SEUJA,VOL. 1, NO. 2, DECEMBER. 2021, PP. 1-16

ARC. SEU

Southeast University Journal of Architecture

Journal homepage: www.seu.edu.bd/seuja

Speech Intelligibility & Speech Privacy Assessment at Restaurants in Dhaka

Khairun Nahar [a]*, ***Md. Afif Ibne Mahmood*** [b]

[a]*Lecturer, Department of Architecture, Southeast University, Dhaka, Bangladesh. khairun.nahar@seu.edu.bd*
[b]*Lecturer, Department of Architecture, Stamford University, Dhaka, Bangladesh. afifrakeen@gmail.com*

ARTICLE INFORMATION

Received: November 17, 2021
Revised: February 07, 2022
Accepted: February 27, 2022
Published online: August 08, 2022

Keywords:
Restaurant,
Reverberation Time (RT),
Speech Intelligibility,
Speech Privacy,
Quietude

ABSTRACT

Speech intelligibility and speech privacy in a restaurant is a very important concern for the diners, as many choose to go to a restaurant not only for nourishment but also for a sound and private conversation. Often these conversations at the tables may get interrupted by background noise levels and conversations among other diners.
The problem consists of the difficulty of understanding of speech, while another participatory speech in the background exists- this phenomenon can be termed as the "cocktail party problem". This paper aims to investigate the quality of speech communication in four different restaurants in Dhaka by means of questionnaire and measurements. The results show, a specific narrow range of reverberation time ensures acoustical comfort for diners. It also finds the correlation of other physical and acoustical conditions of the dining space to acoustical comfort such as quietude, communication, privacy etc. that affect speech intelligibility and speech privacy.

1. Introduction

The restaurant we perceive now came in existence at the end of the 18th century. A restaurant may have an indoor space with different seating arrangements along with semi-outdoor/ outdoor spaces. Recently in Bangladesh, these eating facilities have become the most important hang-out places for people of all ages as there is a scarcity of recreation facilities in Dhaka. Thus, most of these spaces remain overcrowded for the whole day to the midnight. No surprise that these places would be full of life but mostly noisy. It is surprising to observe that, although many buildings of these restaurants are designed by architects but there is no sign of acoustic consideration which result in lack of proper hearing or sometimes absence of speech privacy. This, paper aims to find the current acoustical situation of few restaurants in Dhaka and check the correlation of several factors to speech intelligibility & speech privacy and finally check the correlation of speech privacy with the BNBC speech privacy analysis sheet to check the reliability of the analysis.

2. Literature Review

2.1. Factors Affecting the Speech Intelligibility

a. Reverberation Time (RT): The reverberation time of a room is defined as the time required for the sound pressure level in a room to decrease by 60 dB after the sound comes to an end and then RT is calculated.

Formula:
RT=0.16V/(A+V)
…… (1)

Here RT= Reverberation time calculated in second, V= Room Volume in cubic feet, A=Total room absorption in Sqm Sabin, x= air absorbent coefficient.

A relatively lower reverberation time should be contained by the space for speech. For English language, the optimum RT for speech is 0.8 to 1.2 and it ranges from 0.5s to 0.8s for Bangla (BNBC, 2015).

b. Percentage of Syllable Articulation (PSA): Percentage of Syllable Articulation can be identified as The percentage of meaningless syllables correctly written by listeners are called. In ideal condition (no, noise, speech

* *Corresponding author: Khairun Nahar, Lecturer, Department of Architecture, Southeast University, Dhaka, Bangladesh*
This article is published with open access at www.seu.edu.bd/seuja
ISSN No.: 2789-2999 (Print), ISSN No.: 2789-3006 (Online)

level 75 dB), the minimum admissible PSA should be 75% to have a satisfactory Speech Intelligibility (BNBC, 2015).

c. Sound Pressure Level: In a space with a low background noise (<20 dB) and a minimum RT (close to 0.0 s), a maximum Percentage Syllable Articulation (PSA), and thus Speech Intelligibility can be achieved at a sound pressure level of speech ranging from 60 dB to 70 dB.

d. Diffusion of sound: Diffusion of sound in any space is important for keeping the sound pressure level, reverberation time etc. the same anywhere in the space.

There should not be a difference of sound pressure levels greater than 6 dB at any two points in the audience area (BNBC, 2015).

3. Methodology

a. Case Room Selection: There are a number of restaurants in Dhaka. Four of them (dining area) from Dhanmondi, Lalmatia and Mohammadpur area are selected as 'case room' on which the performance of speech intelligibility and privacy will be tested.

They are coded as O1 (Al Fresco, Dhanmondi 27, Dhaka)

O2 (Society Cafe, Housing Society, 6, Mohammadpur, Dhaka)

O3 (The Backyard Chef, Lalmatia, Dhaka)

O4 (Grassroots Café, Aarong, Lalmatia, Dhaka)

b. Properties of the dining spaces:

To define the acoustical quality of restaurants, measurement of several acoustical and physical characteristics of spaces were taken. A thorough survey was done to take the dimension of the space including material used on each surface.

c. AutoCAD drawing of these four restaurants were produced.

d. The dimension of spaces and materials with total absorption was calculated and combined in separate charts.

e. RT is calculated along with the background noise.

f. Correlation of factors checked.

g. Age group of 26-45 taken for survey.

