

Sound Offices and People

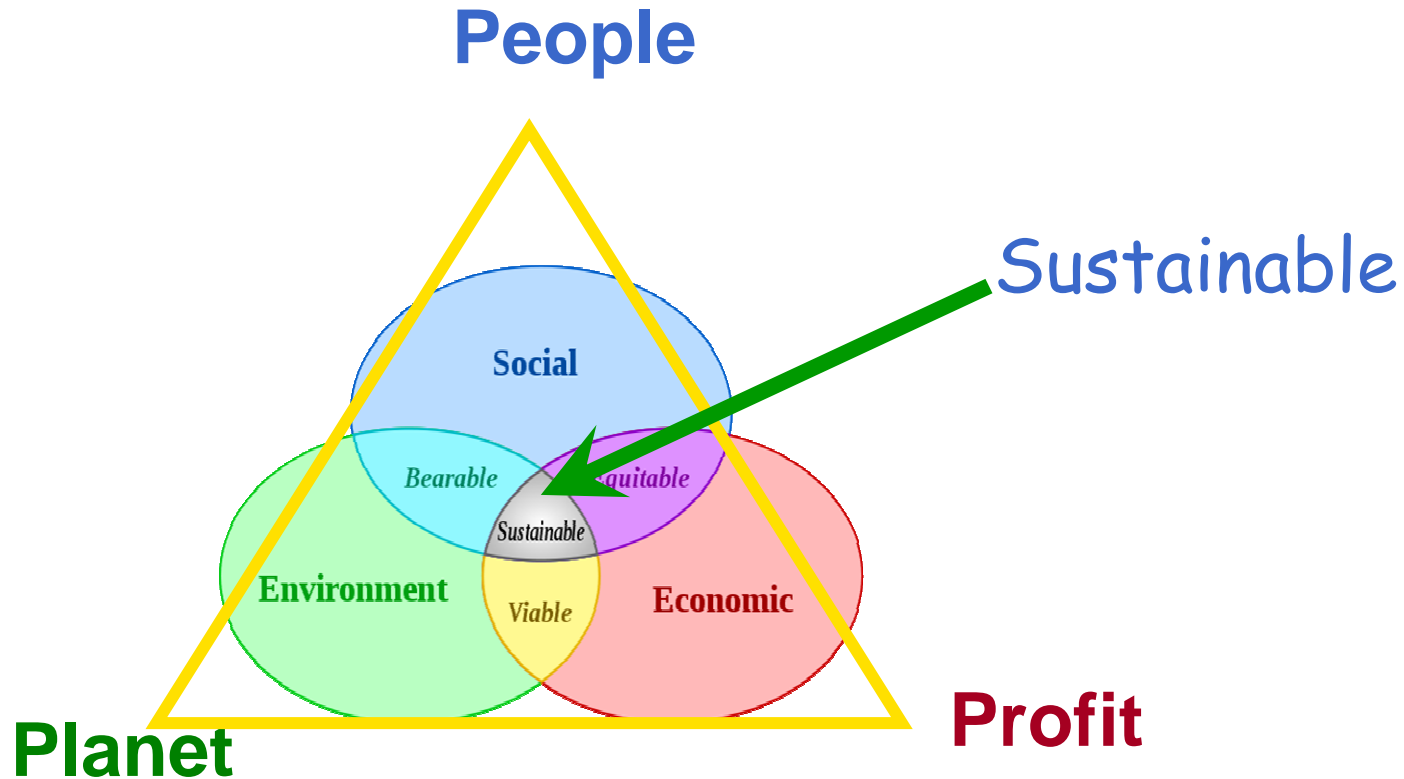
Frans Davidsson, Global Concept Development Manager, Office Environments



