

Attitudes towards Noise, Perceived Hearing Symptoms and Reported Use of Hearing Protection among College Students: Influence of Youth Culture

Jo Anne G. Balanay¹ and Gregory D. Kearney²

¹Environmental Health Sciences Program, Department of Health Education and Promotion, College of Health and Human Performance, East Carolina University
²Department of Public Health, Brody School of Medicine, East Carolina University

Background

- Noise-induced hearing loss and other hearing symptoms are increasing in the younger population in the United States.⁽¹⁾
- Noise exposure is regulated in the workplace but no current standards or guidelines regulate non-occupational noise exposure⁽²⁾, particularly in noisy environments wherein youth participates.
- Young adults are involved in various noisy activities, including concerts and discos.⁽³⁻⁵⁾
- Leisure noise exposure among young adults (16-25 years old) has been shown to have highly significant correlation with NIHL.⁽⁶⁾
- Noise exposure prevention is crucial since impaired hearing is known to adversely affect quality of life and may lead to psychological consequences (e.g., depression, difficulty in concentrating, and emotional problems).⁽⁷⁾
- College students may possess unique characteristics related to noise exposure, hearing loss and hearing protection compared to other young populations. It is important to understand the risk factors that influence their behavior related to noise exposure.

Specific Aims

- To characterize the attitudes of college students toward noise and noise exposures
- To identify noisy activities and locations that college students participate in
- To identify self-reported hearing symptoms related to noise exposure
- To determine the factors associated with the use of hearing protection during noisy activities

Methodology

- ECU college students (n=2,151), ≥17 years old, were assessed via 44-item online surveys through a required personal health course (HLTH 1000): 6 demographic items, 19 items on attitudes toward noise, 5 items on hearing symptoms, and 14 items on noise exposure and hearing protection use.

Attitude Towards Noise

- 19 survey items related to attitudes toward noise were adapted from the Youth Attitudes to Noise Scale (YANS)⁽⁸⁾ and were assessed using a five-point Likert scale (1 = Totally agree, 2 = Partially agree, 3 = Neither, 4 = Partially disagree, and 5 = Totally disagree). The YANS was subdivided into 4 factors:
 - Factor 1 (Youth culture): 8 items dealing attitude towards noise associated with elements of youth culture
 - Factor 2 (Concentration): 2 items dealing with attitudes towards the ability to concentrate in noisy environments
 - Factor 3 (Daily noise): 4 items dealing with attitudes to daily noises (e.g., traffic)
 - Factor 4 (Intent to influence): 4 items dealing with attitudes toward influencing the sound environment.
- Interpretation of the mean YANS score (5.00 as the perfect score):
 - 0.00 – 2.45 – anti-noise or negative attitude towards noise (i.e., noise is perceived as harmful and to be avoided)
 - 2.48 – 2.99 – neutral attitude towards noise (i.e., one does not care or is unaware of the possible consequences of loud noise)
 - 3.00 – 5.00 – pro-noise or positive attitude towards noise (i.e., noise is not perceived as dangerous)

Hearing Symptoms

- Hearing symptom items, as adapted from the Hearing Symptom Description scale (HSD)⁽⁹⁾, pertained to experiences related to temporary tinnitus (i.e., temporary buzzing or ringing in the ears), permanent tinnitus (i.e., permanent buzzing or ringing in the ears), noise sensitivity, hearing loss, and ear pain after loud noise exposure.

Noise Exposure

- Survey items on noise exposure, which were adapted from the Adolescents' Habits and Use of Hearing Protection scale (AAH)⁽¹⁰⁾, focused on participation in noisy activities and use of hearing protection at these activities.

Data Analysis

- Pearson chi-square, non-paired t-tests, ANOVA and logistic regression were conducted to analyze data using SPSS software (p<0.05).