3.1. The Survey

Six questions were selected to prepare the questionnaire to be given to the diners with the reference from Battaglia, 2015. The questionnaire includes diner's age grouping. There are four other questions for Quietude, Communication, Privacy, and Comfort and they were evaluated by ranking from 1 to 4. (Source: Battaglia, 2015). If the response value is higher, the restaurant would be more quiet (Quietude) & easy for conversation (Communication) & if the conversations from adjacent tables are not disturbing then it can be said that privacy is achieved (Privacy); and overall, the restaurant's acoustic environment can be said "comfortable". (Source: Battaglia, 2015).

Circle the number of your answer
Age group
1. 25 and under
2. 26-45
3. 46-65
4. 66 and over

For the following questions, give rating from 1 to 4;
What rating would you give for the loudness of the restaurant?
……1……..…2……..…3…..…...4….
Noisy Quiet
Is it difficult to converse with others at your table?
……1……..…2……..…3…..…...4….
Difficult Easy
Do you feel disturbed from the conversations of other tables?
……1……..…2……..…3……..4….
Disturbing Not Disturbing
Are you comfortable with the way this restaurant sounds?
……1……..…2……..…3…..…...4……
Uncomfortable Comfortable

This survey is entirely anonymous (Source: Battaglia, 2015).

Table 1- Ranking of the variables

sl	A	Q	C	P	Cm
1	2	3	4	3	3
2	2	2	4	3	3
3	2	3	4	3	3
4	2	3	4	3	4
5	2	4	4	3	4
6	2	3	4	3	3
7	2	2	4	4	4
8	2	2	3	4	3
9	2	3	4	3	3
10	2	3	4	3	3
avg	2	2.8	3.9	3.2	3.3

3.2. The Data

a. Calculation of RT: Chairs and tables were considered as the main furniture. RT calculation for the restaurant would be done for the full capacity. The volume was measured. The absorption coefficient values of the materials were calculated for the case room. Then RT is being calculated.

Formula for calculating RT:

RT= 0.16V/ (A+V) (BNBC, 2015), found in literature.

Figure 01

Table 02- Calculation of RT for O1

Sl No	Surface	Material	Area			Ab. Co-ef.	Total Ab.
			Length	Width	Sqm	α1000	Sα
1	Floor	Glazed Tiles			142.15	0.01	1.42
2	East Wall	Large panes of heavy plate glass	16.76	3.66	61.32	0.03	1.84
		Brick, unglazed, painted	3.85	3.05	11.74	0.02	0.28
3	West Wall	6mm Transparent glass	2.61	2.13	5.46	0.03	0.16
		Brick, unglazed, painted	18.21	3.66	66.65	0.02	1.33
		Plywood panelling	7.34	3.05	22.39	0.09	2.02
4	North Wall	Large panes of heavy plate glass	8.97	3.05	27.36	0.02	0.55
5	South Wall	Brick, unglazed, painted	8.25	3.05	25.16	0.02	0.50
6	Ceiling	Plywood paneling, 9 mm			142.15	0.09	12.79

		thick					
7	Table	Marble			22.56	0.01	0.23
8	People	104 people seated on chairs, made of wood	Average Body Surface Area of Bangladeshi people is 1.47 Sqm		121.68	0.86	104.65
Total Absorption, Sqm Sabin							125.77

According to the Table 02, Volume of the room, V= 142.15 x 3.05 = 433.56 cum

Thus, RT of Restaurant = (0.16 x 433.56) / 125.77 = 0.55 s

For RT of 0.55 s, in ideal condition (no, noise, speech level 75 dB), PSA is expected to be about 72% (Imam, 2009), which is inefficient considering both English and Bengali language.

Table 03- Calculation of RT for O2

Sl No	**Surface**	**Material**	**Area**			**Ab. Co-ef.**	**Total Ab.**
			Length	**Width**	**Sqm**	**α1000**	**Sα**
1	Floor	Glazed Tiles			39	0.01	.39
2	East Wall	Plywood paneling, 9 mm thick	1.04	2.91	3.03	0.09	0.27
		Glazed Tiles	1.58	2.91	4.60	0.01	0.05
		Brick, unglazed, painted	5.08	2.91	14.78	0.02	0.30
3	West Wall	6mm Transparent glass	3.02	2.91	8.79	0.03	0.26
		Glazed Tiles	1.83	2.91	5.33	0.01	0.05
		Plywood paneling, 9 mm thick	1.17	2.91	3.40	0.09	0.31
		Brick, unglazed, painted	5.08	2.91	14.78	0.02	0.30
4	North Wall	Brick, unglazed, painted	9.40	2.91	27.35	0.02	0.55
5	South Wall	Brick, unglazed, painted	1.68	2.91	4.89	0.02	0.10
		Glazed Tiles	2.75	2.91	8.00	0.01	0.08
		Plywood paneling, 9 mm thick	2.13	2.91	6.20	0.09	0.56
6	Ceiling	Concrete Block , painted			39	0.07	2.73
7	Table	Transparent glass			3.07	0.03	0.10
		Plywood, 9 mm thick			1.86	0.09	0.18
8	People	33 people seated on chairs, made of wood	Average Body Surface Area of Bangladeshi people is 1.47 Sqm		48.51	0.86	41.72

Total Absorption, Sqm Sabin	47.95

According to the Table 03, Volume of the room, V= 39 x 2.91= 113.49 cum .Thus, RT of Restaurant = (0.16 x 113.49) / 47.95 = 0.38 s. For RT of 0.38 s, in ideal condition (no, noise, speech level 75 dB), PSA is expected to be about 80% (Imam, 2009), which is close to the value 82% considering both English and Bengali language.