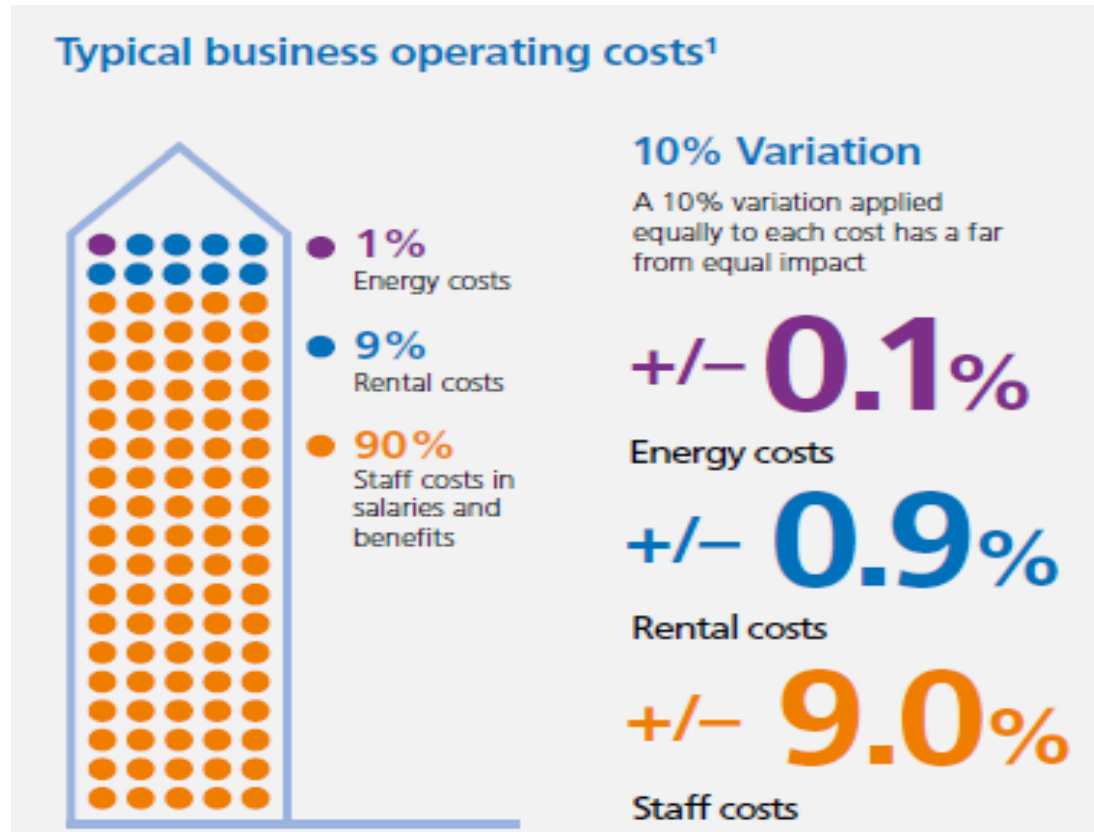
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A SOUND EFFECT ON PEOPLE

