. One naturally-occurring and modifiable potential resource for maintaining late life cognitive

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functioning is social networks. Guided by the convoy model of social relations (Antonucci, 2001; Kahn & Antonucci, 1980), it is theorized that an individual's social network exerts substantial and sustained effects on development across the lifespan. The convoy model further outlines that social networks can be broken down into their distinct structural components, which may have unique implications for mental and cognitive health (Antonucci, 2001; Kahn & Antonucci, 1980). Specifically, a social network can vary not only in the total number of social network members (i.e., social network size), but also in the composition of friends versus family within that network. Social network composition, defined as the proportion of family compared to friends within one's social network (Li & Dong, 2018; Sharifian, Manly, Brickman & Zahodne, 2019), may be a distinct aspect of social relations that predicts later life outcomes. Therefore, the current study aims to examine how this distinct structural component of social networks influences cognitive functioning in later life.

Distinct Effects of Social Relations with Family and Friends

Although social relationships with family members in older adulthood provide beneficial resources such as social support (Montpetit, Nelson, & Tiberio, 2017) and caregiving (Freedman & Spillman, 2014), there is evidence to suggest that familial ties may have some unintended negative consequences (i.e., Fiori, Antonucci & Cortina, 2006; Li & Dong, 2018). A greater proportion of family within one's social network has been cross-sectionally linked to worse emotional (Fiori et al., 2006; Fuller-Iglesias, Webster & Antonucci, 2015), health-related (Litwin & Shiovitz-Ezra, 2006; Shiovitz-Ezra & Litwin, 2012) and cognitive outcomes (Li & Dong, 2018; Sharifian et al., in press) compared to a greater proportion of friends. For example, in a cross-sectional study of health-related behaviors, individuals with more friends within their networks were more likely to engage in medical help seeking and physical activities, and were less likely to abuse alcohol, compared to those with more family within their networks (Shiovitz-Ezra & Litwin, 2012). In another cross-sectional study, African American older adults with large social networks comprising a greater proportion of friends were found to have better cognitive functioning across a battery of neuropsychological tests than those with large networks comprising a greater proportion of family (Sharifian et al., 2019). When examining the relationship between social resources and memory across social relationship types (children, other family, friends, spouse) longitudinally, researchers found that greater contact frequency with friends and not any other relationship type was associated with less decline in memory over time (Zahodne, Ajrouch, Sharifian & Antonucci, in press). In another longitudinal study, having friends was associated with less cognitive decline among women (Béland, Zunzunegui, Alvarado, Otero & del Ser, 2005), however, this study also found protective effects of social engagement with family for cognitive functioning in older adults as well (Béland et al., 2005), contrasting with prior cross-sectional and longitudinal studies.

The association between social network composition and cognition could reflect negative effects of spending time with family and/or positive effects of spending time with friends. Previous research has found that there is a limit to the absolute number of relationships a person can actively maintain in his/her social network. Thus, the larger a person's family is (i.e., the greater total number of family members in their social network), the more it

constricts the number of friendships an individual is able to preserve (Roberts, Dunbar, Pollet & Kuppens, 2009). Spending time with friends may be particularly important for cognitive functioning in later life. Relationships with family members may be viewed as more of an obligation whereas friendships are voluntary in nature (Lee & Ishii-Kuntz, 1987; Rossi, 2004). Prior research has found that interactions with friends are a greater source of immediate joy (Larson, Mannell & Zuzanek, 1986) and provide a greater sense of companionship through informal social activities compared to interactions with family members (Huxhold, Miche & Schüz, 2014). Consistent with this notion, having a greater number of friends, but not family members, has been linked to reduced mortality risk (Giles, Glonek, Luszcz & Andrews, 2005), lower loneliness and higher morale (Lee & Ishii-Kuntz, 1987), and better cognitive functioning (Li & Dong, 2018; Sharifian et al., 2019).

