Educational Differences in Health Discussion Mobilization through Social Networks

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ABSTRACT

Using the nationally-representative data from US older adults, I examine how older adults mobilize health discussion through social networks in reaction to the onset of diseases. The results show heterogeneous patterns across levels of education. When encountering new diseases between 2005 and 2010, older adults with lower education were more likely to abandon networks with whom they expect to rarely discuss health issues and recruit new members that possibly provide richer health discussion than the existing ones. People with higher education, on the other hand, showed less changes in networks and focused on promoting health discussion with the maintained networks. When considering the total amount of health discussion, the increase was observed only for those with a bachelor or higher degree. Those patterns – high fluctuation in social networks but little increase in health discussion for low-educated older adults – may partly explain health disparities by education in later life.

MOBILIZATION OF HEALTH DISCUSSION THROUGH SOCIAL NETWORKS

How do older adults' social networks change when encountering the onset of diseases? 1) Health problems and physical disability impede older adults' social participation, which may result in the decrease in social networks. For example, Thoits and Hewitt (2001) show an example of volunteer work: while the active participation in community services promotes good health, there is also a strong "selection" process by which unhealthy people regress from the activity. This process may explain the positive cross-sectional association between good health and social connectedness among older adults in the USA (B. Cornwell, 2009; E. Y. Cornwell & Waite, 2009). 2) However, we can also think about the opposite relationship between health problems and network changes. Health problems increase the needs for medical information and instrumental support for managing their health status, which makes older adults seek more resources from their social networks and cultivate more health-focused networks than before the onset of illness. For this reason, patients often experience a higher level of emotional and instrumental support after the onset of chronic diseases (Avlund, Lund, Holstein, & Due, 2004; Bloom & Kessler, 1994; de Leon, Gold, Glass, Kaplan, & George, 2001).

From this perspective, we expect two networking strategies in confronting health problems. First, one can aim to increase or maintain the size of overall social networks for securing the amount of support. Many studies show the advantage of large social networks (Berkman & Syme, 1979; Crooks, Lubben, Petitti, Little, & Chiu, 2008) and the addition of new networks (B. Cornwell & Laumann, 2015) for various health dimensions, which may be partly explained by better access to resources through networks. Second, it is possible to exploit one's original networks for health-specific needs rather than seeking new sources of support. A series of studies by Perry and Pescosolido (2010, 2012, 2015) show that people "activate" health-specific discussion through their existing social networks in reaction to diseases, and the successful activation explains a larger part of prognosis than general characteristics of discussion networks.

In this study, I investigate the changes in the level of health discussion with social network members after the onset of chronic diseases using the longitudinal and representative data of US older adults. Based on sequential analyses of social networks and health discussion, I examine how older adults react to health problems and secure their health-focused networks.

In this study, I especially focus on heterogeneity across levels of education. While many studies have consistently reported health disparities by education in the USA (Lleras-Muney, 2005; Montez & Hayward, 2014; Olshansky et al., 2012), scholars pointed out an unequal access to resources through social networks as one of the important mechanisms (Link & Phelan, 1995; Marmot, 2002). While previous studies using the data from the General Social Survey reported a positive association between the level of education and social network size (Marsden, 1987; McPherson, Smith-Lovin, & Brashears, 2006), there are few studies about educational differences in social network changes focused on the old-age population. One study on US older adults (B. Cornwell, 2015) investigates this topic in detail and shows that older adults with no high school diploma lose more social networks – mainly due to network members' deaths and widowhood – but incompletely recuperate the losses, which leads to the decline in the overall network size. Those results echo findings from urban sociology that the urban poor fail to cultivate durable networks due to residential instability and concentrated poverty (Sampson, Morenoff, & Earls, 1999; Small, 2007) and depend on "disposable" social ties that serve immediate needs for survival and easily decay (Desmond, 2012). Based on those findings, I hypothesize that lower-educated older adults may experience more fluctuation in health discussion networks.

There is one more reason that I expect the instability of social networks for those with low education. The mobilization of health discussion is only possible when you expect the knowledge and information about medical issues from your network members. Considering that network homophily based on education is strong in the USA (McPherson, Smith-Lovin, & Cook, 2001; Smith, McPherson, & Smith-Lovin, 2014), highly-educated older adults may have a better quality of networks from which they can draw diverse resources and information – in other words, we can expect "multiplex" social networks from them (Huang & Tausig, 1990). In this situation, highly-educated people do not have to cultivate new social relationships for the purpose of health promotion since they already have rich resources in their original social networks. Since I do not directly measure or test the multiplexity of social networks, I indirectly infer the quality of ties from patterns in health discussion mobilization and discuss the implication.