Table 04- Calculation of RT for O3

Sl No	**Surface**	**Material**	**Area**			**Ab. Co-ef.**	**Total Ab.**
			Length	**Width**	**Sqm**	**α1000**	**Sα**
1	Floor	Glazed Tiles			48.6	0.01	0.49
2	East Wall	Large panes of heavy plate glass	5.52	2.9	16.008	0.03	0.48
3	West Wall	Brick, unglazed, painted	3.89	2.9	11.28	0.02	0.23
4	North Wall	Brick, unglazed, painted	18.84	2.9	54.64	0.02	1.09
		Plywood paneling, 9 mm thick			5.58	0.09	0.50
5	South Wall	Brick, unglazed, painted	18.84	2.9	54.64	0.02	1.09
		Plywood paneling, 9 mm thick			5.58	0.09	0.50
6	Ceiling	Plywood paneling, 9 mm thick			1.6	0.09	0.14
		Concrete Block , painted			47	0.07	3.29
7	Table	wood			4.84	0.01	0.05
8	People	20 people seated on chairs, made of wood	Average Body Surface Area of Bangladeshi people is 1.47 Sqm		29.4	0.86	25.28
Total Absorption, Sqm Sabin							33.14

According to the Table 04, Volume of the room, V= 48.6 x 2.9= 140.94 cum

Thus, RT of Restaurant = (0.16 x 140.94) / 33.14 = 0.68 s

For RT of 0.68 s, in ideal condition (no, noise, speech level 75 dB), PSA is expected to be about 70% (Imam, 2009), which is efficient considering both English and Bengali language.

Table 05- Calculation of RT for O4

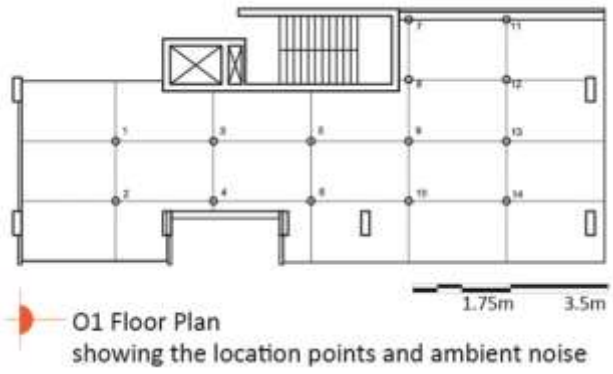
Sl No	**Surface**	**Material**	**Area**			**Ab. Co-ef.**	**Total Ab.**
			Length	**Width**	**Sqm**	**α1000**	**Sα**
1	Floor	Brick, unglazed			47.58	0.02	0.95
2	East Wall	Large panes of heavy plate glass	2.6	3.05	7.93	0.03	0.24
		Brick, unglazed, painted	0.6	3.05	1.83	0.02	0.04
		Plywood paneling, 9 mm thick	3.59	3.05	10.95	0.09	0.99
	West Wall	Brick, unglazed, painted	5.43	3.05	15.65	0.02	0.31

		6mm Transparent glass	1.01	3.05	3.08	0.03	0.09
4	North Wall	Brick, unglazed, painted			10.88	0.02	0.22
		6mm Transparent glass	0.3	3.05	0.92	0.03	0.03
5	South Wall	Brick, unglazed, painted			18.51	0.02	0.37
		Large panes of heavy plate glass	2.39	3.05	7.29	0.03	0.22
6	Ceiling	Plywood paneling, 9 mm thick			36.51	0.09	3.29
		Concrete Block , painted	6.71	1.65	11.07	0.07	0.77
7	Table	wood			5.85	0.01	0.06
8	People	28 people seated on chairs, made of wood	Average Body Surface Area of Bangladeshi people is 1.47 Sqm		41.16	0.86	35.40
Total Absorption, Sqm Sabin							**42.97**

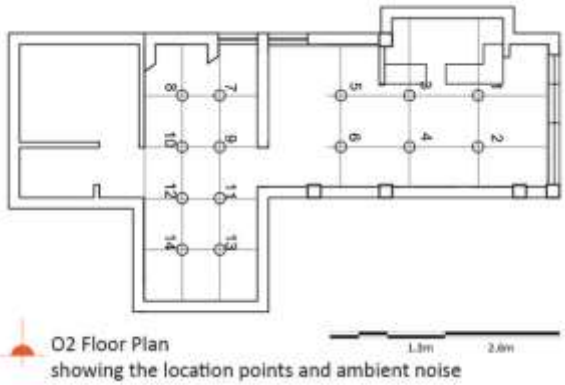
According to the Table 05, Volume of the room, V= 47.58 x 3.05= 145.119 cum

Thus, RT of Restaurant = (0.16 x 145.119) / 42.97=0.54 s

For RT of 0.54 s, in ideal condition (no, noise, speech level 75 dB), PSA is expected to be about 72% (Imam, 2009), which is efficient considering both English and Bengali language.



