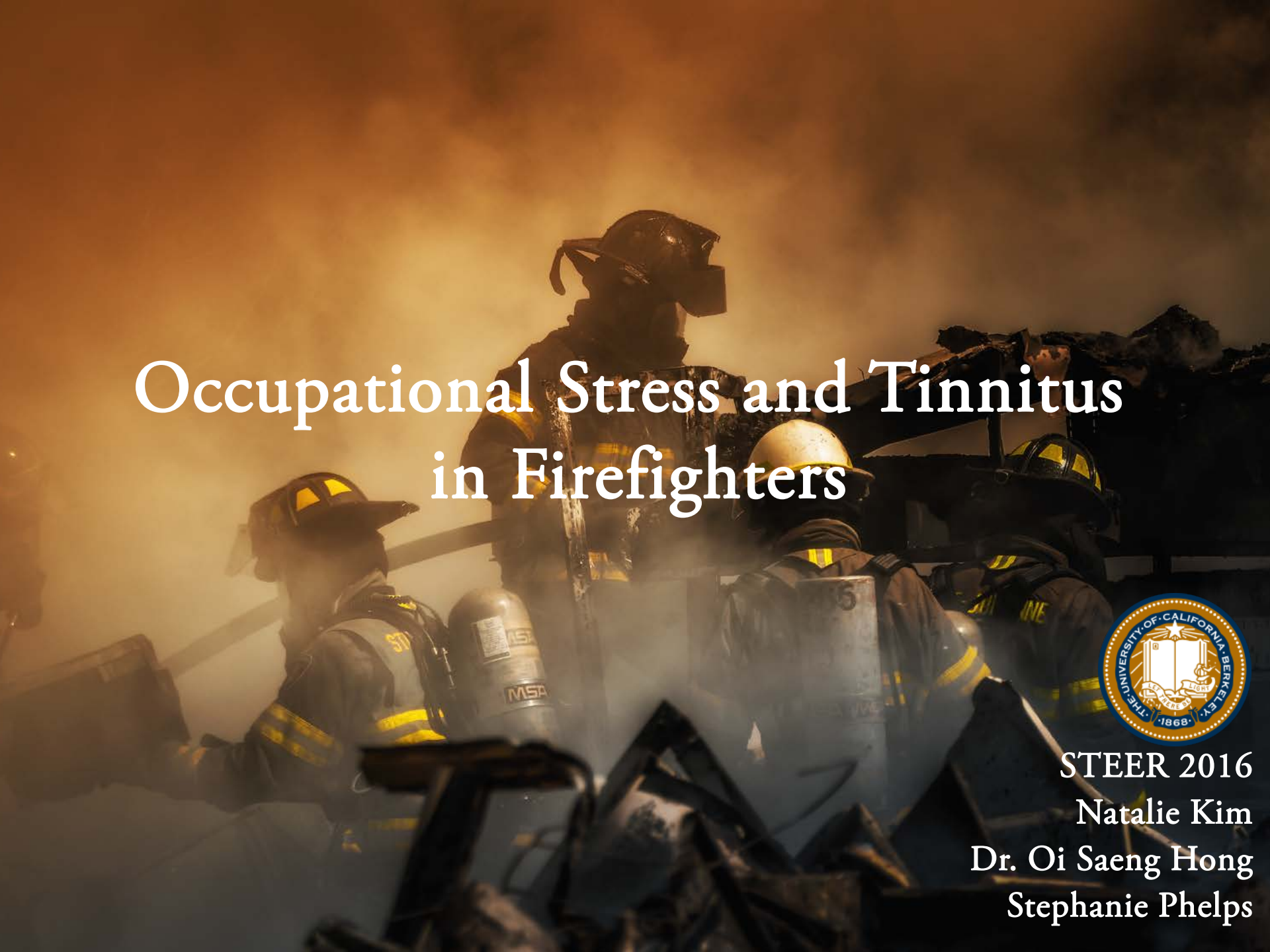

Occupational Stress and Tinnitus in Firefighters

STEER 2016
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Project Aims

- Research and produce literature reviews for two projects:
- 1st project: Gender difference in hearing loss and hearing protection among factory workers in high noise
- 2nd project: Occ. stress and tinnitus in firefighters
  - Ran various statistical tests using SPSS Version 24
  - Main Purpose: To assess the relationship between occupational stress and tinnitus in firefighters
  - Assess relationships between other variables including: Gender, years of service, occ. noise exposure, occ. stress, and hearing loss

Background Information

- Tinnitus is the perception of ringing in the ears
- Affects over 50 million Americans, 1 in 5 people
- The condition is a major occupational health problem among noise exposed workers
- Highly correlated with hearing loss: 90% of people with tinnitus have hearing loss
- Among firefighters, noise-induced hearing loss is one of the most prevalent occupational injuries