The benefits of spending time with friends may be due to the necessity of active maintenance to sustain these relationships (i.e., Roberts & Dunbar, 2011; 2015). Prior research examining social relationships in young adults found that family relationships require less maintenance than friendships (Roberts & Dunbar, 2011). That is, friendships required greater engagement in activities and more frequent communication to maintain emotional closeness over time (Roberts & Dunbar, 2011; 2015). Indeed, prior research has found that a greater number of close friendships is associated with greater leisure activity engagement (Ihle, Oris, Baeriswyl & Kliegel, 2018), and more frequent engagement in leisure and social activities has been linked to better cognitive outcomes in older adulthood (Ihle et al., 2018; Jonaitis et al., 2013; Verghese et al., 2003; 2006). Further, when examining the independent effects of friendships and familial ties, often, friendships are found to play a more prominent role in socioemotional and physical health outcomes relative to familial ties (i.e., Giles et al., 2005; Lee & Ishii-Kuntz, 1987; Li & Dong, 2018). Overall, these studies provide the rationale for the hypothesis that the link between social network composition and cognition reflects the benefits of spending time with friends rather than negative effects of spending time with family. Specifically, individuals with a greater proportion of family within their network may be less socially engaged with friends than individuals with a greater proportion of friends within their network, and in turn, may be less likely to experience the benefits afforded by frequent contact with friends.

Despite prior evidence that having a greater proportion of family within one's network in later life is associated with worse outcomes, previous research studies examining social network composition have been predominantly cross-sectional and may therefore be subject to reverse causation (i.e., Li & Dong, 2018; Sharifian et al., 2019; Shiovitz-Ezra & Litwin, 2012). It may be that older adults with lower cognitive functioning experience a greater mobilization of familial ties in their social network to help support them. Thus, in order to disentangle the relationship between network composition and cognitive functioning, the current study aimed to investigate the longitudinal association between composition and cognitive functioning in older adulthood. Further, we aimed to examine whether contact frequency with friends and/or contact frequency with family mediates the relationship between composition and cognition.

Based on prior research (Li & Dong, 2018; Sharifian et al. 2019), we hypothesized that a greater proportion of family within one's social network would be associated with lower

episodic memory and greater decline in episodic memory over time. In addition, based on evidence that friendships may require more active maintenance compared to family relationships, we hypothesized that contact frequency with friends would mediate the relationship between composition and episodic memory. Specifically, we hypothesized that a greater proportion of family within one's social network would reduce contact frequency with friends and, in turn, lead to lower episodic memory. We hypothesized that a greater proportion of family would be associated with greater contact frequency with family, however, due to mixed findings in the literature regarding contact frequency with family (i.e., Béland et al., 2005; Zahodne et al., in press), we have no a-priori hypothesis regarding the association between contact frequency with family and episodic memory.

Methods

Participants and Procedure

Longitudinal data from the Health and Retirement Study (HRS; 2006 – 2014) were used in the current study. The HRS is a nationally representative sample of Americans aged 51 and older followed since 1992, who are interviewed every 2 years (Sonnega & Weir, 2014). Details of the HRS longitudinal panel design, sampling, and all assessments instruments are available on the HRS website (http://hrsonline.isr.umich.edu). All participants were provided written informed consent, and all study procedures were approved by the University of Michigan institutional review board.

In 2006, HRS began administering a psychosocial questionnaire to alternating halves of the sample. Thus, one half the sample first received this questionnaire in 2006, while the other half of the sample first received it in 2008. Each of these subsamples received the questionnaire a second time either in 2010 (for those who originally received it in 2006) or 2012 (for those who originally received it in 2008). In the current study, these subsamples were combined into a single sample with two time points of psychosocial data (T1: 2006/2008 and T2: 2010/2012). Episodic memory was assessed at each of these time points, as well as two years later: (T3: 2012/2014). Thus, social network data were available at T1 and T2, and episodic memory data were available at T1, T2, and T3. Overall, participants at baseline (n = 10,463) were, on average, 68.48 years old (SD = 10.89), 59.90% female, and 74.40% non-Hispanic White.