O1 Floor Plan
showing the location points and ambient noise



O2 Floor Plan
showing the location points and ambient noise

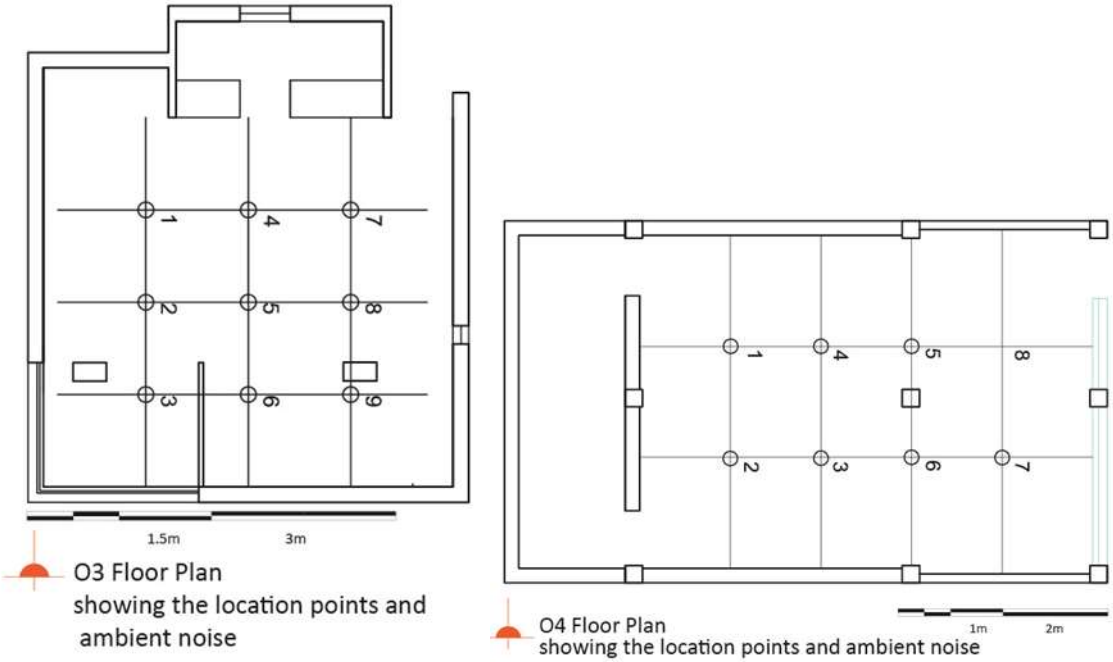


Figure: 02-Background noise at vacant room and after participating 10 people were measured at selected location points, of the four restaurants, shown in Figure 02were measured by the sound meter.

After calculating the background noise in the vacant room, the reading of background noise is taken again when at least 10 people occupy the seating and started talking within themselves. Then the average background noise is found for the space.

Table 06- Background noise (O1)

Location Points	Background noise in vacant room (dB)	Background noise after participating 10 people (dB)
1	50.5	55.1
2	50.5	56.4
3	50.5	61.1
4	51 .9	63.3
5	51 .9	60.2
6	53 .7	62.3
7	57.6	63.0
8	57 .6	63.1
9	55.6	58.4
10	52.7	62.3
11	58.5	62.7
12	55.4	63.1
13	54.3	55.5
14	54.2	60.1

Table 07- Background noise (O2)

Location Points	Background noise in vacant room (dB)	Background noise after participating 10 people (dB)
1	50.5	58.1
2	50.5	56.7
3	51.0	55.1
4	51.0	55.1
5	51.9	60.5
6	52.3	62.5
7	52.0	60.2
8	53.2	62.0
9	52.1	62.0
10	52.7	62.2
11	53.0	58.7
12	53.0	60.3
13	54.3	60.2
14	54.2	60.0

Table 08- Background noise (O3)

Location Points	Background noise in vacant room (dB)	Background noise after participating 10 people (dB)
1	52.3	55.0
2	52.0	55.0
3	51.0	53.1
4	51.0	53.2
5	51.2	58.0
6	52.3	58.0
7	52.0	56.9
8	52.0	55.8

Table 09- Background noise (O4)

Location Points	Ambient Noise (A.N.) in vacant room (dB)	Ambient Noise after participating 10 people (dB)
1	50.0	56.0
2	52.0	55.2
3	51.0	53.2
4	51.9	52.2
5	50.3	57.0
6	51.3	56.2
7	51.3	56.2
8	52.0	55.8
9	51.8	55.0