Background Information

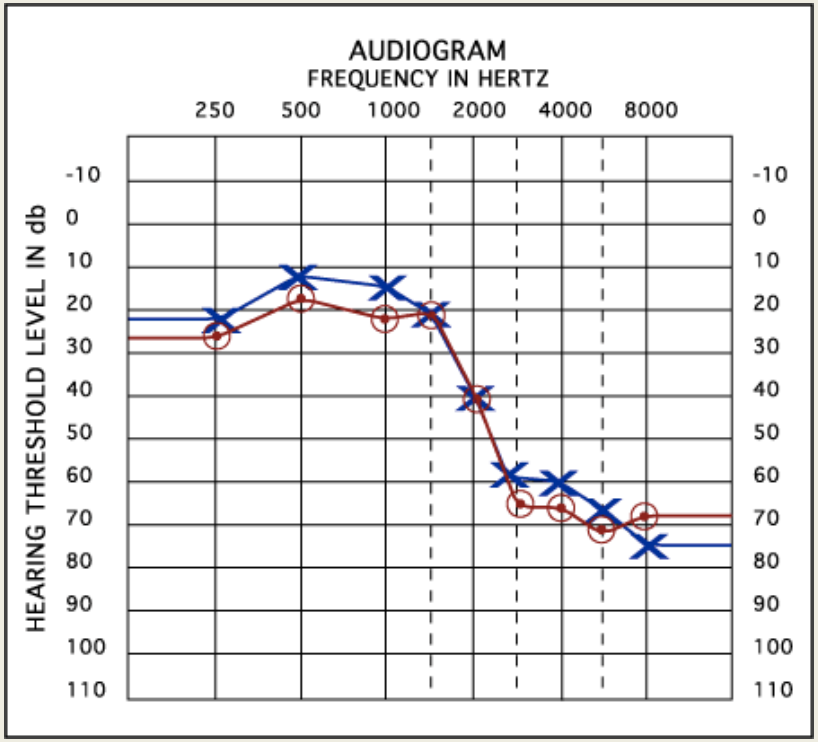
- Known to be symptomatic of physical conditions such as hearing loss and ear injuries, but is also linked to psychological disorders including: depression, anxiety, insomnia

- Recent studies look into applying cognitive-behavioral therapy and mindfulness stress-reduction therapy to alleviate tinnitus

Methods

- Study design: cross-sectional survey
- Study sample: N=240 East Bay CA and Central TX firefighters
- Measures: age, gender, hearing loss, tinnitus, occupational stress, years of service, occupational noise exposure
  - Audiograms to measure hearing loss

Methods: Measures



Audiograms measure hearing loss and observes two variables:

1. High frequency (4, 6 kHz): Average of high freq hearing between both ears
2. Low frequency (0.5, 1, 2, 3 kHz): Average of low freq hearing between both ears

Methods: Measures

- Occupational stress measured using ERI-ratio calculation
  - ERI-ratio: measurement based on effort, reward, and over-commitment
- Dependent variables: Presence and frequency of tinnitus
- Independent variables: Occupational stress, occupational noise exposure, high frequency hearing loss, gender, years of service

Statistical Methods

- Descriptives & Frequencies:
  - Continuous variables: Frequency of tinnitus, occupational stress, occupational noise exposure, high frequency hearing loss, years of service
  - Dichotomous variables: Presence of tinnitus, gender
- Bivariate Correlations:
  - Age and years of service
  - High and low frequency hearing loss
  - Presence of tinnitus and independent variables
  - Frequency of tinnitus and independent variables
- Multiple Logistic Regression:
  - Dependent variable: Presence of tinnitus
  - Covariates:
    1. Occupational stress
    2. Years of service
    3. High frequency hearing loss
    4. Occupational noise exposure
    5. Gender

Results

Descriptive Statistics: Summary table

Variable	Count	Mean	Std. Deviation	Frequencies	Valid Percent
Years of service	224	15.0	8.9	.	.
Frequency of tinnitus	103	6.3	7.8	.	.
High freq. hearing loss	240	15.7	12.4	.	.
Occupational stress	236	.9	.3	.	.
Occ. noise exposure	238	44.1	19.5	.	.
Presence of Tinnitus:				.	.
Yes				103	43.1
No				136	56.9
Gender:				.	.
Male				223	92.9
Female				17	7.1

Correlations of the presence and frequency of tinnitus with independent variables

		1	2	3	4	5	6	7
1	Presence of tinnitus	1						
2	Frequency of tinnitus[a]	.	1					
3	Occupational stress[b]	0.209**	-.012	1				
4	Occ. noise exposure[c]	.032	-.089	.160*	1			
5	Gender[d]	.055	-.118	.030	.066	1		
6	Years of service	.020	.238*	.161*	-.028	-.154*	1	
7	High freq. hearing loss	.185**	.414**	.067	-.031	-.175**	.418**	1

*p<.05, **p<.01

[a]Frequency of tinnitus: percentage of time being aware of tinnitus

[b]Occupational stress: greater the ER-ratio number, greater the stress

[c]Occupational noise exposure: percentage of time hearing is exposed to noises as loud as a vacuum and above