Measures

Social Network Composition.—Composition was calculated from 4-items assessing (a) whether the participant was partnered (0 = no partner, 1 = partner), number of (b) children, number of (c) other family members (brothers, sisters, parents, cousins, grandchildren), and number of (d) friends with whom the participant had a close relationship. Scores were summed across these 4-items to obtain total social network size. Composition was then calculated by dividing the total number of family members (partner, children, other family members) by the total network size and multiplying by 100. Therefore, composition was represented by a percentage of family within one's network and could range from 0 (no family and all friends) to 100 (all family and no friends). Composition at T1 was used as the primary exposure variable in the longitudinal mediation model.

Contact Frequency.—Two separate contact frequency scores were calculated: contact frequency with friends and contact frequency with family. Contact frequency was assessed separately for children, other family members, and friends with 3-items. For each relationship type, participants rated how often they (a) meet up (included both arranged and chance meetings), (b) speak on the phone, and (c) write or email network members on a 6-point scale ranging from *three or more times a week* (1) to *less than once a year or never* (6). Scores were reverse coded so that higher score represent greater contact frequency. Scores across the 3 items were averaged within the friend domain to represent contact frequency with friends. Scores across the 6 items (i.e., 3 items for each domain: children, other family members) were averaged to represent contact frequency with family. Contact frequency with family and contact frequency with friends at T2 were used as mediators in the longitudinal mediation model, controlling for T1 contact frequency with friends and family (i.e., autoregressive paths).

Episodic Memory.—Episodic memory functioning was assessed with the HRS variant of the Consortium to Establish a Registry for Alzheimer's Disease (CERAD) immediate and delayed word recall task (Ofstedal et al., 2005). Participants heard a list of 10 words and were asked to recall the words immediately and after a 5-minute delay. A z-score composite was computed from raw scores on the immediate and delayed recall trials using means and standard deviations from the baseline (T1: 2006/2008) wave to improve reliability. Episodic memory at T2 and latent change in episodic memory from T2 to T3 were used as outcomes in the longitudinal mediation model, controlling for T1 memory (i.e., autoregressive path).

Covariates.—Age, gender, race, ethnicity, education, baseline assessment wave, T1 physical illness burden, T1 memory, T1 total social network size, T1 contact frequency with friends, and T1 contact frequency with family were included as covariates. Age and gender (0 = male, 1 = female) were self-reported. Self-reported race and ethnicity was represented by 3 dummy-coded variables to represent individuals who were (a) Non-Hispanic White, (b) Non-Hispanic Black, (c) Hispanic (of any race), (d) Non-Hispanic Other, with Non-Hispanic White as the reference group. Education was represented by self-report number of years of education (0 – 17). Baseline assessment wave represented whether the participant first received the psychosocial questionnaire in the 2006 or 2008 wave (1 = 2006, 0 = 2008). Physical illness burden at T1 was represented by the sum of self-reported chronic diseases: diabetes, cancer, lung disease, heart problems, hypertension, and arthritis. Total social network size at T1 was a sum score of all social network members. Episodic memory at T1 and contact frequency with friends and family at T1 (see descriptions above) were included to account for autoregressive paths in the mediation model.

Analytic Strategy

Because mediation models attempt to capture causal processes that occur over time, the use of concurrent assessments increases bias in findings (Maxwell & Cole, 2007). Therefore, a longitudinal mediation model was used to avoid concurrent assessment of our primary exposure variable (composition), mediators (contact frequency with family, contact frequency with friends), and outcome (episodic memory). This longitudinal mediation model is depicted in Figure 1. As shown, T2 contact frequency with friends and family

variables were regressed onto T1 composition, controlling for T1 contact frequency with friends and family, and allowed to covary. T2 memory and latent change in memory from T2 to T3 (McArdle & Nesselroade, 1994) were both regressed onto T2 contact frequency with friends and family, as well as T1 composition, controlling for T1 memory. Latent difference scores (LDS) model the portion of the follow-up value that is not identical to the baseline value and is a better representation of change than a raw difference between T2 and T3 because features of change that are of interest (mean change, inter-individual variability in change, relationship between baseline value and change) are modeled as explicit parameters (McArdle, 2009). Missing data were managed with full information maximum likelihood with robust standard errors. Descriptive statistics and correlations were calculated in SPSS (Version 25). The longitudinal mediation model was conducted in Mplus (Version 8; Muthén & Muthén, 2007).