These characteristics are combined in the table 10

Table 10- Restaurant Data

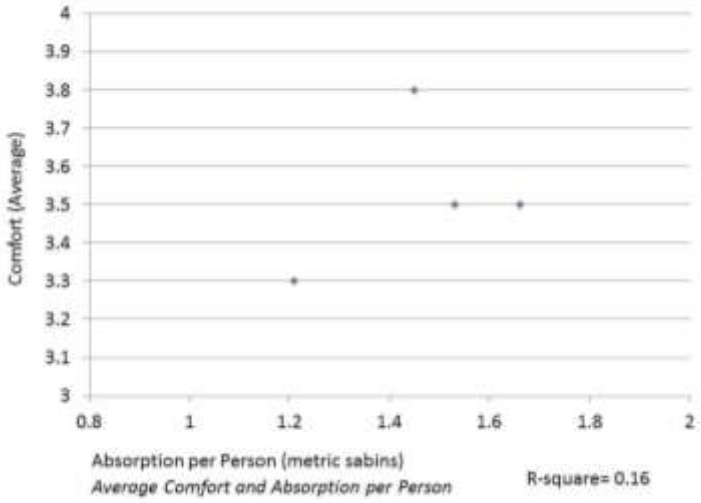
		Restaurant No			
		1	2	3	4
Acoustic Measurements	T: Reverberation Time (sec)	0.55	0.38	0.68	0.54
	B: Background Noise (dBC)	53.98	52.24	51.73	51.23
Basic Measures	L: Length (m)+ W: Width (m)	31.9	20.04	13.96	14.33
	W: Width (m)				
	H: Height (m)	3.05	2.91	2.91	3.05
	C: Capacity (persons)	104	33	20	28
Calculated Measures	F: Floor Area (m2)	142.15	39	48.6	47.58
	V: Volume (m3)	433.56	113.49	140.94	145.12
	D: Density-1 (m2/person)	1.37	1.18	2.43	1.70
	aT: Absorption, Total (m2)	125.77	47.95	33.14	42.97
	aP: Absorption per Person	1.21	1.45	1.66	1.53
Average Subjective Impressions of Age Group: 26 to 45	Quietude	2.8	3	3.2	3
	Communication	3.9	3.9	3.9	3
	Privacy	3.2	3.5	3	3
	Comfort	3.3	3.8	3.5	3.5

Values for Quietude, Communication, Privacy & Comfort were calculated from the questionnaire and put as an average for each restaurant. Floor Area, Cubic Volume, Cavity Ratio (5H x (L+W)/LW), Total Absorption, Density-1 (m2/person): Floor Area (m2)/ Capacity (persons)the measure of Absorption per Person: (Absorption, Total (m2)/ Capacity (persons)) were calculated.

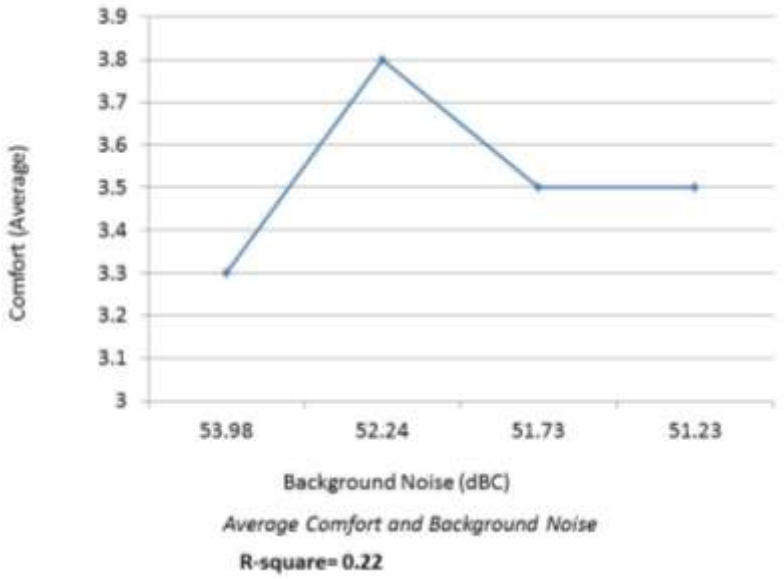
4. Analysis

Scatter plots reveal the mean-error-squared (r2 values) for Average Comfort . Physical measures were generated in the

Microsoft Excel spreadsheet:

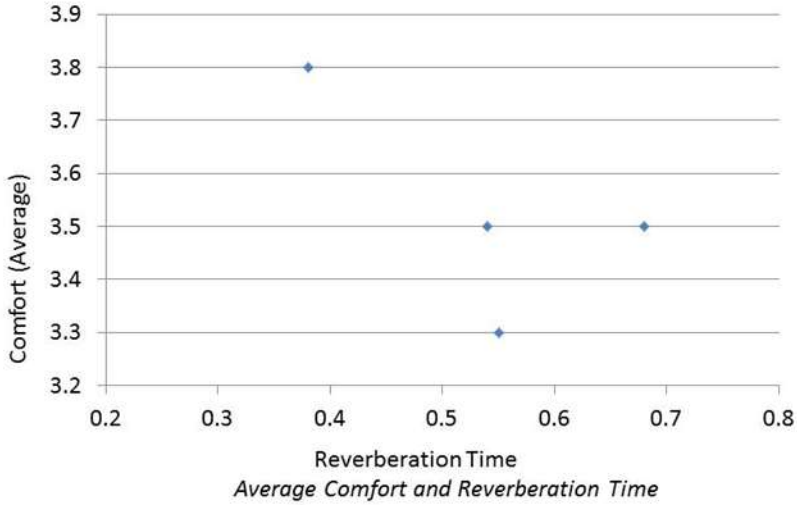


The data does not indicate a strong correlation between Average Comfort and Absorption per Person (r2 = 0.16).

