

## Abstract

**Background:** The association of hearing loss with cognitive decline and depression may be mediated by reduced social engagement.  
**Methods:** Cross-sectional study of adults from the 2010 National Health Interview Survey (NHIS). Participants reported (1) their ability to carry out social activities, (2) their satisfaction with social activities, and (3) their hearing status. Ordinal regression models adjusted for sociodemographic and health covariates estimated the odds ratios (OR) of hearing loss with satisfaction and ability with social activities.  
**Results:** Among 15,633 adults (mean age 47.6 years), those with a little, moderate, and a lot of hearing trouble had greater odds of reporting poorer satisfaction with social activities (OR=1.43 [1.28-1.59], 1.62 [1.33-1.97], and 1.66 [1.14-2.41], respectively) and ability to carry out social activities relative to those with no trouble (OR=1.39 [1.25-1.54], 1.35 [1.12-1.64], and 1.57 [1.10-2.24], respectively).  
**Conclusion:** Hearing loss may impact social engagement and contribute to depression and cognitive decline, which may further decrease social engagement in a cyclical pattern.

## Introduction

**Social engagement** has been proposed as a mechanistic pathway explaining the association between hearing loss and negative health outcomes including cognitive decline, poorer physical function, and depression. However, there remains a paucity of research characterizing this association in nationally representative data.

## Research Question

**Are adults with hearing loss less satisfied with and able to engage in social activities?**

## Methods

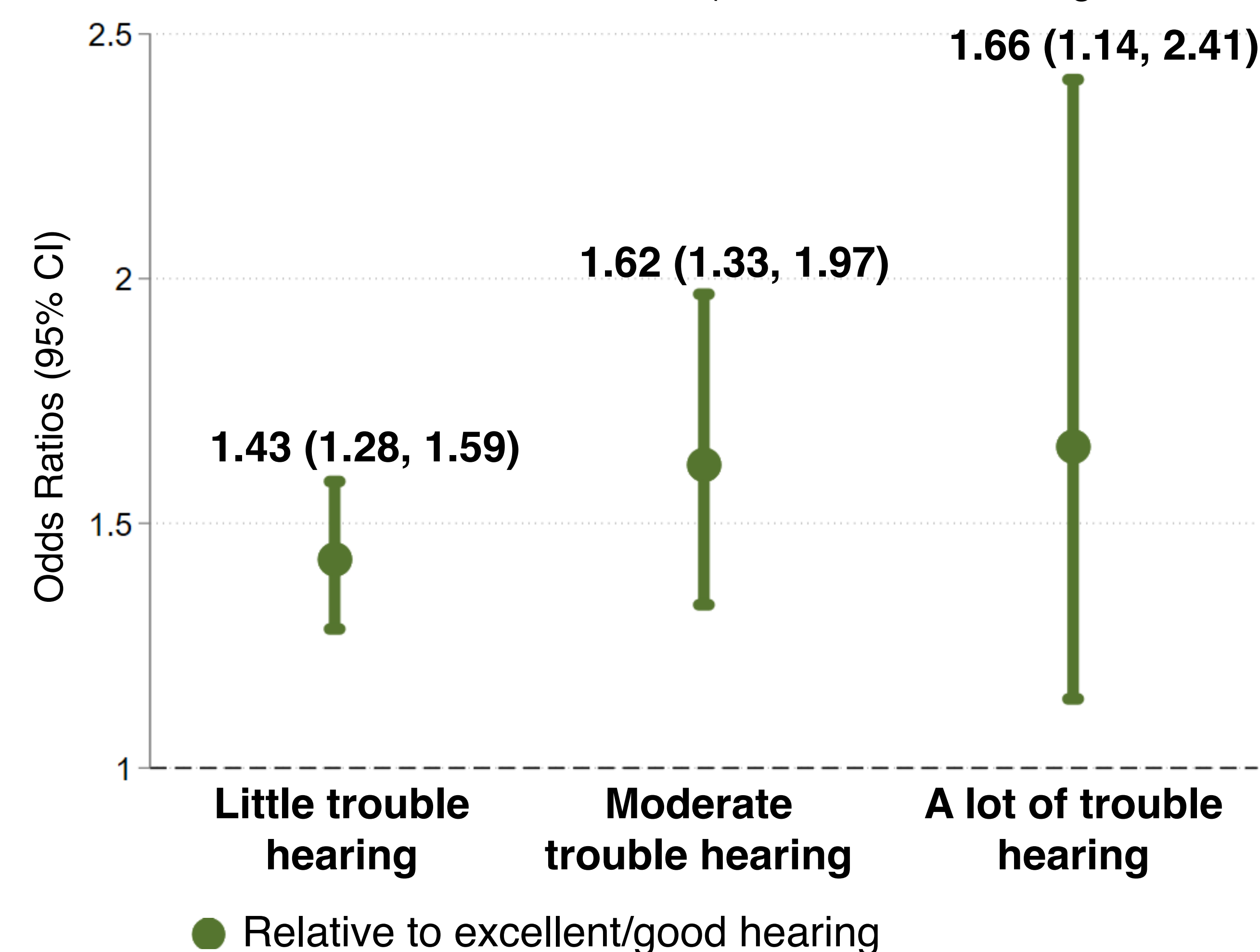
**Design and study population:** Cross-sectional study of 15,663 adults from the 2010 National Health Interview Survey (NHIS), a nationally representative survey of community-dwelling adults in the U.S.  
**Exposure:** Self-reported hearing status (excellent/good hearing [reference group], mild trouble, moderate trouble, or a lot of trouble hearing) and self-reported hearing aid use.  
**Outcomes:**  
• **Self-reported satisfaction with social activities and relationships:** excellent, very good, good, fair, or poor.  
• **Self-reported ability to carry out social activities:** excellent, very good, good, fair, or poor.  
**Covariates:** Age, sex, race/ethnicity, education (<high school [HS], ≥ HS), income-to-poverty ratio (IPR), marital status, health status, and needing help with ADLs.  
**Statistical analysis:** Weighted ordinal regression models.

