

Study Shows Noisy Restaurants Pose Health Risks

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Loud restaurant noise can be a barrier to communication and enjoyment of a dining experience^{1,2} and might increase the risk for adverse health effects among patrons and employees. In addition to adversely affecting the subjective quality of the dining experience, environments that require a person to raise their voice to be understood an arm's length distance suggest an ambient sound level sufficient to create a risk for noise-induced hearing loss.

Restaurants are complex sound environments with multiple sources, including background music, conversations, dinnerware, chairs, and appliances. Excessive noise is a major complaint of diners, at times being reported more frequently than poor service.² Multiple studies and media articles have focused on how loud sound levels in restaurants make it increasingly difficult for persons to engage with others in normal conversations. Analyses of crowd-sourced sound levels from 1,788 restaurants in New York City revealed that 25% exceeded levels of 81 decibels A-weighted (dBA), likely requiring diners to raise their voice to be heard by fellow patrons.² In a study of 30 casual dining and quick service restaurants in the Orlando, FL, area, instantaneous sound levels varied from 58.1 dBA to 97.5 dBA.³ Only 23% of those Orlando restaurants surveyed had sound levels low enough (60 dBA) to allow persons to converse without raising their voices. A nonoccupational limit that is known to eliminate the risk for noise-induced hearing loss in any exposed person is a 24-hour equivalent level of 70 dBA or less.⁴ Sound energy doubles for every 3 dBA increase in the average exposure level, which results in a halving of the allowable cumulative daily "noise dose" exposure; thus, a continuous sound level exposure of 70 dBA for 24 hours is considered to have the same health risk as an exposure of 85 dBA for 45 minutes.

Persons exposed to sound levels that are not sufficient to cause hearing loss can nevertheless experience annoyance as well as health effects, including increased risk for ischemic heart disease, hypertension, sleep disturbance, and cognitive impairment.⁵

STUDY METHOD

Porter Novelli Public Services administered the 2021 SummerStyles survey during June 2-21, 2021, to a national nonin-



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stitutionalized representative sample of adults aged ≥ 18 years. Panel members were randomly recruited by mail using address-based probability sampling and were provided with a laptop or tablet computer and Internet access to complete the survey, if needed. Among the 5,741 persons sampled, 4,085 (71.2%) completed the survey. Respondents were not required to answer individual questions and could exit the survey at any time. The survey included three questions about how loud restaurant noise affects the respondents' dining experience, how likely they are to avoid a noisy restaurant, and how often they believe restaurants are too loud when dining out.

Data were weighted to adjust for sampling design and nonresponse to be representative of the U.S. adult population based on the U.S. Census's 2019 American Community Survey for gender, age, household income, race/ethnicity, household size, education, census region, metropolitan area status, and parental status (of children aged 12-17 years). Personal identifiers were not included in the data file. Three questions were included related to this study: the respondent's 1) enjoyment of a loud dining experience, 2) likelihood of avoiding a noisy restaurant, and 3) perception of how frequently a restaurant was too loud. Participants were asked to indicate their responses with a forced five-choice scale (e.g., never or seldom, some of the time, about half the time, most of the time, always). For analysis, responses were grouped into three categories: 1) a loud dining experience (very or somewhat enjoyable/somewhat or very annoying/no difference), 2) avoiding a noisy restaurant (very or somewhat likely/somewhat or very unlikely/don't know or not sure), and 3) how often a restaurant was felt to be too loud (never or seldom/some of the time/about half the time, most of the time, always). Respondents were grouped by quartile according to age. SAS version 9.4; SAS Institute Inc., Cary, NC, was used for descriptive analysis. Multinomial logistic regressions were used to calculate adjusted odds ratios (aORs), 95% confidence intervals (CIs), and p-values ($\alpha=0.05$).



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Table 1. Selected characteristics regarding restaurant noise perception among surveyed adults aged ≥18 years — Porter Novelli SummerStyles, United States, 2021