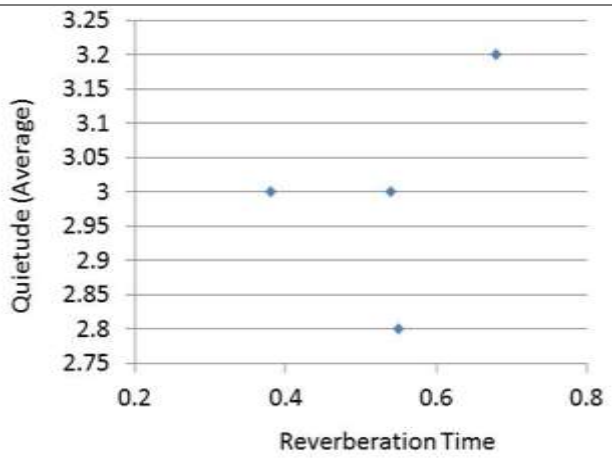


A degree of correlation is evident between Average Comfort & Background Noise (dBC) (r2 = 0.22). This is generally assumed that increased noise in restaurants results in discomfort.

It is seen that, there is no significant correlationbetween Average Comfort and Density (r2= 0.07)

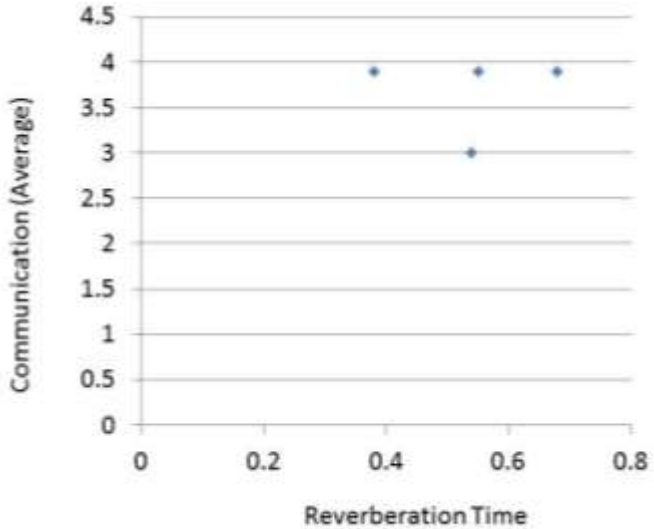


However, there is a significant correlation for Average Comfort and Reverberation Time, (r2= 0.43) which also indicates an optimal level between 0.5 and 0.6 seconds



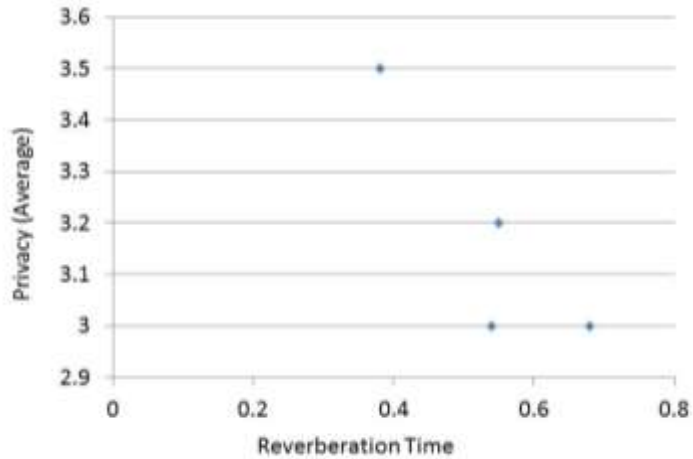
Reverberation Time compared to the averaged responses for the subjective impressions of Communication, Quietude and Privacy show some interesting correspondences:

A degree of correspondence is evident between RT and Quietude ($r2 = 0.2$). Quietude (how quiet the Space seems to be) also Correspond with significance.



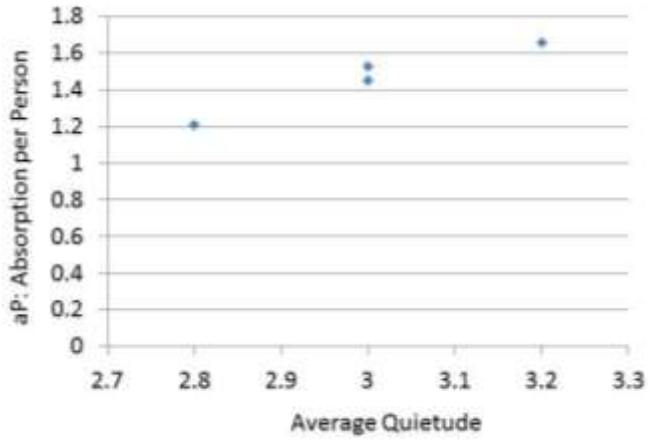
Average Communication and Reverberation Time

Communication (ability to converse with other diners at the same table) correlates the least ($r2 = .0.0001$)



