The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences, 2026, **81(3)**, gbaf261
https://doi.org/10.1093/geronb/gbaf261
Advance access publication 16 December 2025
Research Article

Poorer subjective hearing is associated with less frequent and more negative social interactions in older adults

Elliot M. Friedman, PhD[1,2,*], Markus H. Schafer, PhD[3], Melissa M. Franks, PhD[1,2], Alexander L. Francis, PhD[2,4]

[1]Department of Human Development and Family Science, Purdue University, West Lafayette, Indiana, United States
[2]Center on Aging and the Life Course, Purdue University, West Lafayette, Indiana, United States
[3]Department of Sociology, Baylor University, Waco, Texas, United States
[4]Department of Speech Language and Hearing Sciences, Purdue University, West Lafayette, Indiana, United States

*Address correspondence to: Elliot M. Friedman, PhD. E-mail: efriedman@purdue.edu

Decision Editor: Jessica A. Kelley, PhD, FGSA (Social Sciences Section)

Abstract

Objectives: Hearing loss is one of the most common chronic conditions among U.S. adults, with increasing incidence and severity from middle age onward. Hearing loss is frequently linked to feelings of loneliness and social isolation, especially with advancing age, although the mechanisms underlying these links are not well defined. We examined the associations between subjective hearing and frequency and quality of routine social interactions in a national sample of adults.

Methods: Data were from the second waves of the Midlife in the United States study and the National Study of Daily Experiences. Participants ($N = 1,870$) rated their hearing compared to peers, reported frequency of contact with friends and family, and were interviewed daily for 8 consecutive days about positive and negative social interactions during each day.

Results: Poorer subjective hearing was associated with significantly less frequent social contact, a greater number of arguments and avoided arguments across the 8-day period, and fewer positive interactions. The only evidence of moderation was the association between hearing and the number of arguments; Black (compared to White) participants with poorer hearing had fewer arguments, but otherwise age, sex, and race and ethnicity did not moderate any of the associations between subjective hearing and frequency or quality of social interactions.

Discussion: These results support the possibility that impaired hearing may affect the quality of routine social interactions, potentially increasing the risk of social isolation and loneliness.

Keywords: Hearing loss, Population sample, Daily diary

The importance of social connections for health and longevity has been recognized for decades (see House et al., 1988), the adverse health impacts of social isolation rivaling factors like smoking, diet, and physical inactivity (Holt-Lunstad et al., 2010). The risk of social isolation is particularly high in later life compared to younger ages (Donovan & Blazer, 2020; Kannan & Veazie, 2023), and almost 50% of U.S. adults over age 60 report feeling lonely at least some of the time (Perissinotto et al., 2012). While there are myriad factors operating across individual and societal levels that contribute to social isolation (U.S. Surgeon General, 2023), hearing loss has emerged as an important influence (Bott & Saunders, 2021; Shukla et al., 2020), although the processes that can result in social isolation have not been examined extensively. The aim of the current study was to assess the relationship between hearing, subjectively determined, and the frequency and quality of routine social interactions in community-dwelling adults.

Hearing loss is one of the most common chronic disabilities in the US, affecting more than 56 million adults over age 40 (38%) and over 23 million (75%) over age 70 (Goman & Lin, 2016). Two recent reviews concluded that hearing loss, whether assessed objectively or subjectively, is associated with a greater likelihood of social isolation and loneliness (Bott & Saunders, 2021; Shukla et al., 2020). Social isolation and loneliness are hypothesized to be the end results of a sequence whereby individuals with hearing loss withdraw from and then actively avoid social interactions (Motala et al., 2024). For those with hearing loss, following conversations in social contexts requires significant effort and concentration, which can be both taxing and irritating (Vas et al., 2017). Indeed, individuals with hearing loss and their primary communication partners report feelings of frustration around difficulties with communication (Kamil & Lin, 2015; Vas et al., 2017). As a result, those with hearing loss may disengage from social interactions within social contexts (e.g., "zoning out" during conversations) and then eventually curtail or avoid social interactions altogether, ultimately leading to greater social isolation and loneliness (Motala et al., 2024).

The likelihood that aging adults with hearing loss will avoid potentially unpleasant social interactions is further increased by shifting social goals in later life. As articulated by Socio-emotional Selectivity Theory (SST), older adults, more than adults in midlife or young adulthood, prioritize emotionally meaningful and positive social relationships and tend to

Received: April 14 2025; Accepted: December 10 2025

avoid social relationships and interactions that are emotionally unpleasant (Charles & Carstensen, 2010). To the extent that hearing loss makes existing social relationships less pleasant, adults with such limitations would be expected to report less routine contact with other people, consistent with SST.

Besides reducing overall social contact and making it more stressful, hearing loss may also deprive affected adults of positive social interactions. The cognitive effort required for communication and the risk of missing intonation or other subtle acoustic properties of speech can limit the ability to exchange humor, warmth, camaraderie, and spontaneity, ingredients that make interactions uplifting and enjoyable. Positive experiences generally are uniquely related to well-being (Sin & Lyubomirsky, 2009), and the lack of positive social interactions specifically may increase the risk of loneliness (Zhaoyang et al., 2022).

Inquiry into the processes by which hearing loss may result in social isolation and loneliness would be enriched by an examination of routine daily social interactions and how the frequency and quality of those interactions vary with differing degrees of hearing loss. To that end, we use data from two large national studies interviewing the same individuals—Midlife in the United States (MIDUS) and the National Study of Daily Experiences (NSDE) – to determine both the typical frequency of interactions with diverse social others and the number of positive or negative social interactions participants have during an average week. We approach this endeavor with two hypotheses. First, and consistent with the argument that individuals with impaired hearing are more likely to avoid social interactions because of potential unpleasantness (Motala et al., 2024), we expect to observe less social contact in those with poorer hearing. Second, those social interactions that do occur are more likely, on balance, to be negative. Prior work with NSDE data has conceptualized negative social interactions—arguments and avoided arguments—as stressors (Almeida et al., 2002; Cichy et al., 2012), and we expect those with poorer hearing to report more such interactions. Relatedly, and for similar reasons, we hypothesize that those with poorer hearing will report fewer positive social interactions.