Indirect effects were defined as the product of the association between composition and a mediator (contact frequency with friends or contact frequency with family) and the association between that mediator and an outcome (T2 memory or memory change from T2 to T3), independent of all covariates. Direct effects were defined as associations between composition and an outcome (i.e., T2 memory or memory change from T2 to T3), independent of all mediators and covariates. Model fit was determined based on fit indexes: Tucker-Lewis Index (TLI) and Comparative Fix Index (CFI) approximately .95 and a root mean squared error of approximation (RMSEA) of .08 or lower (Hu & Bentler, 1998; 1999).

Finally, the current analyses were weighted using HRS psychosocial leave-behind sample weights from baseline. The use of sample weights allows for findings to be generalizable to the larger U.S population of adults over age 50.

Results

Descriptive statistics and correlations for main variables of interest are listed in Table 1 and Table 2, respectively. Initial correlations revealed that a greater proportion of family within one's network was associated with less frequent contact with friends and more frequent contact with family. Contact frequency with both friends and family were significantly and positively associated with T2 and T3 episodic memory.

Subsequently, the longitudinal mediation structural equation model was conducted and revealed good model fit, $\chi^2(4) = 7.81$, $p = .099$, CFI = 1.00, TLI = .99, SRMR = .002, RMSEA = .01 [.00, .02] $p = 1.00$, and mediational pathways and covariances are depicted in Figure 1.

T2 Memory

An indirect effect of T1 composition through T2 contact frequency with friends was found on T2 memory (Standardized Indirect Effect = −.01, $SE = .00$, $p < .001$). Specifically, a greater proportion of family in one's social network at T1 was associated with less frequent contact with friends at T2 ($\beta = -.08$, $SE = .01$, $p < .001$), and less frequent contact with friends at T2 was associated with lower memory at T2 ($\beta = .06$, $SE = .01$, $p < .001$), controlling for T1 memory. Composition at T1 was also significantly associated with more

frequent contact with family members at T2 (β = .06, *SE* = .01, *p* < .001), however, contact frequency with family at T2 was not significantly associated with memory at T2 (β = .01, *SE* = .01, *p* = .493), and thus, no indirect effect was found (Standardized Indirect Effect = .00, *SE* = .00, *p* = .498).

In addition, significant effects of age (β = −.23, *SE* = .01, *p* < .001), gender (β =.07, *SE* = .01, *p* < .001), race (non-Hispanic Black: β = −.03, *SE* = .01, *p* < .001), and years of education (β = .14, *SE* = .01, *p* < .001) were found. Older age and self-identifying as non-Hispanic Black were each associated with lower T2 memory. Being female and having more education were each associated with higher T2 memory. Significant autoregressive paths were also found for T1 memory (β = .44, *SE* = .01, *p* < .001), contact frequency with family (β = .52, *SE* = .01, *p* < .001), and contact frequency with friends (β = .45, *SE* = .01, *p* < .001). After accounting for covariates and indirect paths, no direct effect of T1 composition on T2 memory emerged (β = −.01, *SE* = .01, *p* = .346).

Latent Change in Memory

Similar to T2 memory, there was an indirect effect of composition on latent change in memory through T2 contact frequency with friends (Standardized Indirect Effect = −.01, *SE* = .00, *p* < .001), but not through T2 contact frequency with family (Standardized Indirect Effect = .00, *SE* = .00, *p* = .384). A greater proportion of family in one's social network at T1 was associated with less frequent contact with friends at T2 (estimate provided above) and less frequent contact with friends at T2 was associated with greater decline in episodic memory between T2 and T3 (β = .07, *SE* = .01, *p* < .001). Contact frequency with family at T2 was not significantly associated with latent change in memory between T2 and T3 (β = .01, *SE* = .01, *p* = .372).