Results

Characteristic	n	%
Gender		
Male	750	34.9
Female	1390	64.6
Other	8	0.4
No response	3	0.1
Age		
18	621	28.9
19	928	43.1
20	133	6.2
21	69	3.2
22 and older	82	3.8
No response	318	14.8
Race		
White	1448	67.3
Black	415	19.3
Hispanic or Latino	124	5.8
Asian or Pacific Islander	83	3.9
American Indian or Alaskan Native	27	1.3
Other	51	2.4
No response	3	0.1
Academic class standing		
Freshman	1700	79.0
Sophomore	270	12.6
Junior	136	6.3
Senior	38	1.8
Other	3	0.1
No response	4	0.2
Residence type		
Campus residence hall	1718	79.9
Fraternity or sorority house	9	0.4
Off-campus housing	354	16.5
Parent/ guardian's home	63	2.9
No response	7	0.3

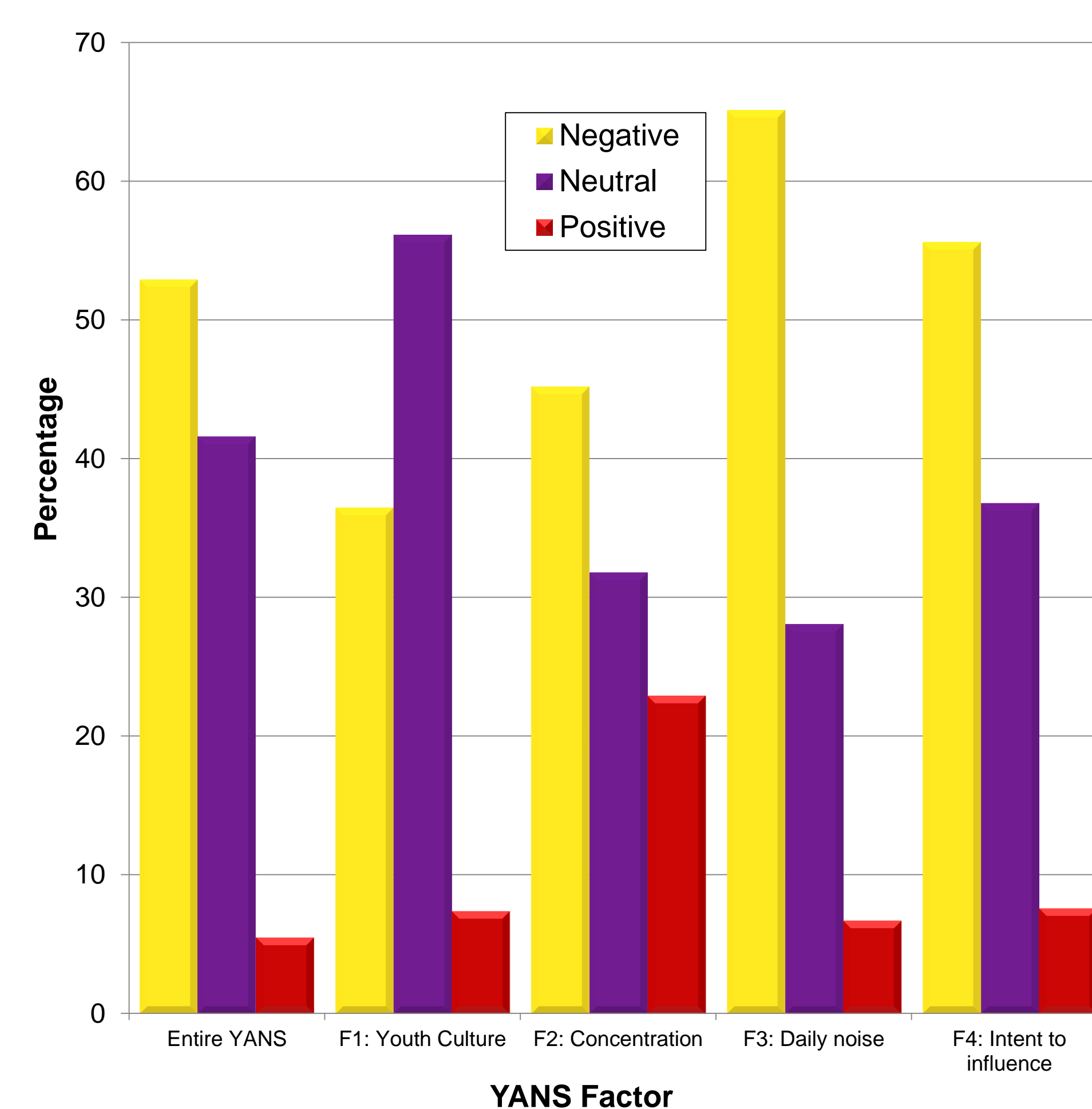


Figure 1. Percentage of Attitude Towards Noise Category by YANS Factor (N=2151)

Factor	Total (N = 2,151) ^b		Men (N = 750) ^b		Women (N = 1,390) ^b		P-value ^c
	Mean	SD	Mean	SD	Mean	SD	
Entire YANS	2.76	0.55	2.75	0.60	2.76	0.52	0.63
F1: Youth culture	2.90	0.58	2.88	0.63	2.91	0.54	0.19
F2: Concentration	2.88	0.89	2.85	0.89	2.89	0.89	0.25
F3: Daily noise	2.41	0.86	2.44	0.83	2.38	0.87	0.14
F4: Intent to influence	2.72	0.69	2.71	0.72	2.73	0.69	0.69

^a - Gender was identified as "other" for 8 students, and missing for 3 students.
^b - Numbers do not add to the total value because of missing and "other" responses.