We also examine potential moderation of the relationship between hearing and social interactions by three factors: age, gender, and race and ethnicity. Data from three recent waves of the National Health and Nutrition Examination Survey (NHANES) show robust age-related declines in objectively and subjectively assessed hearing (Humes, 2023). Social networks also tend to become smaller with age (Bruine de Bruin et al., 2020), although, consistent with SST (Carstensen et al., 1999), this reduction can be attributed in part to older adults selecting relationships that provide positive emotional experiences and avoiding those that are more negative. Men in the NHANES study are also more likely than women to have and report greater hearing loss (Humes, 2023), while women in middle and later life tend to have larger, more diverse social networks with whom they have more frequent social contact (Fischer & Beresford, 2015). Given the existing body of research, we hypothesize that hearing loss will be less robustly associated with the frequency and quality of social interactions in older adults and in women. The literature on racial and ethnic differences in the prevalence of hearing loss is limited and mixed, although recent estimates suggest that hearing loss among Black and Hispanic populations is prevalent (Lor et al., 2021). For similar reasons, the impact of hearing loss on social interactions in Black and Hispanic adults is also difficult to predict, though it is likely to differ from the impact on White adults. On the one hand, the pervasive and persistent racial discrimination faced by Black adults in particular has been shown to exacerbate the negative impact of routine stressors (Murry et al., 2018). For example, one study showed that the adverse impact of negative social interactions (e.g., daily arguments) on affect and physical symptoms was more profound in Black than in White participants (Cichy et al., 2012). Tensions around hearing loss might therefore be greater in Black and Hispanic adults than in Whites. On the other hand, strong kinship networks are more typical of Black and Hispanic than White communities (Murry et al., 2018), and these may serve to blunt the adverse effects of hearing loss in social situations. Given these competing perspectives and limited extant data, we treat examination of racial and ethnic variability in hearing loss and connections to social interactions as exploratory.

Method

Sample

Data for the current study are from the second wave of MIDUS (MIDUS 2). MIDUS originated in 1995-1996 (MIDUS 1) with a total sample of 7,108 men and women between the ages of 24 and 75 comprising a national probability sample of non-institutionalized English-speaking adults ($N = 3,487$) living in the co-terminus United States and recruited by random digit dialing (RDD), a sample of monozygotic and dizygotic twin pairs ($N = 1,914$) recruited from a national twin registry, a sample of siblings of RDD participants ($N = 950$), and oversamples of select metropolitan areas ($N = 757$; Brim et al., 2004). A follow-up study (MIDUS 2) was completed in 2004-2006. Mortality-adjusted retention was 75% from MIDUS 1 to MIDUS 2. A new sample of Black residents of Milwaukee County, WI ($N = 592$) was recruited at MIDUS 2 to increase Black representation in MIDUS. All respondents completed telephone interviews and self-administered questionnaires.

A sub-sample of MIDUS 2 respondents who completed the telephone interviews and self-administered questionnaires were invited to participate in the NSDE and complete short telephone interviews about daily experiences for 8 consecutive days ($N = 2,022$). The NDSE sample was composed of 1,141 RDD respondents, 516 twins, 185 siblings, and 180 Milwaukee participants. Of these, 92% completed at least one interview, with most (68%) completing all eight interviews ($M = 8.4$, $SD = 1.3$), yielding an analytical sample of 1,870 for the current study.

Measures

Subjective hearing

As part of the MIDUS 2 questionnaire assessments, participants were asked, "Compared to others your age, how would you rate your overall hearing?" Response options ranged from 1 = Poor to 5 = Excellent. Objective (i.e., instrumental) measures of hearing are typically considered the gold standard of hearing assessment (Kamil et al., 2015), but subjective self-assessments (e.g., of fatigue and listening effort) tend to correspond better with subjective hearing self-assessments (Alhanbali et al., 2018; Hornsby & Kipp, 2016).

Social contact

Participants responded to two separate questionnaire items about frequency of social contact: "How often are you in

contact with any members of your family, that is any of your brothers, sisters, parents, or children who do not live with you, including visits, phone calls, letters, or electronic mail messages?" and "How often are you in contact with any of your friends, including visits, phone calls, letters, or electronic mail messages?" Response options for both questions ranged from 1 = Several times a day to 8 = Never or hardly ever. Responses were reverse coded so that higher numbers indicated more frequent contact and then averaged (range = 1-8). This variable was the primary outcome in the first set of analyses and a covariate in analyses involving NSDE data.

Daily experiences

The NDSE daily telephone interviews included questions about having "an argument or disagreement with anyone"; something that happened that they "could have argued about but decided to let pass in order to avoid a disagreement"; and "an interaction with someone that most people would consider particularly positive." Each "Yes" response was scored a "1" and the total number of days with arguments, avoided arguments, and positive interactions across the week was individually calculated (range = 0-8). The number of days with an argument/avoided argument/positive social interaction the dependent variables for analyses.

Covariates

All models adjusted for participant age (continuous) and sex (1 = female). Self-reported racial and ethnic identity was measured with a categorical variable (0 = non-Hispanic White; 1 = non-Hispanic Black; 2 = Hispanic). While the MIDUS sample includes participants of other races and ethnicities (e.g., Asian, Native American), they represent less than 5% of the sample and were therefore excluded from analyses. Educational attainment was determined from the MIDUS 2 telephone interview and recoded to three categories: High school diploma or GED or less; 2-year college degree or partial completion of a 4-year degree; completion of a 4-year college degree or more. Marital status was measured using a dichotomous variable (0 = not married or partnered; 1 = married or in a marriage-like relationship).

Analyses

Analyses were conducted using Stata18 (College Station, TX).