| Characteristic | No. | | All respondents weighted % (95%CI) |
|--|------------|----------|------------------------------------|
| | Unweighted | Weighted | |
| Loud restaurant dining experience (grouped)* | | | |
| Annoying | 2,929 | 2,773 | 68.0 (55.2–69.8) |
| Enjoyable | 339 | 426 | 10.4 (9.1–11.6) |
| No Difference | 808 | 881 | 21.6 (20.0–23.2) |
| Likely to avoid a noisy restaurant (grouped)† | | | |
| Likely avoiding | 2,785 | 2,641 | 64.8 (62.9–66.6) |
| Unlikely avoiding | 881 | 954 | 23.4 (21.8–25.0) |
| Don't know/Not sure | 410 | 484 | 11.9 (10.6–13.2) |
| How often restaurant is too loud (grouped)‡ | | | |
| Half of the time to always | 907 | 950 | 23.3 (21.7–24.9) |
| Some of the time | 2,310 | 2,211 | 54.3 (52.4–56.1) |
| Never/Seldom | 855 | 913 | 22.4 (20.8–24.0) |
| Sex | | | |
| Male | 2,097 | 1,978 | 48.4 (46.6–50.2) |
| Female | 1,988 | 2,017 | 51.6 (49.8–53.4) |
| Age group quartiles (yrs) | | | |
| 18–32 | 528 | 1,028 | 25.2 (23.2–27.1) |
| 33–48 | 1,124 | 1,045 | 25.6 (24.0–27.1) |
| 49–62 | 1,144 | 1,000 | 24.5 (23.0–25.9) |
| ≥63 | 1,289 | 1012 | 24.8 (23.4–26.1) |
| Race/Ethnicity¶ | | | |
| White, non-Hispanic | 3,028 | 2,583 | 63.3 (61.3–65.1) |
| Black, non-Hispanic | 311 | 477 | 11.7 (10.3–13.0) |
| Hispanic | 412 | 667 | 16.4 (14.7–17.9) |
| Other, ≥2 races, non-Hispanic | 334 | 359 | 8.8 (7.7–9.9) |
| Education | | | |
| Less than high school | 209 | 449 | 11.0 (9.5–12.5) |
| high school | 1,015 | 1,117 | 27.3 (25.7–29.0) |
| Some college or associate degree | 1,244 | 1,228 | 30.1 (28.4–31.7) |
| Bachelor's degree or higher | 1,617 | 1,291 | 31.6 (30.0–33.20) |
| Income USD (\$)§ | | | |
| <50,000 | 945 | 1220 | 29.9 (28.1–31.7) |
| 50,000-99,999 | 1300 | 1284 | 31.4 (29.7–33.1) |
| 100,000-149,999 | 910 | 764 | 18.7 (17.4–20.0) |
| ≥150,000 | 930 | 817 | 20.0 (18.6–21.4) |
| U.S. Census region of residence** | | | |
| Northeast | 764 | 710 | 17.4 (16.0–18.7) |
| Midwest | 898 | 847 | 20.7 (19.3–22.2) |
| South | 1,468 | 1,551 | 38.0 (36.2–39.8) |
| West | 955 | 978 | 23.9 (22.3–25.5) |
| Metropolitan statistical area status | | | |
| Non-metropolitan | 556 | 547 | 13.4 (12.2–14.6) |
| Metropolitan | 3,529 | 3,538 | 86.6 (85.4–87.8) |

Abbreviation: CI = confidence interval.
 *Panelists completed the statement, "I feel loud restaurants make the dining experience." (table excludes 9 no response)
 †Panelists were asked, "When choosing a restaurant, how likely are you to avoid a noisy restaurant?" (table excludes 9 no response) §Panelists were asked, "When dining out, how often do you feel the restaurant is too loud?" (table excludes 13 no response)
 §Persons who identified as White, Black, Asian, or other or multiracial were all non-Hispanic.
 ¶Persons who identified as Hispanic might be of any race. **Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. Midwest: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. South: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

RESULTS

More than two thirds (68.0%) of adults surveyed reported that a loud dining experience was somewhat or very annoying (Table 1) and nearly as many (64.8%) said it was very or somewhat likely they would avoid a noisy restaurant. Less than one quarter (22.4%) of adult respondents felt the restaurant experience was never or seldom too loud. Most surveyed adults were non-Hispanic White (63.3%) and lived in a metropolitan area (86.6). Compared with men, women were significantly more likely to feel that restaurants were too loud and were more likely to avoid noisy restaurants (Table 2). Adults aged ≥49 years were significantly more likely to report that a loud restaurant was annoying than were those aged 18-32 years and were two to three times more likely to report that they would avoid a noisy restaurant (49-62 yrs: aOR = 2.1; ≥63 yrs: aOR = 2.7) than were those aged 18-32 years. Non-Hispanic Black (Black) and Hispanic adults were significantly less likely to feel that a loud restaurant made the dining experience very or somewhat annoying than were Black and Hispanic adults, who reported no difference and were less likely to avoid a noisy restaurant than were those who reported not knowing or not being sure if they would avoid one. Adults with a bachelor's degree or higher were significantly more likely to report that they felt noise made the dining experience somewhat or very annoying than were adults with less than a high school education. Adults with a high school education or higher were significantly more likely to avoid a noisy restaurant than were those with less than a high school education who responded that they didn't know or weren't sure.