Acoustic vital for Sustainable Design



Success is in the people



Activity Based Acoustic Design

Enhance the workplace

1 Activity

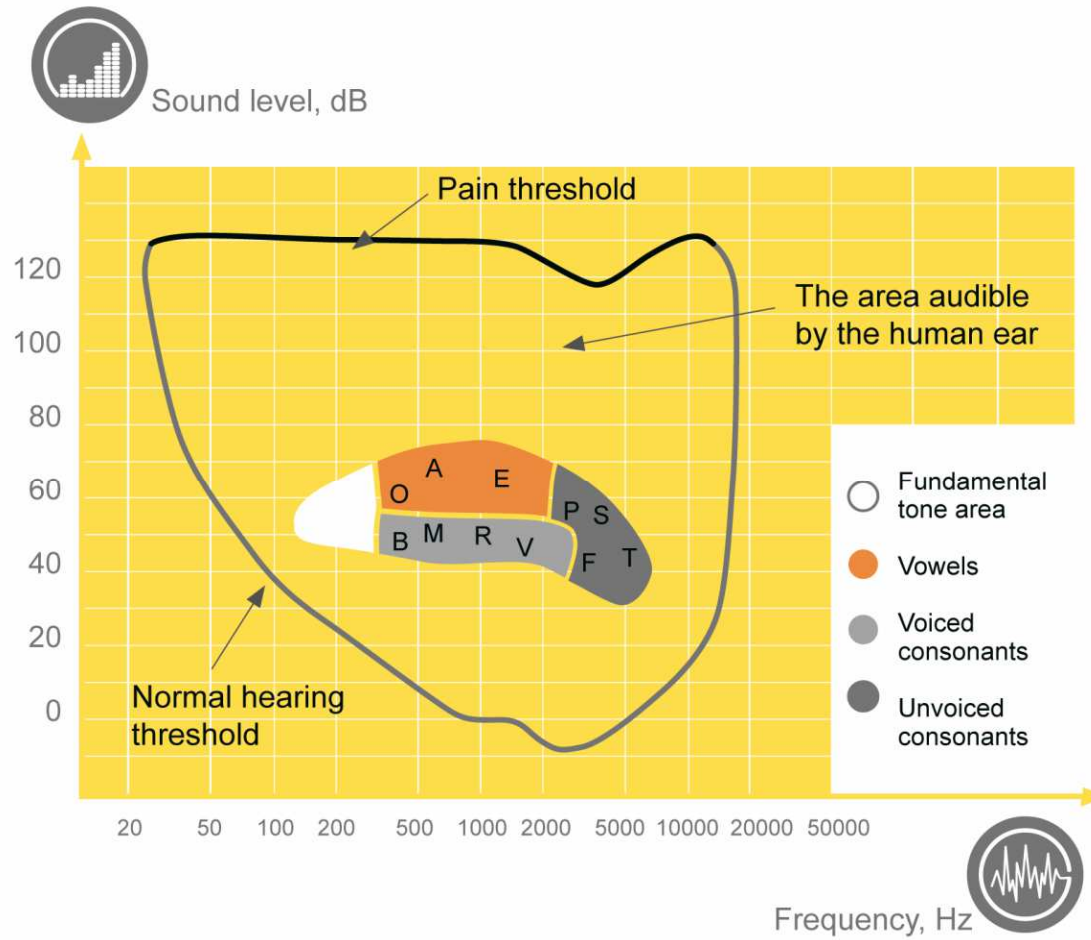
2 People

3 Space