Linear regression models were estimated to examine the association of hearing loss with the frequency of social contact. We first estimated the extent to which subjective hearing predicted frequency of social contact (Model 1). To test for moderation, interaction terms for age, sex, and race and ethnicity were then added to each model (Model 2).

The dependent variables for all analyses involving NSDE data were counts (e.g., number of days with an argument). Because of overdispersion of data (standard deviations larger than or equal to the means) for two of the outcomes—days with arguments and days with avoided arguments—we used negative binomial models for all analyses. Given a majority of zero values (59%) for days with an argument, we compared negative binomial and zero-inflated negative binomial models. Based on AIC and BIC fit statistics, the negative binomial model provided the better overall model fit. Variables for age and hearing were mean-centered to provide interpretable intercepts. As with the social contact analyses, we first estimated the extent to which subjective hearing predicted the number of days with arguments, avoided arguments, and positive social interactions over the course of the 8-day study (Model 1). To test for moderation, interaction terms for age, sex, and race and ethnicity were then added to each model (Model 2). Coefficients for all negative binomial models were exponentiated and reported as incidence rate ratios (IRRs) for ease of interpretation.

All models adjusted for all covariates—the analyses of NSDE data also adjusted for frequency of social contact—and robust standard errors were applied to account for clustering in the data (e.g., siblings and twins).

Results

Descriptive statistics for the analytical sample are shown in Table 1. Average age was 56, most were female (58%), 38% had completed at least a 4-year college degree, 50% rated their hearing "very good" or "excellent" relative to their same-age peers, and most (82.3%) reported having contact with friends and/or family members at least once a week. On average, over the course of the 8-day NDSE study, arguments ($M = 0.7$ days) and avoided arguments ($M = 1.1$ days) were infrequent, occurring on fewer than and slightly more than one day, respectively. Indeed, the majority of participants (59%) reported no arguments during the study. In contrast, participants reported positive interactions on more than half the days ($M = 4.6$).

Frequency of social contact

Results from linear regression models predicting frequency of social contact are shown in Table 2. Better subjective hearing was significantly associated with more social contact ($p = 0.04$) as were greater age ($p < .01$), being female ($p < .001$), and having some college education (compared to those with a high school degree or the equivalent; $p = .04$). Addition of interaction terms showed no moderation, indicating consistent

Table 1. Descriptive statistics ($N = 1,870$).

Variable	Mean (SD)	Range	%
Age	56.3 (12.1)	34–84	
Sex (1 = female)			58.0
Race and ethnicity			
Non-Hispanic White			85.1
Non-Hispanic Black			11.7
Hispanic			3.1
Education			
High school/GED			31.1
Some college			30.5
College+			38.4
Married			68.7
Contact with others > once a week			82.3
Hearing relative to others			
Poor			4.1
Fair			14.6
Good			30.9
Very good			32.6
Excellent			17.8
Days with an argument	0.7 (1.0)	0–7	
Days with an avoided argument	1.1 (1.1)	0–7	
Days with a positive interaction	4.6 (2.2)	0–8	

Table 2. Linear regression models estimating frequency of interactions with friends and/or non-residential family members predicted by subjective ratings of hearing, race, and their interaction.

Variable	Model 1	Model 2
Hearing compared to others	**0.06 [0.01,0.11]**	0.03 [–0.05,0.11]
Age	**0.01 [0.00,0.01]**	**0.01 [0.00,0.01]**
Sex (1 = female)	**0.42 [0.29,0.54]**	**0.42 [0.29,0.54]**
Education (Ref. = High School/GED)		
Some college	**0.16 [0.01,0.31]**	**0.15 [0.01,0.30]**
College+	0.14 [–0.00,0.29]	0.14 [–0.01,0.28]
Race and ethnicity (Ref. = Non-Hispanic White)		
Non-Hispanic Black	–0.16 [–0.37,0.05]	–0.15 [–0.36,0.06]
Hispanic	–0.11 [–0.45,0.22]	–0.12 [–0.47,0.26]
Marital status (1 = married)	–0.02 [–0.15,0.11]	–0.03 [–0.16,0.11]
Hearing × Age		–0.00 [–0.01,0.00]
Hearing × Sex		0.09 [–0.02,0.20]
Hearing × Non-Hispanic Black		–0.13 [–0.33,0.08]
Hearing × Hispanic		–0.03 [–0.32,0.26]
Model R^2	.03	.03

Note. $N = 1{,}870$. Model 1 shows the main effects of predictors; Model 2 adds the interaction terms: hearing by age, sex, and race and ethnicity. Unstandardized coefficients and 95% confidence intervals are shown. Statistically significant associations are shown in bold text. Ref = reference.

Table 3. Negative binomial regression models estimating number of days with an argument.

Variable	Model 1	Model 2
Hearing compared to others	0.96 [0.90,1.02]	**0.90 [0.81,0.99]**
Age	**0.97 [0.97,0.98]**	**0.97 [0.97,0.98]**
Sex (1 = female)	**1.20 [1.04,1.37]**	**1.21 [1.05,1.39]**
Race and ethnicity (Ref. = Non-Hispanic White)		
Non-Hispanic Black	1.07 [0.85,1.35]	0.99 [0.78,1.26]
Hispanic	**1.43 [1.03,1.98]**	1.35 [0.98,1.88]
Education (Ref. = High School/GED)		
Some college	1.05 [0.87,1.25]	1.06 [0.89,1.27]
College+	**1.31 [1.11,1.55]**	**1.34 [1.13,1.58]**
Marital status (1 =married)	**1.29 [1.11,1.50]**	**1.30 [1.12,1.52]**
Contact with others (1≥ once a week)	1.05 [0.87,1.27]	1.05 [0.87,1.27]
Hearing × Age		1.00 [0.99, 1.01]
Hearing × Sex		1.03 [0.90, 1.17]
Hearing × Non-Hispanic Black		**1.48 [1.18,1.85]**
Hearing × Hispanic		1.19 [0.87,1.64]
Model R^2	.03	.03

Note. $N = 1{,}870$. Model 1 shows the main effects of predictors; Model 2 adds interaction terms: hearing by age, sex, and race and ethnicity. Incidence rate ratios and 95% confidence intervals are shown. Statistically significant associations are shown in bold text. Ref = reference.

associations across ages, sexes, and racial and ethnic groups. We estimated the same models using the full sample from MIDUS 2 ($N = 4{,}403$). Results showed a stronger association between better hearing and more social contact (b = 0.08, $p < .001$) and less social contact among Black compared to White respondents (b = –0.15, $p = .02$). Otherwise, the results were comparable to the models with the smaller NSDE sample (data not shown).