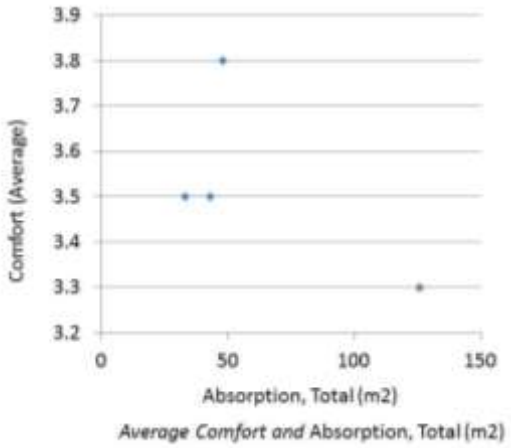
Average Privacy and Reverberation Time

Reverberation Time affects Privacy ($r2 = .77$) (lack of disruption due to sound from other tables) to a large extent.



Average Quietude and Absorption per Person

There is a significant agreement between Average Quietude and Absorption per Person (r2 = 0.94).



Average Comfort and Absorption, Total (m2)

Also, There is a significant correlation for Average Comfort and Absorption, Total (m2) R2= 0.

At a glance,

	R-square
Average Comfort and Absorption per Person	0.16
Average Comfort and Background Noise	0.22
Average Comfort and Reverberation Time	0.43
Average Comfort and Absorption, Total (m2)	0.42
Average Quietude and Reverberation Time	0.22
Average Communication and Reverberation Time	0.0001
Average Privacy and Reverberation Time	0.77
Average Quietude and Absorption per Person	0.94

5. Result

It is seen that,

There is a strong correspondence between reverberation time and acoustical comfort.

There is a remarkable concurrence between Average Quietude and Absorption for each Person (r2 = 0.94). Explaination can be given as- less absorption would make the restaurant seem too noisy, and more absorption would lead too much clarity to conversations from diners at adjacent tables.

Reverberation Time affects Privacy (r2 = .77) to a large extent.

Although, there are many studies regarding noise

annoyance and the objective acoustical parameters in public spaces, (Ebru, speech intelligibility), there are few that concentrate on the relationship of the subjective evaluation and the objective conditions with the characteristics of an enclosed space. In this study, to find factors that affect speech intelligibility and speech privacy, we examined the relationship of subjective and objective measurements. Thus, after these calculations, Speech Privacy Analysis for the 4 different restaurants is done by using the speech privacy analysis sheet given in BNBC (Appendix)

No of Restaurants	1	2	3	4
Privacy (Surveyed Result)	3.2	3.5	3	3
Speech Privacy through BNBC Sheet	-2	0.3	12	12

The data indicates a strong correlation between the surveyed average privacy and Speech Privacy analysis through BNBC Sheet ($r2 = 0.61$).

To improve the PSA, (at least 75%)

Acoustic absorptive materials need to be implied to get a good result.

Limitation

There should be further research with different type of age group and their response to particular acoustic environment**.** More research needed to find desired PSA by applying trial and error method to get desired RT

References

1. Imam, S. M. N., Ahmed, N. & Takahashi, D. 2009. Effects of Reverberation Time on Percentage Syllable Articulation for Bangla Language. Journal of the Asiatic Society Bangladesh. 06/2009. 35(1):37-48.

2. Kinsler, L. E; Frey, A. R., Coppens, A. B & Sanders, J. U. 2000. Fundamentals of Acoustics. 4th Edition. New York: John Willey and Sons Inc.

3. Pumnia, B. C; Jain, A. K & Jain, A. K. 2005. Building Construction. New- Delhi: Firewall Media. Bangladesh National Building Code (BNBC). 2015.Bangladesh National Building Code. Dhaka: Chapter 3, Part 8.

4. Muktadir, M. A. 2010. Designing buildings in the tropics with environmental technologies in Architecture. Dhaka, Bangladesh: AUST.

5. Battaglia, Paul; Achieving acoustical comfort in restaurants; University at Buffalo, The State University of New York

6. Özgüner, Ebru; Emirtekin; Taherzadeh, Speech Intelligibility And Privacy In Eating Facilitie

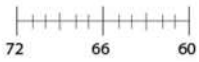
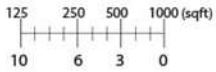
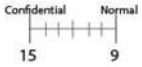
7. Filippi, Marco, Astolfi, Arianna, 2003 Good Acoustical Quality in Restaurants: a Compromise Between Speech Intelligibility and Privacy

Annexure

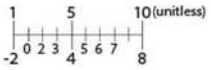
Speech Privacy Analysis Sheet

For Option 01

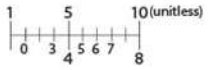
Speech Rating

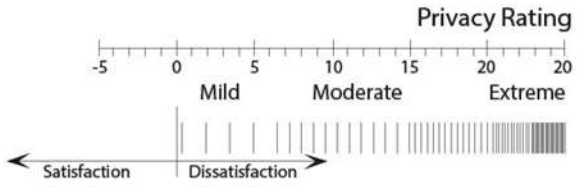
		A	B	C
Speech effort How people talk in source room				60
Source room floor area, (A1) Approximates effect of source room absorption				11
Privacy allowance Degree of privacy desired				10
	Speech Rating Total			81

