

Abstract:

The purpose of this project was to determine if going to a football game would affect a person's hearing in a negative way and the hypothesis was that going to a game will negatively impact a person's hearing right after the game but will fully recover 24 hours after. When going to a game a person is exposed to decibels from 80-110 decibels and decibels over 85 can cause permanent hearing loss if exposed to it for an extended period of time and each football game is around 3 hours. Each participant was tested 3 separate times one 24 hours before the game (control) one 1 hour after the game and one 24 hours after the game to see if their hearing has recovered if there was a negative impact on their hearing. When comparing 24 hours before the game to 1 hour after the game by using a t test the results showed 3.57 for the t value and when comparing 24 hours before the game to 24 hours after the game the results showed 0.335 and in order to be significant the t value must be over 1.812 because the degree of freedom is 10 and the significant level is 0.05 and the test is a one tailed t test and this shows that attending a football game will have a significant effect immediately after the game and then it will return back to normal 24 hours which supports the hypothesis

Keywords: decibels, hearing loss, participants

Introduction:

Hearing is important because it helps you maintain relationships with family and friends and also lets you experience life events. In 2019, the National Collegiate Athletic Association (NCAA) found that 47.5 million fans attended a college football game every year, and when attending a football game people are exposed to loud noise levels ranging from 80-110 decibels and noise levels over 85 decibels can cause permanent hearing loss if exposed to it for an extended period of time so I am trying to find out if attending a football game will affect a person's hearing and I believe that attending a football game will immediately and negatively affect a person's hearing but it will have fully recovered 24 hours after the game.

Methodology:

I will test at least ten participants. I am going to test each person's hearing using the Mimi hearing app using an Apple iPhone. I tested each person 24 hours prior to the game (quiet setting at home) to get their starting hearing levels then after the game then I tested each person again to see if their hearing has changed at all. Then about 24 hours after the game I will test them again to see if their hearing has fully recovered from the football game. The Mimi Hearing test will tell us the individual's average hearing loss (dB HL). I will also monitor the sound levels (in decibels (dB)) and the number of times the sound level reaches above 80dB during the game.

Environmental sound levels will be measured using an Apple Watch connected to the Health app (Hearing section) of an iPhone.

Data and Results:

all change is compared to pre game (24 hours)		all numbers are in dB		avg is between each participants 2 ears									
Participant	24 hrs pre game		before(avg)(dB)	postgame	after(avg)(dB)	change(+/-)	average change		24 hrs postgame	24 hrs after (avg) (dB)	change(+/-)	change	
1 left ear	22		18.5	26	22	4	3.5		21	16	-1	-2.5	
right ear	15			18		3			11		-4		
2 left ear	10		10	19	20.5	9	10.5		8	7	-2	-3	
right ear	10			22		12			6		-4		
3 left ear	7		6.5	21	14.5	14	8		7	6.5	0	0	
right ear	6			8		2			6		0		
4 left ear	16		13.5	19	20.5	3	7		7	6.5	-9	-7	
right ear	11			22		11			6		-5		
5 left ear	12		10.5	19	19.5	7	9		7	7	-5	-3.5	
right ear	9			20		11			7		-2		
6 left ear	27		28.5	43	38	16	9.5		29	30.5	2	2	
right ear	30			33		3			32		2		
7 left ear	15		12	18	19	3	7		14	13.5	-1	1.5	
right ear	9			20		11			13		4		
8 left ear	23		18.5	31	23	8	4.5		25	19	2	0.5	
right ear	14			15		1			13		-1		
9 left ear	9		6	21	19.5	12	13.5		9	8	0	2	
right ear	3			18		15			7		4		
10 left ear	11		9.5	20	18.5	9	9		12	11.5	1	2	
right ear	8			17		9			11		3		
	13.35 Mean		Mean	21.5			8.15 ave increase in dB		12.55 Mean			-0.8 Aveorase decrease in dB	

- I can conclude that participants hearing had a negative effect right after the game because the t value from the test is 3.5 (compared 24 hours before the game - 1 hour after) which shows that the results are significant
- I can conclude that each participant's hearing went back to normal after 24 hours because I did another t test to compare before the game (24 hours- 24 hours) and the results are 0.34 for the t value which shows that it is not significant to 24 hours before the game.
- I can conclude that this data supports my hypothesis because when comparing the times right after a game a participant's hearing loss went significantly up but after 24 hours they had mostly recovered

Time	decibels
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7:00	68
7:05	87
7:10	85
7:15	94
7:20	91
7:25	87
7:30	89
7:35	90
7:40	101
7:45	95
7:50	100
7:55	101
8:00	96
8:05	88
8:10	90
8:15	91
8:20	105
8:25	104
8:30	104
8:35	96
8:40	103
8:45	97
8:50	96
8:55	93
9:00	94
9:05	102
9:10	88
9:15	97
9:20	89
9:25	95

9:30	95
9:35	99
9:40	91
9:45	101
9:50	105
9:55	93
10:00	101
10:05	101
10:10	108
10:15	108
10:20	99
10:25	96
10:30	91
10:35	100
10:40	93
10:45	100
10:50	103
10:55	109
11:00	102

- I can conclude that participants were exposed to high levels of decibels during the game ranging from 68-108 decibels

Conclusion:

I can conclude that the data supports my hypothesis because the participants' hearing loss increased right after the game but went back to normal 24 hours after the game because in order to be significant the T value must be over 1.812 and for 24 hours before the game - 1 hour after the game the value was 3.5 so it is significant and for 24 hours before the game - 24 hours after the game the T value was 0.85

References:

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Noise Induced hearing loss

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<https://apps.apple.com/us/app/mimi-hearing-test/id932496645> Mimi hearing test