Arguments or disagreements

Results from negative binomial regression models predicting the number of days with an argument are shown in Table 3. Subjective hearing was inversely but non-significantly associated with the number of argument days (Model 1). Hispanic participants reported significantly more days with arguments compared to White participants. Postestimation analyses showed that while Black (0.70) and White (0.65) respondents reported a similar number of days with arguments, Hispanic participants reported significantly more (0.93, $p = .03$; data not shown). Reporting more days with arguments was also associated with having a college education or more and with being younger, female, and married.

The addition of interaction terms for race and ethnicity, but not age or sex, indicated significant moderation (Model 2), shown graphically in Figure 1. Simple slopes analyses showed a significant inverse association between subjective hearing and argument days among White participants (-.06, $p = .008$) but a significant positive association among Black participants (.20, $p = .01$); the association among Hispanic participants was in the same direction as among Black participants, but not statistically significant (0.09, $p = .56$). Additional analyses probing this moderation further showed the difference in slopes between Black and White participants, but not between Hispanics and either of the other two groups, was statistically significant ($p = .001$). Among those rating their hearing as "Poor," there were significantly more argument days reported by White than Black participants (0.83 vs. 0.31, $p < .001$). In contrast, among those rating their hearing as "Excellent" Black participants reported more days with an argument than did White participants (1.03 vs. 0.57, $p = .01$). White participants rating their hearing as excellent compared to their peers had 30% fewer days with an argument than those rating their hearing as poor ($p = .01$). For Black participants, the pattern was reversed: those rating their hearing as excellent had 70% more argument days than those rating their hearing as poor ($p = .003$).

Avoided arguments

Results from negative binomial regression models predicting the number of days with an avoided argument are shown in Table 4. Subjective hearing was significantly inversely associated with avoided arguments in the full sample (Model 1). Age was inversely associated with avoided arguments, while women were more likely than men to report avoided arguments, and those with more education (both some college and college or more) reported more days with avoided arguments than high school graduates. There was also significant moderation by race and ethnicity, but not age or sex, of the association with subject hearing (Model 2). Simple slopes analyses showed a significant inverse association between hearing and avoided arguments among White participants (–0.07, $p = .009$), but no significant associations for the other racial and ethnic groups. The difference in slopes between Black and White participants, but not between Hispanic and either of the other two groups, was statistically significant ($p = .04$).

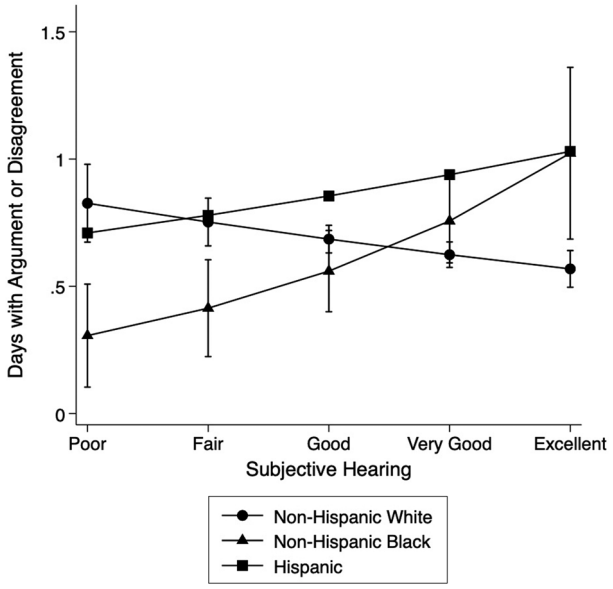

Figure 1. Association of subjective hearing and number of argument days was significantly moderated by race. For clarity, error bars (95% confidence intervals) are not shown for "Hispanic."

Table 4. Negative binomial regression models estimating number of days with an avoided arguments predicted by subjective ratings of hearing.

Variable	Model 1	Model 2
Hearing compared to others	**0.95 [0.91,0.99]**	0.95 [0.89,1.03]
Age	**0.99 [0.98,0.99]**	**0.99 [0.98,0.99]**
Sex (1 = female)	**1.20 [1.09,1.33]**	**1.20 [1.09,1.33]**
Race and ethnicity (Ref. = Non-Hispanic White)		
Non-Hispanic Black	1.02 [0.87,1.20]	0.99 [0.85,1.16]
Hispanic	1.05 [0.82,1.35]	1.04 [0.81,1.35]
Education (Ref. = High School/GED)		
Some college	**1.16 [1.03,1.31]**	**1.17 [1.03,1.32]**
College+	**1.35 [1.19,1.53]**	**1.37 [1.20,1.54]**
Marital status (1 = married)	0.98 [0.88,1.09]	0.99 [0.87,1.10]
Contact with others (1≥ once a week)	0.95 [0.83,1.09]	0.96 [0.83,1.09]
Hearing × Age		1.00 [0.99, 1.01]
Hearing × Sex		0.96 [0.87, 1.05]
Hearing × Non-Hispanic Black		**1.20 [1.03,1.40]**
Hearing × Hispanic		1.00 [0.81,1.25]
Model R^2	.02	.02

Note. Model 1 shows the main effects of predictors; Model 2 adds the interaction terms: hearing by age, sex, and race and ethnicity. Incidence rate ratios and 95% confidence intervals are shown. Statistically significant associations are shown in bold text. Ref. = reference.