Isolation Rating

Sound Transmission Class (STC)- Accounts for transmission loss of common barrier				30
Noise reduction factor (A2/S) Approximates effect of receiving room sound absorption and common barrier size				00
Adjacent room background noise level (dBA) Masking sound available				53
	Isolation Rating Total			83

Speech Privacy Rating Number

Find Speech Privacy Rating Number by subtracting isolation rating total from speech rating total. Then use graph at top of sheet to predict degree of satisfaction				-2

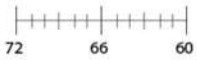
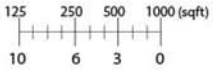
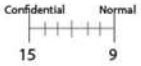


Source: Concepts in architectural acoustics / [by] M. David Egan
&
Bangladesh National Building Code-2015 Vol_3_3 (Draft)

Speech Privacy Analysis Sheet

For Option 02

Speech Rating

		A	B	C
Speech effort How people talk in source room				60
Source room floor area, (A1) Approximates effect of source room absorption				12.5
Privacy allowance Degree of privacy desired				10
	Speech Rating Total			82.5

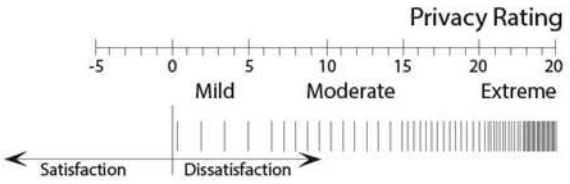
Isolation Rating

Sound Transmission Class (STC)- Accounts for transmission loss of common barrier				30
Noise reduction factor (A2/S) Approximates effect of receiving room sound absorption and common barrier size				00
Adjacent room background noise level (dBA) Masking sound available				52.2
	Isolation Rating Total			82.2

Speech Privacy Rating Number

Find Speech Privacy Rating Number by subtracting isolation rating total from speech rating total. Then use graph at top of sheet to predict degree of satisfaction

				0.3

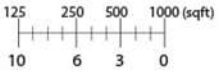
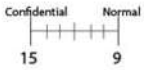


Source: Concepts in architectural acoustics / [by] M. David Egan
&
Bangladesh National Building Code-2015 Vol_3_3 (Draft)

Speech Privacy Analysis Sheet

For Option 03

Speech Rating

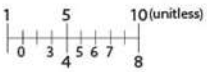
		A	B	C
Speech effort How people talk in source room				60
Source room floor area, (A1) Approximates effect of source room absorption				24
Privacy allowance Degree of privacy desired				10
	Speech Rating Total			94

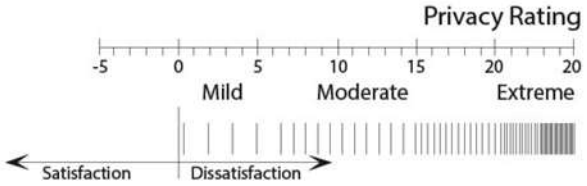
Isolation Rating

Sound Transmission Class (STC)- Accounts for transmission loss of common barrier				30
Noise reduction factor (A2/S) Approximates effect of receiving room sound absorption and common barrier size				00
Adjacent room background noise level (dBA) Masking sound available				52
	Isolation Rating Total			82

Speech Privacy Rating Number

Find Speech Privacy Rating Number by subtracting isolation rating total from speech rating total. Then use graph at top of sheet to predict degree of satisfaction				12



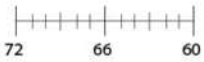
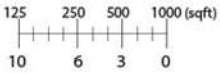
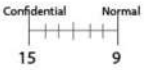


Source: Concepts in architectural acoustics / [by] M. David Egan
&
Bangladesh National Building Code-2015 Vol_3_3 (Draft)

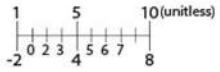
Speech Privacy Analysis Sheet

For Option 04

Speech Rating

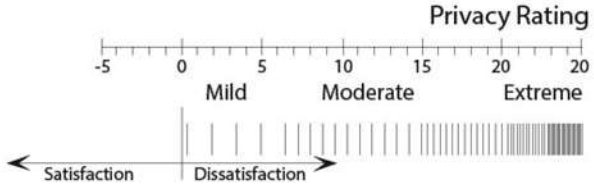
		A	B	C
Speech effort How people talk in source room				60
Source room floor area, (A1) Approximates effect of source room absorption				23
Privacy allowance Degree of privacy desired				10
	Speech Rating Total			93

Isolation Rating

		A	B	C
Sound Transmission Class (STC)- Accounts for transmission loss of common barrier				30
Noise reduction factor (A2/S) Approximates effect of receiving room sound absorption and common barrier size				00
Adjacent room background noise level (dBA) Masking sound available				51
	Isolation Rating Total			81

Speech Privacy Rating Number

		A	B	C
Find Speech Privacy Rating Number by subtracting isolation rating total from speech rating total. Then use graph at top of sheet to predict degree of satisfaction				12



Source: Concepts in architectural acoustics / [by] M. David Egan
&
Bangladesh National Building Code-2015 Vol_3_3 (Draft)