DATA

The data are from the National Social Life, Health, and Aging Project (NSHAP), a panel study on a nationally representative sample of the US older population. The NSHAP recruited 3,005 participants aged 57-85 in Wave 1 (W1, 2005-2006) and followed up 2,261 in Wave 2 (W2, 2010-2011). In this study, I focus on the data from 2,194 respondents who reported at least one social network member in both waves and have no missing values in other covariates.

Social networks are from the network module called "name generator" (Burt, 1984; B. Cornwell, Schumm, Laumann, & Graber, 2009). The module elicits up-to-five social network members with whom the respondent regularly discusses important matters in the past year, which provides *ego-centered networks* consisting of *ego* (i.e., the respondent) and *alter*s (i.e., network members enumerated by the module). After collecting real names of alters, the "name interpreter" reveals detailed information about each alter (e.g., type of relationship, contact frequency, emotional closeness) including the likelihood of *health discussion* with three levels (i.e., not likely, somewhat likely, very likely to talk about health problems).

Chronic diseases are measured by the modified Charlson's comorbidity index (Vasilopoulos et al., 2014). I consider 10 chronic diseases (i.e., heart attack, congestive heart failure, procedure for coronary artery disease, stroke, diabetes, cancer, metastatic cancer, COPD, rheumatoid arthritis, dementia) and assign higher points for cancer (2) and metastatic cancer (6) which add up to a maximum value of 16. I measure the onset of new diseases by the difference between comorbidity indices between W1 and W2. I use four categories of *education* (i.e., <high school, high school, associate, ≥bachelor).

ANALYTIC STRATEGY

I examine the relationship between the onset of diseases and i) losses of social networks, ii) additions of new network ties, iii) changes in the level of health discussion among maintained social networks, and iv) changes in the overall health discussion during the study period. The equations are as follows:

$$\text{logit}[\text{pr}(L_{ai} = 1)] = \beta_1 {H^1}_{ai} + \beta_2 C_i + \beta_3 {H^1}_{ai} C_i + \beta_4 {N^1}_{ia} + \beta_5 {X^1}_i + \text{u}_i \qquad (1)$$

$$\text{logit}[\text{pr}(A_{ai} = 1)] = \beta_1 {H^2}_{ai} + \beta_2 C_i + \beta_3 {H^2}_{ai} C_i + \beta_4 {N^2}_{ia} + \beta_5 {X^1}_i + \text{u}_i \qquad (2)$$

$$\text{logit}[\text{pr}({H^2}_{ai} > k)] = \beta_1 C_i + \beta_2 {N^1}_{ia} + \beta_3 {X^1}_i + \text{u}_i \quad (3)$$

$${H^2}_i = \beta_1 C_i + \beta_2 {X^1}_i + \varepsilon_i \quad (4)$$

The subscripts *i* and *a* are for ego and alter, and the superscripted numbers are for the time when the variable is assessed (i.e., W1 or W2). If there is no superscript, it stands for a longitudinal change in values. Equation (1)-(3) are alter-level analyses and include random effects u_i. In Equation (1), I regress ego *i*'s loss of alter *a* (L_{ai}) on health discussion at W1 (${H^1}_{ai}$), the change in comorbidity between W1 and W2 (C_i), and the interaction of the two (${H^1}_{ai}C_i$) with alter-level covariates (${N^1}_{ia}$: order in the roster, kin, female, contact frequency, emotional closeness) and ego-level covariates at W1 (${X^1}_i$: age, female, race/ethnicity, marital status, working status, depression, functional health, ego-level network characteristics) using logistic regression. I especially focus on β_3 in this equation: it captures how an ego manages his or her social networks based on the expectation for health discussion when encountering the onset of diseases. In Equation (2), I examine the addition of alter during the study period (A_{ai}). Since the information about newly-added alters are only available at W2, I compare network characteristics measured at W2 between new and existing alters. In Equation (3), I consider health discussion with alter *a* at W2 (${H^2}_{ai}$) after controlling for health discussion at W1 (which is included in ${N^1}_{ia}$) using ordinal logistic regression to check how the level of health discussion changes among maintained alters during two waves.