Positive interactions

Results from negative binomial regression models predicting the number of days with positive interactions are shown in Table 5. Subjective hearing was significantly associated with more positive interactions in the full sample ($p < .001$). Compared to White participants, those identifying as Black reported significantly fewer days with positive interactions ($p < .001$). Greater age, female gender, and greater educational attainment were all significantly associated with more days with positive interactions. There was no evidence that age, sex, or race and ethnicity moderated the association of hearing and positive interactions (Model 2).

Discussion

This study examined the relationship between subjective hearing relative to peers and the frequency and quality of routine social interactions in a racially and ethnically diverse national sample of adults. In the main, and consistent with our hypotheses, the results showed that poorer ratings of hearing were associated with less social contact, a greater likelihood of negative social interactions (arguments and avoided arguments), and fewer positive interactions. These daily experiences of more negative and fewer positive social interactions among most who report poorer hearing may contribute to individual decisions to withdraw from or avoid social situations, increasing the risk of social isolation and loneliness.

The measure of social contact in the present study was self-reported frequency of contact with friends and family, and the results in the smaller NSDE sample, as well as the full MIDUS 2 main sample, both indicated that poorer subjective hearing was associated with less frequent contact. These results are consistent with the framework proposed by Motala and colleagues (2024) where impaired hearing is argued to lead to withdrawal from and eventual avoidance of social interactions. They are also consistent with earlier studies linking impaired hearing to social contact. Adults in the Longitudinal Aging Study Amsterdam who reported difficulty following conversations, for example, had smaller social networks (Kramer et al., 2002). Participants in the Canadian Longitudinal Study of Aging who reported poorer hearing also reported having less access to social support and greater loneliness (Mick et al., 2018). Research using data from the NHANES showed that women aged 60-69 with poorer objectively measured hearing had greater odds of being socially isolated (e.g., unmarried; no close friends; lack of emotional or instrumental social support; Mick et al., 2014). This collective body of work does not illuminate the reasons for reduced social contact—whether the individual with hearing loss withdraws from such contact or is excluded by those contacts—but they are consistent in showing that social contact is rarer for those with poor hearing, whether objectively or subjectively measured.

One potential explanation for a reduction in social contact is the quality of social interactions. Our findings suggest that during a typical week, those with poorer hearing are more likely to report having or avoiding arguments, both of which are considered negative experiences and potentially stressful (Almeida et al., 2002; Cichy et al., 2012). We do not know from NSDE data whether the arguments are related to poorer hearing specifically, but these results are consistent with qualitative studies documenting the frustrations around communication experienced by those with hearing loss and their communication partners (Heffernan et al., 2016; Kamil & Lin, 2015). Negative social experiences are particularly noxious for aging adults (Rook, 2015) who are consequently likely to avoid interactions that are aversive as well as the people with whom they have unpleasant interactions (Charles & Carstensen, 2010). Indeed, the current results showed that greater age was associated with fewer arguments and avoided arguments and more positive social experiences. The higher rate of arguments

Table 5. Negative binomial regression models estimating days with positive interactions predicted by subjective ratings of hearing, race, and their interaction.

Variable	Model 1	Model 2
Hearing compared to others	**1.04 [1.02,1.07]**	**1.05 [1.01,1.08]**
Age	**1.01 [1.00,1.01]**	**1.01 [1.00,1.01]**
Sex (1 = female)	**1.10 [1.05,1.16]**	**1.11 [1.06,1.16]**
Race and ethnicity (Ref. = Non-Hispanic White)		
Non-Hispanic Black	**0.83 [0.77,0.90]**	**0.82 [0.76,0.89]**
Hispanic	1.00 [0.91,1.12]	1.00 [0.90,1.13]
Education (Ref. = High School/GED)		
Some college	**1.20 [1.13,1.27]**	**1.20 [1.13,1.27]**
College+	**1.33 [1.26,1.41]**	**1.33 [1.26,1.41]**
Marital status (1 = married)	1.04 [0.99,1.09]	1.04 [0.99,1.09]
Contact with others (1≥ once a week)	**1.12 [1.04,1.19]**	**1.12 [1.05,1.19]**
Hearing × Age		1.00 [1.00, 1.00]
Hearing × Sex		0.98 [0.94, 1.02]
Hearing × Non-Hispanic Black		1.06 [0.98,1.14]
Hearing × Hispanic		0.99 [0.88,1.11]
Model R^2	.01	.01

Note. Model 1 shows the main effects of predictors; Model 2 adds the interaction terms: hearing by age, sex, and race and ethnicity. Incidence rate ratios and 95% confidence intervals are shown. Statistically significant associations are shown in bold text. Ref. = reference.

and avoided arguments among those with poorer subjective hearing may thus be a precursor for steering clear of situations where arguments are likely, as well as the people associated with them, ultimately leading to fewer social contacts. Poignantly, our results suggest that those with hearing loss also experience fewer positive social exchanges during a typical week. The extensive literature on social connectedness and health shows that positive social interactions have robust salubrious effects on mental and physical well-being (Cohen, 2004; Holt-Lunstad, 2018) in ways that are independent of the number of social contacts or the availability of social support (Friedman et al., 2024). Our results suggest that those with poorer hearing are routinely exposed to the twin adversities of more negative social interactions and fewer positive ones.