In addition, significant effects of age (β = −.24, *SE* = .01, *p* < .001), gender (β =.07, *SE* = .01, *p* < .001), year of baseline assessment (β = −.05, *SE* = .01, *p* < .001), race (non-Hispanic Black: β = −.03, *SE* = .01, *p* < .001; Non-Hispanic Others: β = −.04, *SE* = .01, p < .001), years of education (β = .12, SE = .01, *p* < .001), and network size (β = .02, *SE* = .01, *p* = .011) were found. Being female, having more education, and a larger social network size were each associated with less decline in memory over time. Older age, baseline assessment in 2006, greater physical illness burden, and self-identifying as non-Hispanic Black or "Other" were each associated with greater decline in memory over time. After accounting for covariates and indirect paths, no direct effect of T1 composition on latent change in memory emerged (β = .02, *SE* = .01, *p* = .083).

Discussion

Guided by the social convoy model (Antonucci, 2001), the goal of the current study was to examine whether social network composition has a substantial and sustained effect on cognitive aging in older adulthood. We specifically aimed to determine whether distinct structural components stemming from unique social relations (i.e., contact frequency with friends and/or with family) explain the longitudinal association between social network composition and episodic memory in older adulthood. We found that having a greater proportion of family within one's social network was indirectly associated with lower

subsequent episodic memory via less frequent contact with friends. This was consistent across both T2 memory and latent change in memory from T2 to T3. In contrast, contact frequency with family did not significantly mediate the relationship between composition and episodic memory. In line with the convoy model, these findings highlight that social relationships have an enduring and significant effect on developmental processes across the lifespan and further highlight that social resources from unique social relationships (i.e., friends, family) have differential effects on cognitive aging processes.

These findings are consistent with prior evidence which suggests that a greater number of close friendships is associated with better cognitive functioning in later life (Ihle et al., 2018; Kimura, Takeda, Ohura & Imai, 2017). Our findings further extend these previous findings by suggesting that friendships may play a more substantial role in later-life cognitive functioning relative to familial ties, consistent with prior research examining health and well-being outcomes in older adulthood (see Study 1; Chopik, 2017). For example, previous research has found that individuals with a greater proportion of friends within their networks have less risk of poorer physical health and depressive symptoms compared to those with a greater proportion of family within their networks (Park et al., 2018), suggestive that those with many friendships reap more socioemotional benefits than those with many familial ties.

Friendships may play a particularly salient role in later life cognitive functioning due to several distinctions between family and friend relationships. One important distinction is that friendships require more maintenance (i.e., more active communication and engagement in activities) to sustain emotional closeness compared to familial social relationships (Roberts & Dunbar, 2011; 2015). Indeed, for older adults in residential settings, those with good friends have greater active social interactions and more frequent conversations compared to older adults with no good friends (McKee, Harrison, & Lee, 1999). Without maintenance, emotional closeness within friendships will be susceptible to decay (Roberts & Dunbar, 2011; 2015). Consistent with this notion, friendships have been found to be better sources of companionship than family members due to their promotion of informal social activities (Huxhold et al., 2014).

In addition to helping maintain the friendship, these shared activities may also help to promote physical and cognitive health. Prior research has found that those with a greater number of close friendships report greater engagement in leisure activities, and in turn, better cognitive functioning (Ihle et al., 2018). Thus, friendships may promote activity engagement (Ihle et al., 2018), and activity engagement has been associated with preserved cognitive functioning in older adulthood (i.e., Litwin, Schwartz & Damri, 2017; Jonaitis et al., 2013). The negative consequences of having a greater proportion of family within one's social network may be due to the constraints on the number of friendship an individual can actively maintain (Roberts et al., 2009; Wrzus, Wagner & Neyer, 2012), thereby reducing contact with friends and the cognitive benefits associated with such contact.

In contrast, although we found that a greater proportion of family within one's network was associated with more frequent contact with family, contact frequency with family was not associated with episodic memory. This may be due to the fact that contact with family may consist of more obligatory tasks (i.e., work, chores, babysitting, etc.) than leisure activities,

and therefore, may be less likely to benefit cognition in later life. The lack of association between contact frequency with family and episodic memory further highlights that the positive effects of friendship rather than the negative effects of familial ties may be driving the relationship between composition and cognitive functioning. Because the current study could not examine the content of social interactions with friends versus family, future research is needed to investigate differences in interactions with friends versus family that may be relevant for late-life cognition.