DISCUSSION

Among persons with hearing loss, and even among those with normal hearing, noise can be a substantial barrier to the enjoyment of a restaurant dining environment.⁶ Hearing loss is associated with a higher risk for loneliness and social isolation, especially among women and older adults, and difficult listening environments can lead to withdrawal from social situations.⁷ In addition, to be heard in noisy environments, persons might need to speak more loudly, increasing the potential for emitting large quantities of respiratory droplets, thereby possibly increasing the transmission and spread of infectious diseases.⁸

Multiple factors can affect ambient sound levels in restaurants, including room shape and materials, background music, and seating style and density. Interior and architectural designs, such as open kitchens, hard surfaces, and an absence of upholstered chairs, tablecloths, carpeting, draperies, plants, or sound-absorbent paneling, also

Table 2. Adjusted multinomial logistic regression comparing characteristics of adult respondents to restaurant noise survey responses — Porter Novelli SummerStyles, United States, 2021

| Characteristic | aOR (95% CI) | | | | | |
|---|--|-----------------------------|---|----------------------------------|--|--------------------------------------|
| | Loud restaurant dining experience* (grouped) | | Likely to avoid a noisy restaurant† (grouped) | | How often restaurant is too loud‡ (grouped) | |
| | Annoying vs. no difference | Enjoyable vs. no difference | Likely to avoid vs. don't know | Unlikely to avoid vs. don't know | Half of the time to always vs. never or seldom | Some of the time vs. never or seldom |
| Sex | | | | | | |
| Male | Referent | Referent | Referent | Referent | Referent | Referent |
| Female | 1.3 (1.1–1.5)¶ | 1.4 (1.1–1.8)¶ | 1.2 (1.0–1.5)¶ | 1.2 (1.0–1.5) | 1.3 (1.1–1.6)¶ | 1.3 (1.1–1.5)¶ |
| Age group quartiles (yrs) | | | | | | |
| 18–32 | Referent | Referent | Referent | Referent | Referent | Referent |
| 33–48 | 0.9 (0.8–1.1) | 0.8 (0.6–1.0) | 1.3 (1.0–1.7) | 0.9 (0.7–1.3) | 0.9 (0.7–1.1) | 0.8 (0.7–1.1) |
| 49–62 | 1.2 (1.0–1.5)¶ | 0.7 (0.5–1.0)¶ | 2.1 (1.6–2.8)¶ | 1.4 (1.0–1.9)¶ | 0.9 (0.7–1.2) | 1.0 (0.8–1.2) |
| ≥63 | 2.3 (1.8–2.9)¶ | 0.5 (0.3–0.7)¶ | 2.7 (2.0–3.7)¶ | 1.2 (0.9–1.7) | 1.2 (0.9–1.6) | 1.3 (1.1–1.7)¶ |
| Race/Ethnicity** | | | | | | |
| White, non-Hispanic | Referent | Referent | Referent | Referent | Referent | Referent |
| Black, non-Hispanic | 0.6 (0.4–0.7)¶ | 1.2 (0.8–1.7) | 0.6 (0.5–0.8)¶ | 0.8 (0.5–1.1) | 0.6 (0.4–0.7) | 0.5 (0.4–0.7) |
| Hispanic | 0.6 (0.5–0.8)¶ | 1.3 (1.0–1.8) | 0.7 (0.5–0.9)¶ | 0.8 (0.6–1.1) | 0.8 (0.7–1.1) | 0.7 (0.5–0.9)¶ |
| Other, 2+ races, non-Hispanic | 0.8 (0.6–1.1) | 1.7 (1.1–2.5) | 0.9 (0.6–1.3) | 0.9 (0.6–1.3) | 1.2 (0.9–1.8) | 1.1 (0.8–1.6) |
| Education | | | | | | |
| Less than high school | Referent | Referent | Referent | Referent | Referent | Referent |
| High school | 1.2 (0.9–1.6) | 0.8 (0.5–1.2) | 1.5 (1.1–2.1)¶ | 1.4 (1.0–2.0) | 1.1 (0.8–1.5) | 1.1 (0.8–1.5) |
| Some college or associate degree | 1.3 (1.0–1.7) | 0.9 (0.6–1.4) | 1.6 (1.1–2.2)¶ | 1.5 (1.0–2.1) | 1.1 (0.8–1.5) | 1.3 (1.0–1.8)¶ |
| Bachelor's degree or higher | 1.6 (1.2–2.1)¶ | 1.1 (0.7–1.6) | 1.9 (1.3–2.7)¶ | 1.5 (1.0–2.2) | 1.1 (0.8–1.6) | 1.5 (1.1–2.0)¶ |
| Income USD (\$) | | | | | | |
| <50,000 | Referent | Referent | Referent | Referent | Referent | Referent |
| 50,000–99,999 | 1.0 (0.8–1.2) | 1.1 (0.8–1.5) | 1.0 (0.8–1.3) | 1.3 (1.0–1.7) | 0.6 (0.5–0.8)¶ | 1.1 (0.9–1.3) |
| 100,000–149,999 | 1.1 (0.9–1.5) | 1.3 (0.9–1.9) | 1.2 (0.9–1.7) | 1.6 (1.1–2.3)¶ | 0.7 (0.5–1.0)¶ | 1.3 (1.0–1.6) |
| ≥150,000 | 1.3 (1.0–1.7)¶ | 1.4 (0.9–2.0) | 1.4 (1.0–1.9) | 1.4 (1.0–2.1) | 0.9 (0.6–1.2) | 1.2 (1.0–1.6) |
| U.S. Census region of residence†† | | | | | | |
| Northeast | Referent | Referent | Referent | Referent | Referent | Referent |
| Midwest | 1.0 (0.8–1.3) | 0.9 (0.6–1.3) | 1.0 (0.7–1.4) | 1.2 (0.8–1.7) | 1.0 (0.8–1.4) | 1.1 (0.8–1.4) |
| South | 1.0 (0.8–1.3) | 0.8 (0.6–1.2) | 1.1 (0.8–1.5) | 1.1 (0.8–1.5) | 1.4 (1.0–1.8)¶ | 1.4 (1.1–1.7)¶ |
| West | 0.9 (0.7–1.2) | 0.8 (0.6–1.2) | 1.1 (0.8–1.5) | 1.2 (0.8–1.7) | 1.3 (1.0–1.8) | 1.3 (1.0–1.6) |
| Metropolitan statistical area status | | | | | | |
| Non-metropolitan | Referent | Referent | Referent | Referent | Referent | Referent |
| Metropolitan | 1.1 (0.9–1.4) | 1.0 (0.7–1.5) | 1.3 (1.0–1.7) | 1.2 (0.8–1.6) | 1.2 (0.9–1.6) | 1.1 (0.9–1.4) |