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Speech



Letters importance

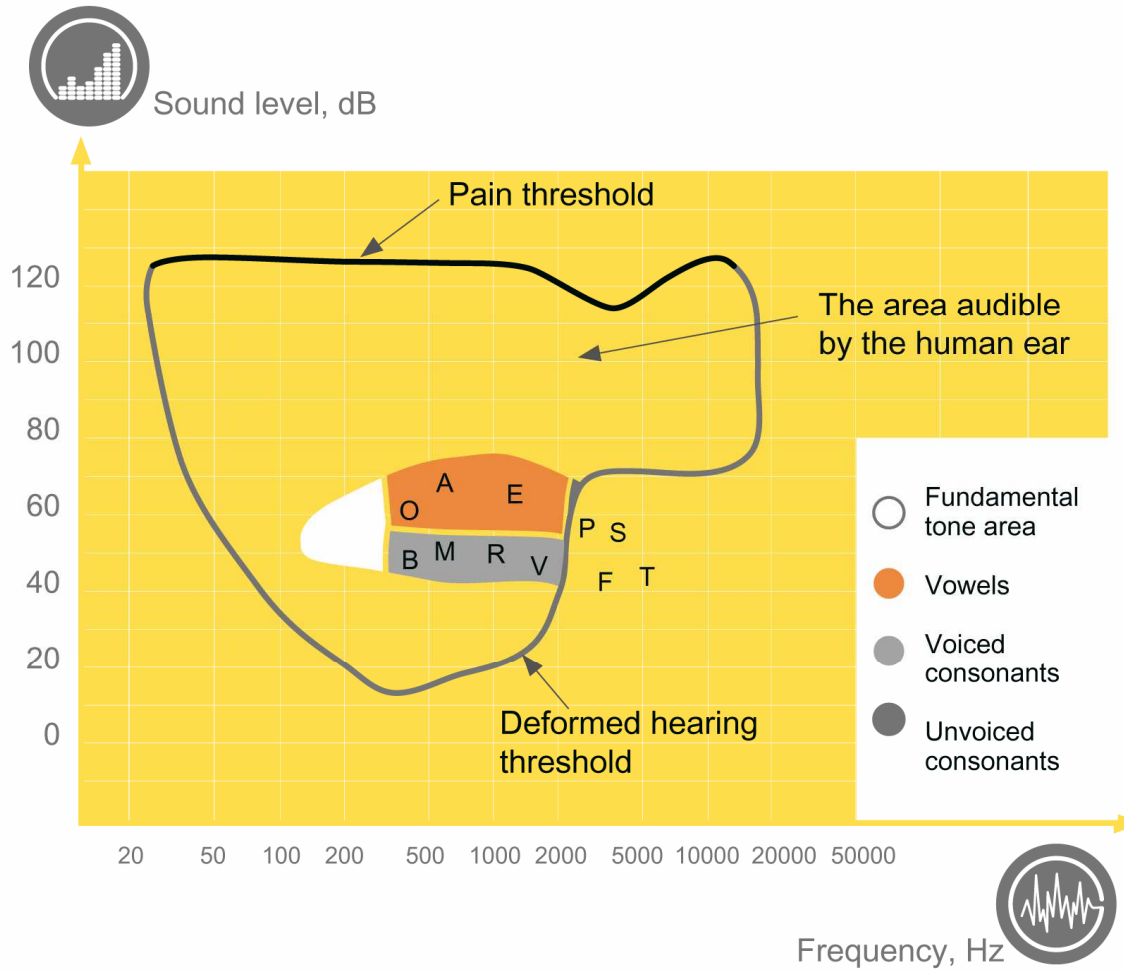
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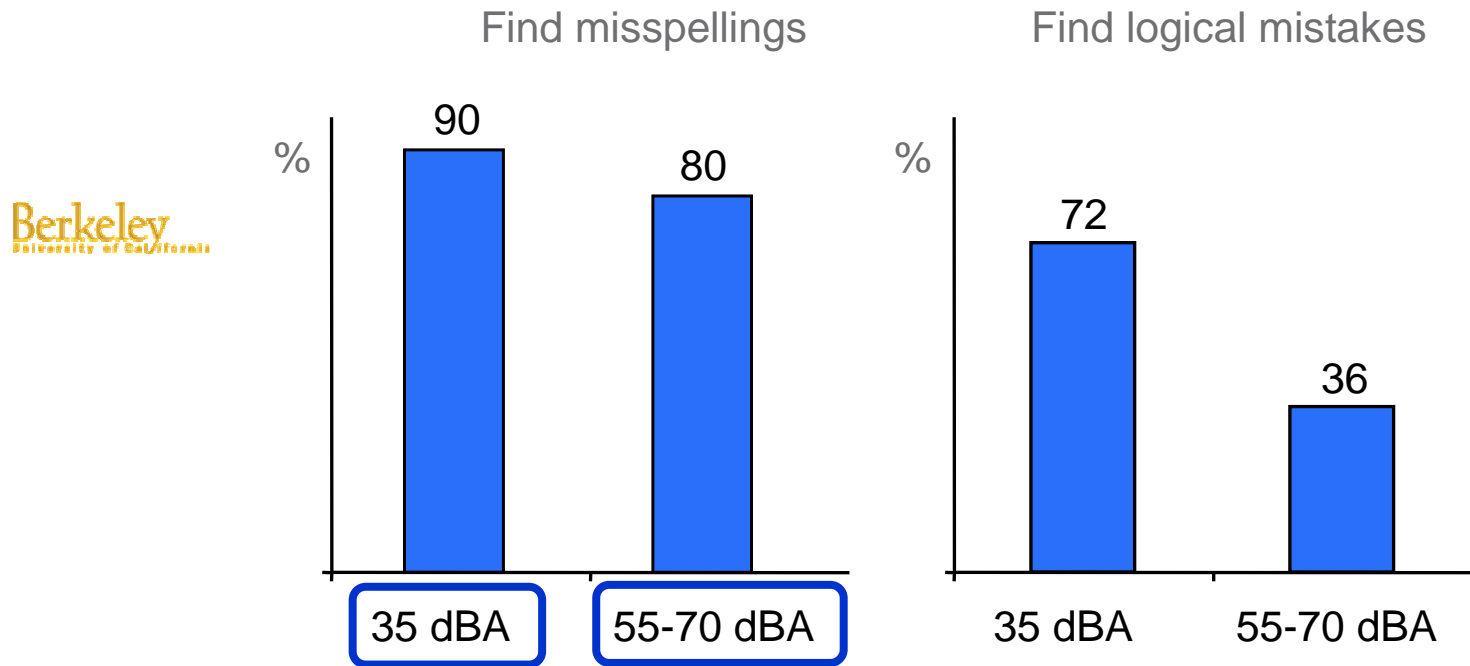
Vowels creates the volume