Another distinction between familial ties and friendships is that familial ties are often obligatory, whereas friendships are more likely to be voluntary. Not only does an individual choose his/her friends, but those friends must also actively choose that individual. Thus, friendships may be more balanced than family relationships. According to the social norm of reciprocity, it is important that individuals not only receive support, but also provide support. Social relationships that are unbalanced – one individual is giving more than receiving – are often terminated (Ikkind & Van Tilburg, 1998), but terminating unbalanced relationships may be more difficult in the family context. Therefore, individuals with a greater proportion of friends in their social network may enjoy a greater number of balanced and reciprocal relationships, which may be beneficial to health. Indeed, prior research has suggested that providing more support than one receives is associated with increased risk of Alzheimer's disease (Amieva et al., 2010).

These findings enhance our understanding of cognitive aging and can inform potential interventions that target social relations as a modifiable protective resource. Specifically, findings highlight the importance of structural elements of social networks, such as composition. Prior intervention research has demonstrated that promoting social contact among isolated older adults has beneficial impacts on mortality risk, subjective health and health care costs (Pitkala, Routasalo, Kautiainen & Tilvis, 2009), life satisfaction and loneliness (McAuley et al., 2000), and cognitive functioning (Dodge et al., 2015). While prior research supports the importance of promoting social contact (i.e., Bassuk, Glass & Berkman, 1999; Fratiglioni, Wang, Ericsson, Maytan & Winblad, 2000), the current findings suggest that specifically targeting the development and maintenance of friendships may be most beneficial for cognition in later life.

Limitations and Future Directions

Although the current study highlights the potential benefits of contact with friends for cognitive functioning in older adulthood, there are some notable limitations. First, we theorized that contact frequency with friends may be more cognitively, socially, and/or physically stimulating compared to social engagement with family. However, we cannot directly measure whether activities/interactions with family members versus friends were more stimulating. Additionally, participants were asked to self-report whether they were married and the number of living children, other family, and friends with whom they felt close in order to calculate social network size and composition. This, however, may not capture all social network members such as more peripheral members (i.e., neighbors, co-workers, etc.). Further, this may not be as precise as other social network measures that collect more detailed information about each social network member (i.e., specific names,

relationships, individual characteristics, etc.). Future research should incorporate more comprehensive assessments of social network characteristics as well as investigate the specific activities individuals were engaging in when in contact with friends versus family in order to further investigate these underlying mechanisms that differentiate social ties with family members and friends.

Further, in order to avoid the use of concurrent predictors, mediators, and outcome variables in our mediation analyses, only two waves of episodic memory were available for use as outcome variables. Thus, growth curve modeling could not be used to obtain precise estimates of the slope of memory over time. Future research should utilize three or more time points of cognitive data after the measurement of psychosocial variables to better estimate the longitudinal trajectory of episodic memory in older adulthood. Finally, although the current study is longitudinal and utilized noncurrent waves to test the mediation model, these data are observational and may still be susceptible to reverse causation. Future intervention research targeting contact with friends and family may be necessary to clarify the directionality of our findings.

Strengths of the current study include the use of a longitudinal mediation model with non-concurrent variables, as well as controlling for autoregressive pathways which helps to reduce bias in longitudinal mediation analyses (see Maxwell & Cole, 2007). An additional strength of the current study was the use of sample weights, which allows for our findings to be generalizable to adults 51 years and older within the United States and increases confidence that interventions informed by these results may be broadly effective.

In conclusion, the negative association between a greater proportion of family within one's social network and later-life episodic memory appears to be mediated by reduced social engagement with friends. Older adults with larger families may have fewer opportunities to engage with friends, which may have negative consequences for later episodic memory functioning. Although spending more time with family members was not found to be negatively associated with episodic memory in this study, spending less time with friends was.