^c - Significance between gender, p < 0.05

Hearing Symptom	Gender				p-value	Total (N = 2,151) ^b	
	Male (N=750) ^b		Female (N=1,390) ^b			n	% ^c
	n	% ^c	n	% ^c			
Ear pain after noise exposure	192	25.6	291	20.9	0.02	485	22.5
Noise sensitivity	136	18.1	310	22.3	0.02	448	20.8
Temporary tinnitus	136	18.1	148	10.6	<0.01	284	13.2
Permanent tinnitus	43	5.7	47	3.4	0.01	91	4.2
Self-reported hearing loss	79	10.5	93	6.7	<0.01	173	8.0

^a - Gender was identified as "other" for 8 students, and missing for 3 students.
^b - Numbers do not add to the total value because of missing and "other" responses.
^c - Percentage within gender

Noisy Activity	Total (N=2,151) ^b	Male (N=750) ^b	Female (N=1,390)	p-value ^c
	n (%)	n (%)	n (%)	
Sporting event	1285 (59.7%)	563 (75.1%)	720 (51.8%)	<0.01
Discos/ dances	1191 (55.4%)	389 (51.9%)	797 (57.3%)	0.05
Attending rock concerts	918 (42.7%)	341 (45.5%)	574 (41.3%)	0.03
Lawn mowing	824 (38.3%)	516 (68.8%)	306 (22.0%)	<0.01
Shooting/ use of firearms	697 (32.4%)	374 (49.9%)	321 (23.1%)	<0.01
Using noisy tools	629 (29.2%)	381 (50.8%)	246 (17.7%)	<0.01
Playing in a band	211 (9.8%)	122 (16.3%)	88 (6.3%)	<0.01

^a - Gender was identified as "other" for 8 students, and missing for 3 students.
^b - Numbers do not add to the total value because of missing and "other" responses.
^c - Gender difference, p<0.05.