Abbreviations: aOR = adjusted odds ratio; CI = confidence interval.

* Panelists completed the statement, "I feel restaurants make the dining experience..."

† Panelists were asked, "When choosing a restaurant, how likely are you to avoid a noisy restaurant?"

‡ Panelists were asked, "When dining out, how often do you feel the restaurant is too loud?"

¶ Statistical difference at p<0.05 compared with the referent group.

** Persons who identified as White, Black, Asian, or other or multiracial were all non-Hispanic. Persons who identified as Hispanic might be of any race.

†† *Northeast*: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. *Midwest*: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. *South*: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. *West*: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

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influence noise levels. To compensate for higher sound levels in restaurants, patrons might involuntarily raise their voice level to be heard, further increasing the ambient sound level—known as the Lombard effect. Loud sound levels reportedly create faster table turnover and larger consumption of alcoholic beverages, a financial incentive for business managers.¹ At the same time, excessive loudness adversely affects persons' perception of the taste, aroma, and texture of food and drink.¹

Higher noise levels in restaurants make it increasingly difficult for persons to socialize and converse with fellow patrons. Restaurant owners and managers can take steps to reduce noise levels, thereby improving the acoustic dining experience and verbal communication within the restaurant. Available engineering and administrative controls include treating walls or ceilings with sound absorptive materials, relocating sound-producing equipment (e.g., ice and beverage dispensers) away from dining areas, and lowering music levels. Acoustical room treatments can be more effective for reducing patrons' voice levels than for other sound sources.⁹

REPORT LIMITATIONS

The findings in this report are subject to at least two limitations. First, the data obtained in this survey were self-reported and relied on the respondents' perception of loudness and recall of their restaurant experience. Second, the type of restaurant was not defined and might have ranged from casual, quick service to premium full-service.

Encouraging restaurant managers to take steps towards noise reduction and proper lighting to facilitate lip reading can also create an environment for enhanced communication with servers and fellow diners. Reducing restaurant noise levels can help maintain an enjoyable environment and reduce the health risks for employees and patrons. 

DISCLOSURE: The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention/the Agency for Toxic Substances and Disease Registry.

References for this article can be found at <http://bit.ly/HJcurrent>.