Consonants carries the information

Impaired hearing

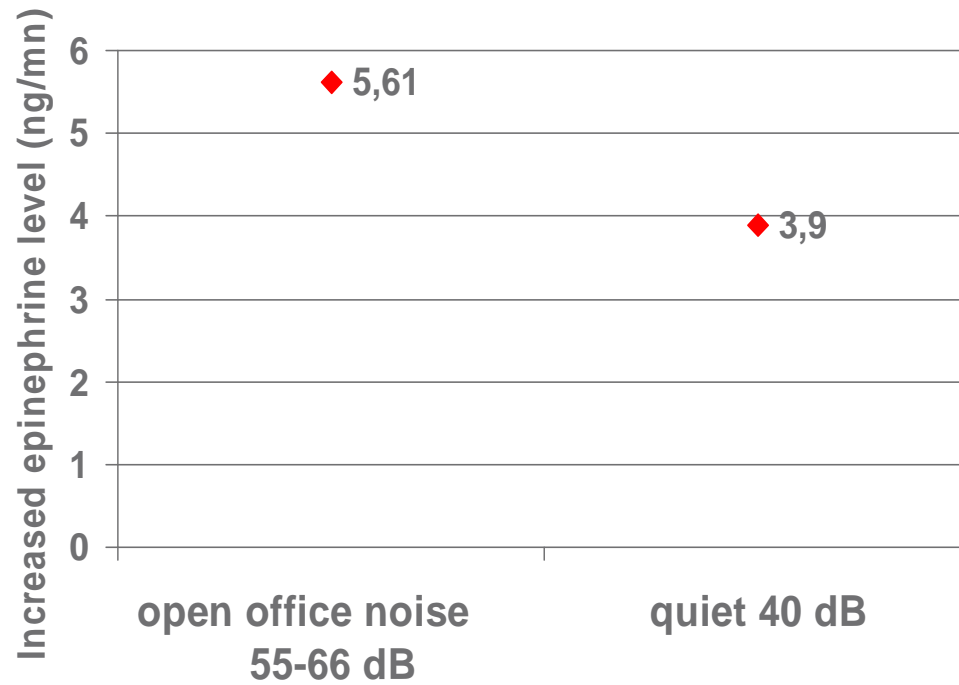


Research: Berkeley



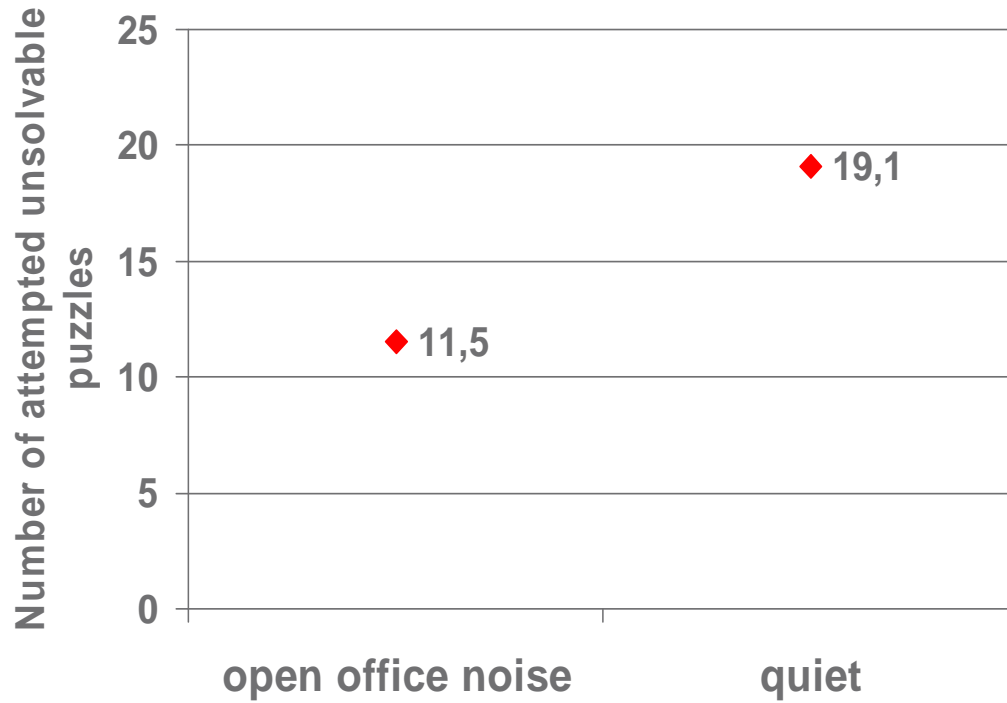
Intellectual performance is enhanced in a good sound environment

Adrenaline levels



Source : Evans Johnson, Cornell university, 2000, "Stress and Open-Office Noise", Journal of Applied Psychology, 2000, Vol. 85, No. 5, 779-783

Task Motivation



Source : Evans Johnson, Cornell university, 2000, "Stress and Open-Office Noise", Journal of Applied Psychology, 2000, Vol. 85, No. 5, 779-783

Stress Research Institute, Stockholm Uni.