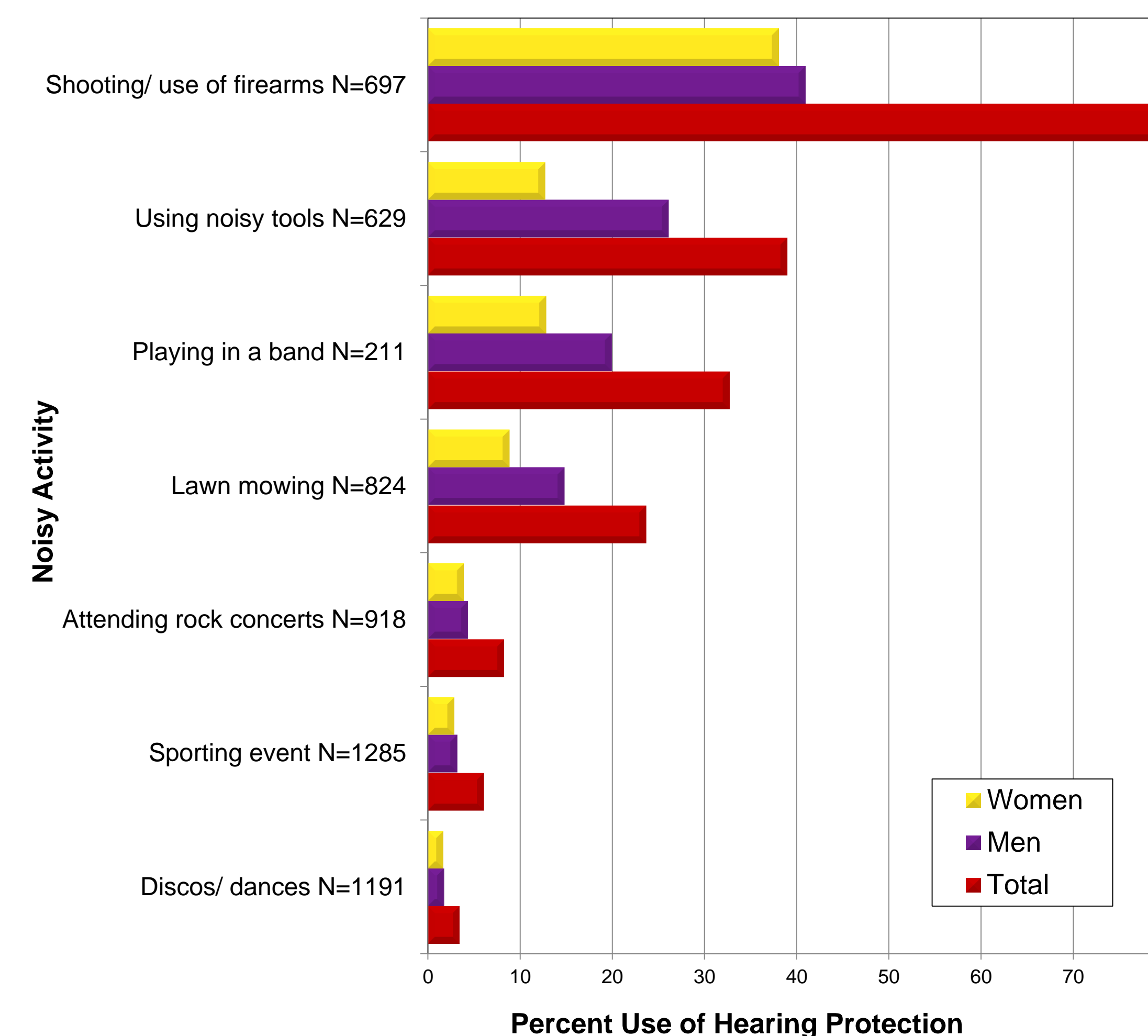


Figure 2. Percentage of Reported Hearing Protection Use by Noisy Activity and Gender

Results (cont'd)

- 39.6% experienced at least one hearing symptom, with ear pain as the most frequently reported (22.5%).
- ~80% were involved in at least one noise activity, 41% of whom reported the use of hearing protection.
- A large majority of those with ear pain, hearing loss, permanent tinnitus and noise sensitivity were involved in attending a sporting event, which was the most reported noisy activity.
- The highest reported hearing protection use was in the use of firearms, and the lowest in discos/ dances.
- Reported use of hearing protection is associated with having at least one hearing symptom, but the relationship is stronger with tinnitus, hearing loss and ear pain ($\chi^2 = 30.5 - 43.5, P < 0.01$) as compared to noise sensitivity ($\chi^2 = 3.8, P = 0.03$).
- Reported use of hearing protection is associated with anti-noise attitudes, particularly in youth social events.