## Results

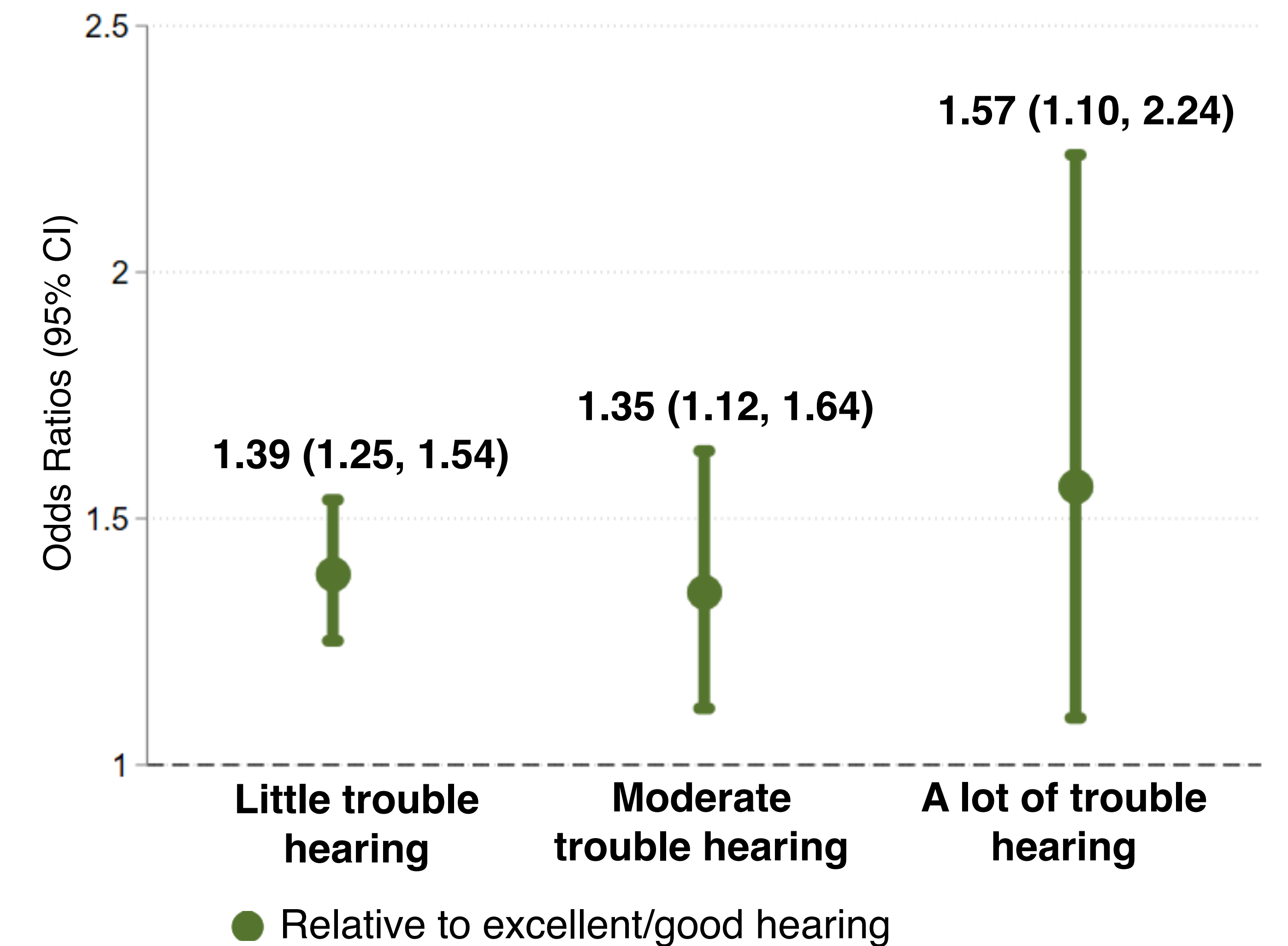
**Table 1.** Characteristics of NHIS adult participants (2010)