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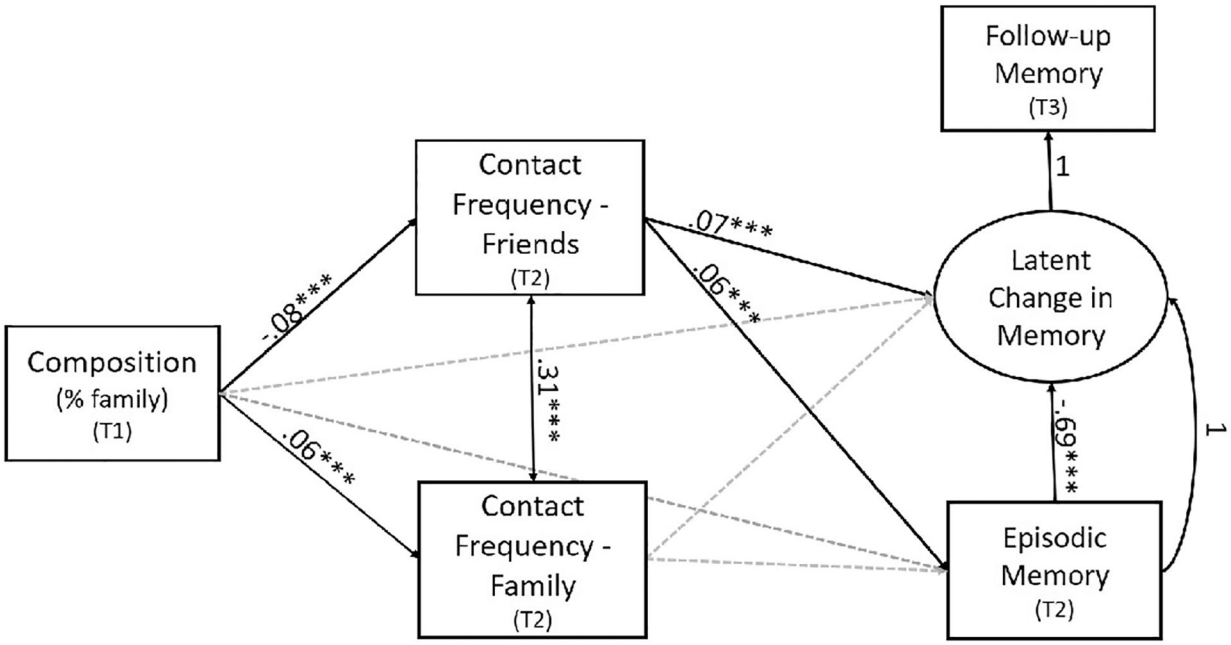

Figure 1.

Mediational pathways from social network composition (i.e., proportion family) to episodic memory through contact frequency. Standardized estimates are reported. Nonsignificant paths are depicted with dotted gray lines. For simplicity, covariate effects and autoregressive paths (T1 social engagement with family/friends, and T1 memory) were estimated but are not shown. * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Table 1

Means and Standard Deviations of Variables of Interest

	M	*SD*
Age (T1)	68.48	10.89
Female (%)	59.10	
2008 Baseline (%)	51.10	
Black (%)	14.30	
Hispanic (%)	9.10	
Other (%)	4.90	
Chronic disease Burden (T1)	1.99	1.35
Education (T1)	12.45	3.23
Network Size (T1)	10.74	10.93
Composition (T1)	65.26	23.06
Contact Frequency - Friends (T2)	3.79	1.09
Contact Frequency- Family (T2)	3.67	0.97
Episodic Memory (T1)	0.01	0.93
Episodic Memory (T2)	−0.09	0.96
Episodic Memory (T3)	−0.08	1.02

Note. Composition represents the % family in one's network

Table 2.

Correlations between Variables of Interest

	1		2		3		4		5
1. Composition (T1)									
2. Contact Frequency with Family (T2)	.02	*							
3. Contact Frequency with Friends (T2)	−.24	***	.41	***					
4. Memory (T2)	−.08	***	.14	***	.23	***			
5. Memory (T3)	−.06	***	.13	***	.22	***	.58	***	