Greater age was associated with more social contact, fewer days with arguments and avoided arguments, and more days with positive experiences while being female was associated with more days with all these experiences as well as more social contact overall. However, moderation analyses showed that neither age nor sex moderated the association of subjective hearing with the social interaction measures, suggesting that the social impact of poorer hearing may not vary with age or sex. In contrast, partial moderation was observed for race where among Black participants, decrements in subjective hearing were associated with fewer arguments, although not fewer avoided arguments or more positive interactions. These results may be anomalous—our examination of racial and ethnic differences was exploratory rather than hypothesis-driven—but they may also illuminate differences that are worthy of further investigation. Routine, uncontrollable, and unpredictable exposure to racial discrimination in Black adults has been shown to exacerbate the negative impact of daily stressors on multiple aspects of individual and family function (Murry et al., 2018). However, we did not observe a greater likelihood of arguments or avoided arguments in Black adults with worse subjective hearing. Instead, there were fewer arguments among those with worse hearing, supporting the possibility that strong kinship networks in Black families and social networks (Murry et al., 2018) may function to reduce social tensions in the context of hearing loss. In light of evidence that what appear to be greater loneliness and social isolation in Black and Hispanic adults with hearing loss may in fact be explained by social structural factors (Lewis et al., 2025) and by instruments that may not fully reflect available social resources (Trujillo Tanner et al., 2022), the nuanced associations between hearing loss and routine social interactions in different populations is a worthy focus for future research.

In the context of extant research linking hearing loss to loneliness and social isolation, the current observations that poorer hearing is also associated with more negative and fewer positive routine social interactions argue for early detection and treatment of hearing loss. A recent trial, for example, showed that adopting hearing aids may help to preserve social network diversity and forestall loneliness and social isolation (Reed et al., 2025). Another intervention approach that may mitigate the risk of social isolation is engaging family members as partners in audiological rehabilitation, consistent with recent clinical practice recommendations for improving hearing outcomes, including social-emotional well-being (Timmer et al., 2024). Family, particularly spouses, play an important role in identifying hearing impairments and promoting proper management of hearing loss. As communication partners of persons with hearing loss also experience additional demands and feelings of being isolated due to communication difficulties (Kamil & Lin, 2015; Vas et al., 2017), involving family members in clinical audiological intervention may have the added benefit of improving the lives not only of persons with hearing loss but also of their communication partners.

There are important limitations to this study that contextualize the results. Most significantly, data on hearing was subjective and based on participants' assessment of how their own hearing compares to that of their peers. Nonetheless, the current results are consistent with studies that examined associations between objectively assessed hearing loss and social network size and quality (Bott & Saunders, 2021; Shukla et al., 2020). Moreover, objective measurement may document hearing loss before an individual perceives any decrements in hearing, making subjective perceptions potentially more relevant for behavioral decisions about social participation. Another limitation is that the reasons for arguments, avoided arguments, and positive interactions in the NSDE data are unclear and may be unrelated to impaired hearing. That said, the clear general association of poorer subjective hearing and both more negative interactions (in the form of arguments and avoided arguments) and fewer positive interactions suggests that hearing plays a role in the quality of routine social interactions, no matter their content. It is also worth considering that while avoiding an argument specifically is considered a stressor (Almeida et al., 2002; Cichy et al., 2012), it may also reflect a successful attempt to avoid a worse interaction in the form of a realized argument. Older adults in particular will often avoid emotionally fraught interactions in order to preserve their relationships (Luong et al., 2011), so avoiding arguments in the context of hearing loss may serve to protect social networks, a possibility that merits further study.

Another source of measurement ambiguity relates to the assessment of overall social contact, which combines face-to-face encounters and phone calls with text-based forms of communication. As face-to-face communication can be frustrating (Kamil & Lin, 2015; Vas et al., 2017), adults with hearing loss may compensate by relying more on text-based communication, potentially leading us to underestimate the degree to which this disability shapes social connection. Furthermore, we expect that reliance on text-based communication has only increased since these data were collected, and we encourage ongoing research to extend the investigation into the realm of digital communication. Still, emerging research suggests that digital communication may only partially buffer the challenges of hearing impairment for maintaining social interaction. Some evidence indicates that video calls can reduce depressive symptoms among older adults with hearing loss (Zhang et al., 2023), yet another recent study finds that digital device use may amplify associations between hearing impairment and poor mental health (Kim & Hwang, 2025). Studies are also inconclusive about whether hearing-impaired adults are more or less likely to adopt digital tools than their peers without impairment; uptake appears to vary by platform, and those who do use video call technologies often struggle with them (Jansen et al., 2024; van Wier et al., 2021; Wang et al., 2022). Still, we found no research that directly evaluates whether digital communication mitigates loneliness or isolation for hearing-impaired adults, despite assumptions that it might (Sen et al., 2022). Finally, although the MIDUS sample is broadly national, it was not designed to be nationally representative. In addition, most of the Black participants for MIDUS and NSDE were recruited from Milwaukee County, WI, and the present results may not generalize to other regions, particularly for Black adults.

Against these limitations are notable strengths, including a large, diverse sample and data on routine daily social interactions that include positive as well as negative experiences. Our results suggest that people who perceive that their hearing is poorer than their peers have less contact with family members and friends, and, with the exception of arguments among Black participants, that the contact they do have is more likely to involve negative interactions and less likely to involve positive ones. These results illuminate daily processes that may contribute to the hypothesized sequence by which hearing loss can lead to social isolation and loneliness (Motala et al., 2024), and they bolster the case for early identification and treatment of hearing loss.

Funding

None declared.

Conflict of interest

None declared.

Data availability

Data used in this manuscript are from the Midlife in the United States study and publicly available (https://www.icpsr.umich.edu/web/NACDA/series/203). The study reported in this manuscript was not preregistered. Data, methods, and study materials may be made available upon request.