Lastly, Equation (4) is OLS regression of ego *i*'s overall health discussion at W2 (${H^2}_i$). In this analysis, I examine how the mixture of network managing behaviors above leads to the overall potential of leveraging health-focused resources. All models above are estimated separately by education to check the heterogeneity in patterns.

PRELIMINARY RESULTS

Table 1-3 contain descriptive statistics and results from analyses. According to Analysis 1 and 2 in Table 2, when encountering an increase in the comorbidity score, older adults without high school diploma are 26% less likely to abandon their social networks if they expect a high level of health discussion with the alter, and 32% more likely to have new alters with whom they expect a higher level of health discussion than the existing ones. As for older adults with high school or higher degree, the level of health discussion has no specific relationship with alter losses, but their new alters are likely to provide a slightly lower level of

health discussion than the existing members. According to Analysis 3, on the other hand, older adults with a bachelor or higher degree are 29% more likely to increase health discussion with the maintained alters between W1 and W2, whereas those with no high-school degree are 28% less likely to increase health discussion.

In sum, older adults with low education seem to focus more on health issues and try to maintain and cultivate health-focused social networks, whereas highly-educated counterparts aim to leverage their original social relationship in the face of diseases. As a result, Analysis 4 in Table 3 shows that the increase in the overall health discussion is only possible for older adults with high education: those with a bachelor or higher degree expect a 0.84 increase in the overall health discussion, whereas the others show a slight decrease in reaction to diseases. Those patterns – high fluctuation in social networks but little increase in health discussion for low-educated older adults – may partly explain health disparities by education in later life.

Table 1. Descriptive Statistics

		Analysis 1: Losses of alters		Analysis 2: Additions of alters		Analysis 3: Changes in health discussion			
		Mean	SD	Mean	SD	Mean	SD	Min	Max
Outcome									
Lost during W1-W2		0.48	0.50						
Added during W1-W2				0.51	0.50				
Health discussion at W2						1.72	0.56	0	2
Alter's characteristic									
Health discussion		1.57	0.68	1.54	0.69	1.72	0.56	0	2
Order in the roster		2.55	1.32	2.63	1.34	2.25	1.24	1	5
Kin		0.65	0.48	0.64	0.48	0.77	0.42		
Female		0.62	0.48	0.61	0.49	0.67	0.47		
Contact frequency		199.64	139.99	192.83	139.93	230.58	135.78	0	365
Emotional closeness		2.12	0.75	2.04	0.75	2.31	0.67	0	3
Ego's characteristic									
Comorbidity		1.38	1.29	1.38	1.29	1.36	1.27	0	8
△Comorbidity		0.56	0.88	0.56	0.88	0.57	0.88	0	6
Education	<High school	0.20	0.40	0.20	0.40	0.18	0.38		
	High school	0.25	0.43	0.25	0.43	0.25	0.43		
	Associate	0.31	0.46	0.31	0.46	0.31	0.46		
	≥Bachelor	0.25	0.43	0.25	0.43	0.26	0.44		
Age		68.24	7.49	68.24	7.49	68.02	7.46	57	85
Female		0.52	0.50	0.52	0.50	0.54	0.50		
Race/ethnicity	White	0.71	0.45	0.71	0.45	0.73	0.44		
	Black	0.16	0.37	0.16	0.37	0.15	0.36		
	Hispanic	0.10	0.30	0.10	0.30	0.10	0.30		
	Others	0.02	0.15	0.02	0.15	0.02	0.14		
Marital status	No partner	0.29	0.45	0.29	0.45	0.28	0.45		
	Married	0.64	0.48	0.64	0.48	0.65	0.48		
	Partnered	0.07	0.26	0.07	0.26	0.07	0.26		
Working		0.35	0.48	0.35	0.48	0.36	0.48		
Depression		2.95	2.40	2.95	2.40	2.91	2.37	0	11
Functional health		0.76	1.48	0.75	1.48	0.72	1.43	0	7
Network size		3.57	1.38	3.81	1.31	3.68	1.34	1	5
Proportion of kin		0.68	0.33	0.66	0.33	0.69	0.31	0	1
Proportion of female		0.64	0.30	0.63	0.29	0.64	0.29	0	1
Average contact frequency		214.80	93.52	205.15	91.50	215.56	90.59	2	365
Average emotional closeness		2.16	0.53	2.07	0.52	2.18	0.51	0	3
Average health discussion		1.61	0.46	1.57	0.46	1.62	0.44	0	2
N(alter)		7819		8339		4086			
N(ego)		2194		2192		1930			

Note. All variables are measured at W1 if there is no additional note except that analysis 2 is based on alter's characteristics at W2.