[d]Gender: 223 males, 17 females

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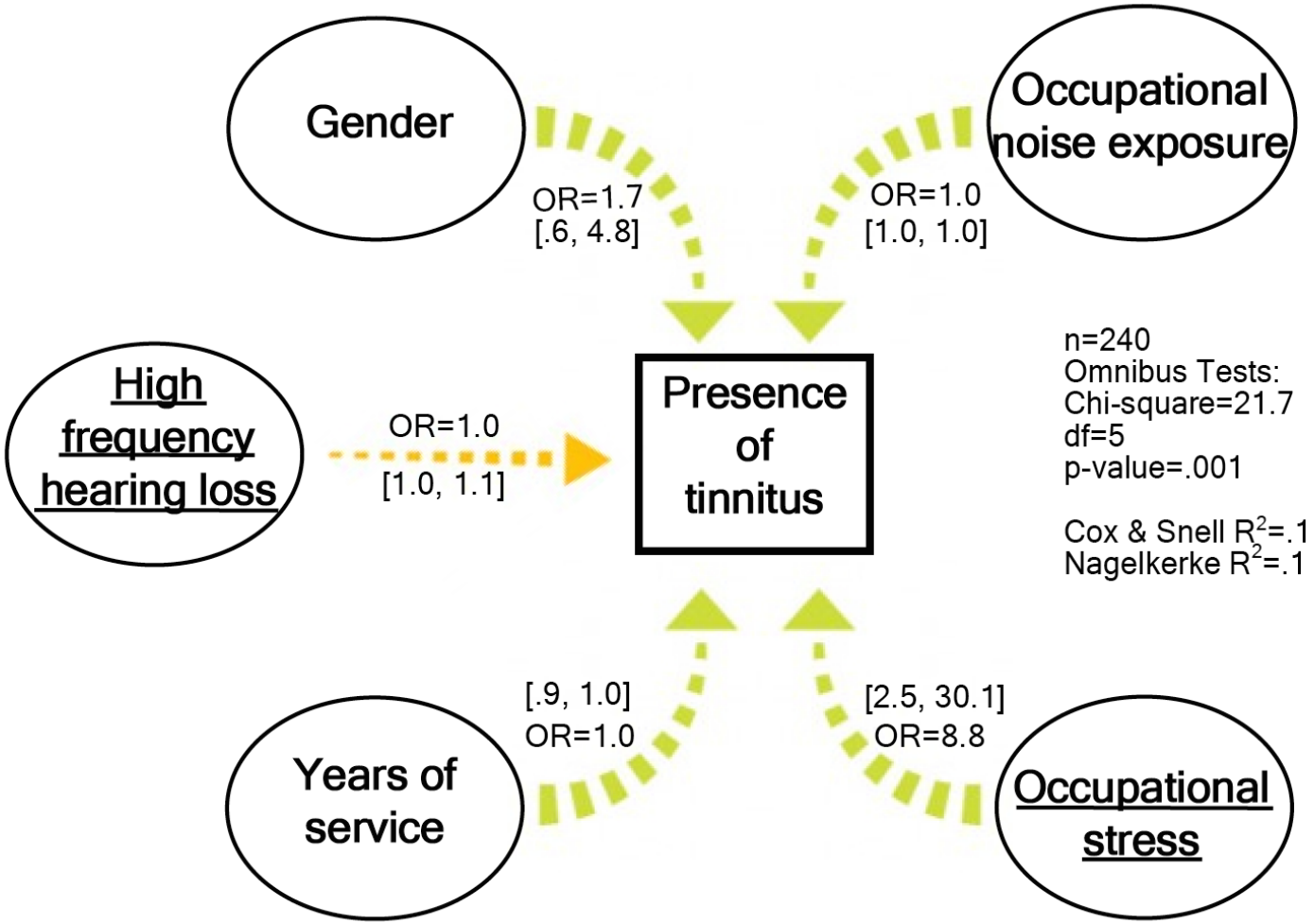
Relationship of occupational stress with tinnitus, controlling for other factors: Multiple logistic regression results



Conclusions

- Bivariate and logistic regression tests indicate a significant correlation exists between occupational stress and the presence of tinnitus in firefighters
- Significant correlations between the independent variables are observed: years of service with occupational stress, noise exposure and frequency of tinnitus

Discussion

- Conclusions supported by past studies which correlate psychological disorders with tinnitus
- Past literature look into the next step: intervention

Future Steps

- More research to replicate the study with a bigger sample size and more diverse participants
- Intervention programs:
  - Cognitive-behavioral therapy
  - Mindfulness stress-reduction therapy
  - PTSD Counseling
  - Support programs/groups
  - Tinnitus acceptance
- Further explore tinnitus and stress as risks for occupational injury
- Explore whether results from hearing tests are associated with injury or stress

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- Photos by: D-TaiL Vision and Thomas Levinson