References

Alhanbali, S., Dawes, P., Lloyd, S., & Munro, K. J. (2018). Hearing handicap and speech recognition correlate with self-reported listening effort and fatigue. *Ear and Hearing*, *39*, 470–474. https://doi.org/10.1097/AUD.0000000000000515

Almeida, D. M., Wethington, E., & Kessler, R. C. (2002). The daily inventory of stressful events: An interview-based approach for measuring daily stressors. *Assessment*, *9*, 41–55. https://doi.org/10.1177/1073191102091

Bott, A., & Saunders, G. (2021). A scoping review of studies investigating hearing loss, social isolation and/or loneliness in adults. *International Journal of Audiology*, *60*, 30–46. https://doi.org/10.1080/14992027.2021.1915506

Brim, O. G., Ryff, C. D., & Kessler, R. C. (Eds.). (2004). *How healthy are we? A national study of well-being at midlife*. Chicago University Press. https://doi.org/10.1017/S0033291704214283

Bruine de Bruin, W., Parker, A. M., & Strough, J. (2020). Age differences in reported social networks and well-being. *Psychology and Aging*, *35*, 159–168. https://doi.org/10.1037/pag0000415

Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously. A theory of socioemotional selectivity. *The American Psychologist*, *54*, 165–181. https://doi.org/10.1037/0003-066X.54.3.165

Charles, S. T., & Carstensen, L. L. (2010). Social and emotional aging. *Annual Review of Psychology*, *61*, 383–409. https://doi.org/10.1146/annurev.psych.093008.100448

Cichy, K. E., Stawski, R. S., & Almeida, D. M. (2012). Racial differences in exposure and reactivity to daily family stressors. *Journal of Marriage and the Family*, *74*, 572–586. https://doi.org/10.1111/j.1741-3737.2012.00971.x

Cohen, S. (2004). Social Relationships and Health. *The American Psychologist*, *59*, 676–684. https://doi.org/10.1037/0003-066X.59.8.676

Donovan, N. J., & Blazer, D. (2020). Social isolation and loneliness in older adults: Review and commentary of a national academies report. *The American Journal of Geriatric Psychiatry: Official Journal of the American Association for Geriatric Psychiatry*, *28*, 1233–1244. https://doi.org/10.1016/j.jagp.2020.08.005

Fischer, C. S., & Beresford, L. (2015). Changes in support networks in late middle age: The extension of gender and educational differences. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *70*, 123–131. https://doi.org/10.1093/geronb/gbu057

Friedman, E., Franks, M., Teas, E., & Thomas, P. A. (2024). Social connectedness, functional capacity, and longevity: A focus on positive relations with others. *Social Science & Medicine*, *340*, 116419. https://doi.org/10.1016/j.socscimed.2023.116419

Goman, A. M., & Lin, F. R. (2016). Prevalence of hearing loss by severity in the United States. *American Journal of Public Health*, *106*, 1820–1822. https://doi.org/10.2105/AJPH.2016.303299

Heffernan, E., Coulson, N. S., Henshaw, H., Barry, J. G., & Ferguson, M. A. (2016). Understanding the psychosocial experiences of adults with mild-moderate hearing loss: An application of Leventhal's self-regulatory model. *International Journal of Audiology*, *55*, S3–S12. https://doi.org/10.3109/14992027.2015.1117663

Holt-Lunstad, J. (2018). Why social relationships are important for physical health: A systems approach to understanding and modifying risk and protection. *Annual Review of Psychology*, *69*, 437–458. https://doi.org/10.1146/annurev-psych-122216-011902

Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine*, *7*, e1000316. https://doi.org/10.1371/journal.pmed.1000316

Hornsby, B. W., & Kipp, A. M. (2016). Subjective ratings of fatigue and vigor in adults with hearing loss are driven by perceived hearing difficulties not degree of hearing loss. *Ear and Hearing*, *37*, e1–e10. https://doi.org/10.1097/AUD.0000000000000203

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science (New York, N.Y.)*, *241*, 540–545. https://doi.org/10.1126/science.3399889

Humes, L. E. (2023). U.S. Population data on hearing loss, trouble hearing, and hearing-device use in adults: National Health and Nutrition Examination Survey, 2011–12, 2015–16, and 2017–20. *Trends in Hearing*, *27*, 23312165231160978. https://doi.org/10.1177/23312165231160978

Jansen, L. A., van Wier, M. F., Lissenberg-Witte, B. I., & Kramer, S. E. (2024). A comparison of the impact of the COVID-19 pandemic on communication among individuals with and without hearing impairment. *International Journal of Audiology*, *63*, 182–189. https://doi.org/10.1080/14992027.2022.2152742

Kamil, R. J., Genther, D. J., & Lin, F. R. (2015). Factors associated with the accuracy of subjective assessments of hearing impairment. *Ear and Hearing*, *36*, 164–167. https://doi.org/10.1097/AUD.0000000000000075

Kamil, R. J., & Lin, F. R. (2015). The effects of hearing impairment in older adults on communication partners: A systematic review. *Journal of the American Academy of Audiology*, *26*, 155–182. https://doi.org/10.3766/jaaa.26.2.6

Kannan, V. D., & Veazie, P. J. (2023). US trends in social isolation, social engagement, and companionship- nationally and by age, sex, race/ethnicity, family income, and work hours, 2003–2020. *SSM - Population Health*, *21*, 101331. https://doi.org/10.1016/j.ssmph.2022.101331

Kim, J., & Hwang, Y. (2025). The relationship between self-reported hearing loss and depression among older adults: The moderating effect of digital device use. *Clinical Gerontologist*, 1–15. https://doi.org/10.1080/07317115.2025.2510285

Kramer, S. E., Kapteyn, T. S., Kuik, D. J., & Deeg, D. J. H. (2002). The association of hearing impairment and chronic diseases with psychosocial health status in older age. *Journal of Aging and Health*, *14*, 122–137. https://doi.org/10.1177/089826430201400107

Lewis, C. T., Malak, S., Hamada, F., & Toman, J. (2025). Racial and ethnic differences in loneliness and social isolation among older adults with hearing loss: Findings from the health and retirement study. *Journal of Aging and Health*, *08982643251360309*, 898264325 1360309. https://doi.org/10.1177/089826432513603

Lor, M., Thao, S., & Misurelli, S. M. (2021). Review of hearing loss among racial/ethnic minorities in the United States. *Western Journal of Nursing Research*, *43*, 859–876. https://doi.org/10.1177/0193945920976402