Table 2. Alter-level Analysis

	(1) Full sample	(2) <High school	(3) High school	(4) Associate	(5) ≥Bachelor
Analysis 1: Losses of alters					
Health discussion at W1	0.666***	0.838	0.762*	0.553***	0.675**
	(0.044)	(0.145)	(0.104)	(0.065)	(0.083)
Comorbidity at W1	1.020	1.005	1.059	0.974	1.060
	(0.025)	(0.058)	(0.055)	(0.042)	(0.058)
△Comorbidity	1.001	1.766*	0.932	0.941	0.920
	(0.087)	(0.473)	(0.172)	(0.131)	(0.155)
Health discussion x △Comorbidity	0.996	0.741*	1.020	1.062	1.033
	(0.049)	(0.108)	(0.104)	(0.087)	(0.103)
Education (ref. : <High school)					
High school	0.793*				
	(0.080)				
Associate	0.731**				
	(0.072)				
≥Bachelor	0.614***				
	(0.065)				
N(alter)	7819	1329	1873	2516	2101
N(ego)	2194	433	547	675	539
Analysis 2: Additions of alters					
Health discussion at W2	0.663***	0.579**	0.594***	0.793*	0.637***
	(0.044)	(0.110)	(0.080)	(0.090)	(0.081)
Comorbidity at W1	1.005	0.991	1.083	0.954	1.025
	(0.027)	(0.060)	(0.057)	(0.044)	(0.059)
△Comorbidity	1.037	0.688	0.937	1.199	1.321
	(0.089)	(0.165)	(0.144)	(0.192)	(0.229)
Health discussion x △Comorbidity	0.993	1.316*	1.047	0.898	0.857
	(0.049)	(0.174)	(0.091)	(0.082)	(0.089)
Education (ref. : <High school)					
High school	0.749**				
	(0.079)				
Associate	0.668***				
	(0.069)				
≥Bachelor	0.513***				
	(0.058)				
N(alter)	8339	1468	2047	2654	2170
N(ego)	2192	431	547	675	539
Analysis 3: Changes in health discussion					
Comorbidity at W1	1.046	1.160	1.157	1.006	0.972
	(0.051)	(0.144)	(0.108)	(0.084)	(0.102)
△Comorbidity	1.042	0.720+	1.026	1.134	1.294+
	(0.071)	(0.132)	(0.123)	(0.139)	(0.190)
Education (ref. : <High school)					
High school	0.840				
	(0.171)				
Associate	0.726				
	(0.144)				
≥Bachelor	0.783				
	(0.165)				
N(alter)	4086	643	1011	1311	1121
N(ego)	1930	347	482	605	496

Note. Odds ratios are reported. Standard errors in parentheses. All models control for alter-level covariates (i.e., order in the roster, kin, female, contact frequency, emotional closeness) and ego-level covariates (i.e., age, female, race/ethnicity, marital status, working status, depression, functional health, ego-level network characteristics)
+ p<0.10 * p<0.05 ** p<0.01 *** p<0.001.

Table 3. Ego-level analysis

	(1) Full sample	(2) <High school	(3) High school	(4) Associate	(5) ≥Bachelor
Comorbidity at W1	0.070+	0.133	0.133+	0.090	-0.055
	(0.041)	(0.098)	(0.070)	(0.083)	(0.112)
△Comorbidity	0.012	-0.040	-0.091	-0.036	0.184+
	(0.071)	(0.132)	(0.117)	(0.128)	(0.110)
Education (ref. : <High school)					
High school	0.261				
	(0.190)				
Associate	0.314				
	(0.196)				
≥Bachelor	0.348+				
	(0.197)				
N	2194	433	547	675	539

Note. Unstandardized coefficients are reported. Standard errors in parentheses. All models control for ego-level covariates (i.e., age, female, race/ethnicity, marital status, working status, depression, functional health, ego-level network characteristics).
+ p<0.10 * p<0.05 ** p<0.01 *** p<0.001.

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