An anti-noise attitude is needed to make a young adult use hearing protection in youth social events or leisure activities, wherein loud music and cheering is acceptable, and hearing protection use may be perceived as awkward.

Conclusions

- College students have significant noise exposures and, thus, improving their knowledge and attitudes through education on hearing health may result to better hearing protection behaviors.
- Attitudes and self-experienced hearing symptoms are important factors affecting the use of hearing protection as a preventive behavior relation to hearing risks.
- To reduce this risk among young population, educational initiatives and awareness campaigns on hearing conservation must be carefully developed to better inform college students on how to protect their hearing from excessive noise and to better encourage them to take such precautions to prevent NIHL.
- A significant amount of education to encourage hearing protective behavior must involve various stakeholders, including the college students, parents, health service providers, schools and universities/colleges.
- Universities and colleges have important roles in disseminating information on noise exposure and hearing conservation among college students through the following strategies:

- Integration of a hearing health and conservation topic into a required health course as part of the college curriculum
- Promotion of hearing conservation by university and college student health services and student organizations
- Implementation of university policies on establishing noise level limitations for all on-campus events

Acknowledgment

The authors would like to thank Ms. Karen Vail-Smith of ECU Department of Health Education and Promotion for their assistance in the administration of the survey.

References

- Niskar AS, Kieszak SM, Holmes AE, Esteban E, Rubin C, Brody DJ. Estimated prevalence of noise-induced hearing threshold shifts among children 6 to 9 years of age: The third National Health and Nutrition Examination Survey, 1988-1994, United States. *Pediatrics* 2001;108:40-3.
- Chung JH, Des Roches CM, Meunier JE, Eavey RD. Evaluation of noise-induced hearing loss in young people using a web-based survey technique. *Pediatrics* 2005;115:861-7.
- Sadhra S, Jackson CA, Ryder T, Brown MJ. Noise exposure and hearing loss among student employees working in university entertainment venues. *Ann Occup Hyg* 2002;46:455-63.
- Serra MR, Biassoni EC, Richter U, Minoldo G, Franco G, Abraham S. Part I: An interdisciplinary long-term study. *Int J Audiol* 2005;44:65-73.
- Beach EF, Gilliver M, Williams W. A snapshot of young adults' noise exposure reveals evidence of "binge listening". *Appl Acoust* 2014;77:71-5.
- Lees REM, Roberts JH, Wald Z. Noise induced hearing loss and leisure activities of young people: a pilot study. *Can J Public Health* 1985;76:171-3.
- Erlandsson SI, Hallberg LR. Prediction of quality of life in patients with tinnitus. *Br J Audiol* 2000;34:11-20.
- Olsen-Widen SE, Erlandsson SI. Self-reported tinnitus and noise sensitivity among adolescents in Sweden. *Noise Health* 2004;7:29-40.
- Erlandsson SI, Olsen SE. Hearing symptom description (HSD). In: Olsen SE. Psychological aspects of adolescents' perceptions and habits in noisy environments. Licentiate dissertation. Department of Psychology, Göteborg University, Sweden, 2004.
- Erlandsson SI, Olsen SE. Adolescent habits and use of hearing protection (AAH). In: Olsen SE. Psychological aspects of adolescents' perceptions and habits in noisy environments. Licentiate dissertation. Department of Psychology, Göteborg University, Sweden, 2004.