Luong, G., Charles, S. T., & Fingerman, K. L. (2011). Better with age: Social relationships across adulthood. *Journal of Social and Personal Relationships*, *28*, 9–23. https://doi.org/10.1177/0265407510391362

Mick, P., Kawachi, I., & Lin, F. R. (2014). The association between hearing loss and social isolation in older adults. *Otolaryngology-Head and Neck Surgery: Official Journal of American Academy of Otolaryngology-Head and Neck Surgery*, *150*, 378–384. https://doi.org/10.1177/0194599813518021

Mick, P., Parfyonov, M., Wittich, W., Phillips, N., Guthrie, D., & Kathleen Pichora-Fuller, M. (2018). Associations between sensory loss and social networks, participation, support, and loneliness: Analysis of the Canadian Longitudinal Study on Aging. *Canadian Family Physician Medecin de Famille Canadien*, *64*, e33–e41. https://www.cfp.ca/content/64/1/e33

Motala, A., Johnsrude, I. S., & Herrmann, B. (2024). A longitudinal framework to describe the relation between age-related hearing loss and social isolation. *Trends in Hearing*, *28*, 23312165241236041. https://doi.org/10.1177/23312165241236041

Murry, V. M., Butler-Barnes, S. T., Mayo-Gamble, T. L., & Inniss-Thompson, M. N. (2018). Excavating new constructs for family stress theories in the context of everyday life experiences of Black American families. *Journal of Family Theory & Review*, *10*, 384–405. https://doi.org/10.1111/jftr.12256

Perissinotto, C. M., Cenzer, I. S., & Covinsky, K. E. (2012). Loneliness in older persons: A predictor of functional decline and death. *Archives of Internal Medicine*, *172*, 1078–1083. https://doi.org/10.1001/archinternmed.2012.1993

Reed, N. S., Chen, J., Huang, A. R., Pike, J. R., Arnold, M., Burgard, S., Chen, Z., Chisolm, T., Couper, D., Cudjoe, T. K. M., Deal, J. A., Goman, A. M., Glynn, N. W., Gmelin, T., Gravens-Mueller, L., Hayden, K. M., Mitchell, C. M., Mosley, T., Oh, E. S.Lin, F. R.; ACHIEVE Collaborative Research Group (2025). Hearing intervention, social isolation, and loneliness: A secondary analysis of the ACHIEVE randomized clinical trial. *JAMA Internal Medicine*, *185*, 797–806. https://doi.org/110.1001/jamainternmed.2025.1140

Rook, K. S. (2015). Social networks in later life: Weighing positive and negative effects on health and well-being. *Current Directions in Psychological Science*, *24*, 45–51. https://doi.org/10.1177/0963721414551364

Sen, K., Prybutok, G., & Prybutok, V. (2022). The use of digital technology for social wellbeing reduces social isolation in older adults: A systematic review. *SSM - Population Health*, *17*, 101020. https://doi.org/10.1016/j.ssmph.2021.101020

Shukla, A., Harper, M., Pedersen, E., Goman, A., Suen, J. J., Price, C., Applebaum, J., Hoyer, M., Lin, F. R., & Reed, N. S. (2020). Hearing loss, loneliness, and social isolation: A systematic review. *Otolaryngology-Head and Neck Surgery: Official Journal of American Academy of Otolaryngology-Head and Neck Surgery*, *162*, 622–633. https://doi.org/10.1177/0194599820910377

Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology*, *65*, 467–487. https://doi.org/10.1002/jclp.20593

Timmer, B. H., Bennett, R. J., Montano, J., Hickson, L., Weinstein, B., Wild, J., Ferguson, M., Holman, J. A., LeBeau, V., & Dyre, L. (2024). Social-emotional well-being and adult hearing loss: Clinical recommendations. *International Journal of Audiology*, *63*, 381–392. https://doi.org/10.1080/14992027.2023.2190864

Trujillo Tanner, C., Yorgason, J. B., Richardson, S., Redelfs, A. H., Serrao Hill, M. M. Y., White, A., Stagg, B., Ehrlich, J. R., & Markides, K. S. (2022). Sensory disabilities and social isolation among Hispanic older adults: Toward culturally sensitive measurement of social isolation. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *77*, 2091–2100. https://doi.org/10.1093/geronb/gbac001

U.S. Surgeon General (2023). Our epidemic of loneliness and social isolation: The U.S. Surgeon General's report on the healing effects of social connection and community. https://www.hhs.gov/sites/default/files/surgeon-general-social-connection-advisory.pdf

van Wier, M. F., Urry, E., Lissenberg-Witte, B. I., & Kramer, S. E. (2021). A comparison of the use of smart devices, apps, and social media between adults with and without hearing impairment: Cross-sectional web-based study. *Journal of Medical Internet Research*, *23*, e27599. https://doi.org/10.2196/27599

Vas, V., Akeroyd, M. A., & Hall, D. A. (2017). A data-driven synthesis of research evidence for domains of hearing loss, as reported by adults with hearing loss and their communication partners. *Trends in Hearing*, *21*, 2331216517734088. https://doi.org/10.1177/2331216517734088

Wang, F., Nguyen, A. W., Lincoln, K. D., Qin, W., & Hamler, T. (2022). Moderating Role of race and ethnicity in the relationship between negative family interactions and mental health among older adults. *The Gerontologist*, *62*, 674–684. https://doi.org/10.1093/geront/gnab148

Zhang, A., Wroblewski, K. E., Imbery, T. E., McClintock, M. K., Hawkley, L. C., & Pinto, J. M. (2023). Can digital communication protect against depression for older adults with hearing and vision impairment during COVID-19? *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *78*, 629–638. https://doi.org/10.1093/geronb/gbac193

Zhaoyang, R., Harrington, K. D., Scott, S. B., Graham-Engeland, J. E., & Sliwinski, M. J. (2022). Daily social interactions and momentary loneliness: The role of trait loneliness and neuroticism. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *77*, 1791–1802. https://doi.org/10.1093/geronb/gbac083