	Overall sample	Excellent/ Good	Little Trouble	Moderate Trouble	A lot of Trouble
<b>Observations, n (%)</b>	15,663	12,980 (83)	1,728 (11)	605 (4)	350 (2)
<b>Age, mean (SD)</b>	48 (19)	45 (18)	57 (17)	62 (15)	68 (14)
<b>Female, n (%)</b>	8,698 (54)	7,390 (50)	857 (50)	294 (47)	157 (44)
<b>White, n (%)</b>	8,324 (67)	6,407 (64)	1,206 (81)	444 (84)	267 (85)
<b>Black, n (%)</b>	2,915 (15)	2,557 (16)	242 (9)	82 (9)	34 (6)
<b>Asian, n (%)</b>	615 (2)	541 (3)	53 (2)	11 (1)	10 (1)
<b>Hispanic, n (%)</b>	3,651 (15)	3,346 (16)	210 (8)	62 (6)	33 (6)
<b>&lt; HS, n (%)</b>	9,617 (59)	7,882 (58)	1,108 (62)	386 (63)	241 (69)
<b>IPR, n (%)</b>					
200%+	8,227 (57)	6,749 (56)	971 (59)	326 (56)	181 (52)
100-199%	3,805 (23)	3,116 (23)	431 (25)	162 (27)	96 (28)
<100%	3,631 (21)	3,115 (21)	326 (17)	117 (17)	73 (20)
<b>Married, n (%)</b>	6,262 (40)	5,165 (40)	702 (41)	254 (43)	141 (40)
<b>Health status, n (%)</b>					
Excellent	3,418 (22)	3,135 (25)	211 (13)	50 (9)	22 (7)
Very Good	4,599 (31)	3,997 (32)	412 (26)	115 (21)	75 (22)
Good	4,803 (30)	3,948 (30)	554 (33)	199 (33)	102 (31)
Fair	2,157 (13)	1,510 (11)	386 (21)	172 (27)	89 (24)
Poor	686 (4)	390 (3)	165 (9)	69 (11)	62 (16)
<b>Help w ADLs, n (%)</b>	432 (3)	241 (2)	103 (5)	40 (6)	48 (13)
<b>Hearing aid, n (%)</b>	415 (3)	37 (0.3)	83 (5)	122 (21)	173 (51)

**Figure 1.** Association of hearing loss with odds of reporting poorer satisfaction with social activities (N=15,248, excluding HA users)



**Figure 2.** Association of hearing loss with odds of reporting poorer ability to carry out social activities (N=15,248, excluding HA users)



**Table 2.** Association of hearing aid use with odds of reporting poorer satisfaction with and ability to carry out social activities (N=2,683, among those with any hearing trouble)

	Poorer satisfaction with social activities	Poorer ability to carry out social activities
	Odds Ratios (95% CI)	
<b>Nonusers (N=2,305)</b>	REF	REF
<b>Hearing aid users (N=378)</b>	0.64 (0.52, 0.78)	0.72 (0.57, 0.90)

## Discussion & Conclusion

- In this nationally representative survey of adults in the U.S., hearing loss is associated with poorer satisfaction with and ability to carry out social activities, consistent with other cross-sectional studies.<sup>1,2</sup>
- The link between hearing loss and social isolation may be related to (1) degraded auditory processing making conversations more difficult to follow,<sup>3</sup> (2) frustration/embarrassment over communication difficulties leading to social withdrawal,<sup>4</sup> and (3) increased cognitive load and depleted cognitive reserve for social interactions.<sup>5</sup>
- Future work using objective hearing loss is necessary as subjective hearing measures tend to underestimate true associations.<sup>6</sup>
- Findings from the ACHIEVE trial will inform us on the impact of hearing interventions on social isolation over time.<sup>7,8</sup>

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