35% Shorten Comfort of Distance* gave:

- Significant reduction in perceived disturbance in general
- Significant reduction in disturbance at close range
- Significant reduction in disturbance at long range
- Significant reduction in cognitive stress

* Comfort of Distance= The distance speech travels before it is perceived to be halved

Research



- Psychological
- Physiological
.....
- Productivity

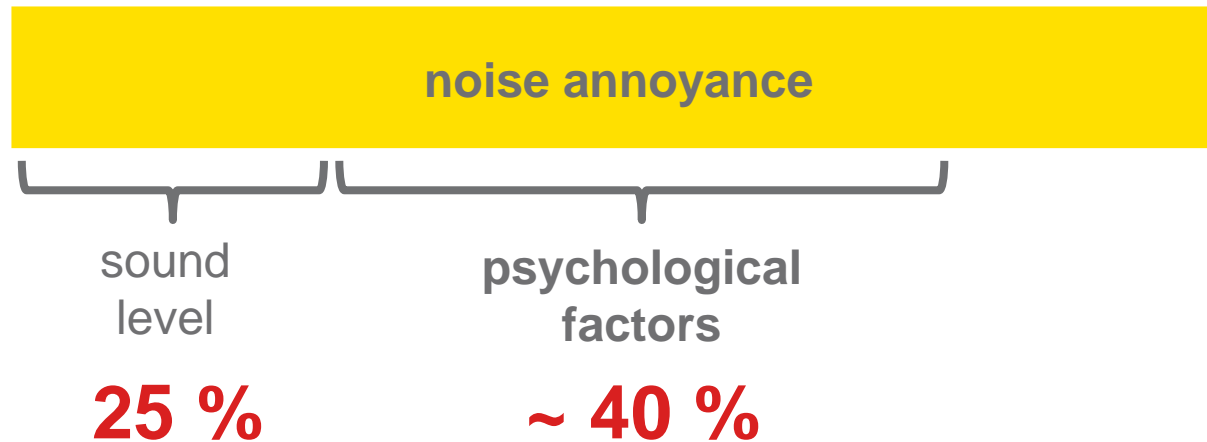
Leesman Index

Q4 Which physical / service features do you consider to be an important part of an effective workspace and how satisfied are you with each?

		% importance overall	% satisfaction overall	% satisfaction Leesman+	Overall / Leesman+ gap	Gap ranking	Gender	Age	Time with organisation
1	Desk	93.3	72.6	76.1	3.5	47	-	<input type="radio"/>	-
2	Chair	92.1	67.1	73.3	6.2	40	-	-	-
3	Tea, coffee and other refreshment facilities	88.9	63.7	83.8	20.1	13	-	<input checked="" type="radio"/>	<input type="radio"/>
4	General cleanliness	82.8	59.0	83.1	24.1	7	-	<input checked="" type="radio"/>	<input type="radio"/>
5	Computing equipment, fixed (desktop)	82.1	66.0	73.8	7.8	36	-	<input type="radio"/>	-
6	Toilets / W.C.	81.0	47.9	69.2	21.3	11	-	<input checked="" type="radio"/>	-
7	Printing / copying / scanning equipment	80.9	66.7	75.0	8.3	33	-	<input checked="" type="radio"/>	<input type="radio"/>
8	Temperature control	80.7	26.9	34.7	7.8	36	-	<input type="radio"/>	<input type="radio"/>
9	Telephone equipment	80.3	68.3	76.4	8.1	35	-	<input type="radio"/>	<input type="radio"/>
10	Restaurant / canteen	79.5	48.8	63.4	14.6	23	-	-	-
11	Meeting rooms (small)	78.9	50.2	68.3	18.1	16	-	<input type="radio"/>	<input type="radio"/>
12	IT Service / Help desk	78.9	57.3	56.5	-0.8	50	-	-	<input type="radio"/>
13	Personal storage	78.2	54.9	56.7	1.8	49	-	<input type="radio"/>	-
14	Natural light	77.3	57.1	76.0	18.9	14	-	<input type="radio"/>	-
15	WiFi network connectivity in the office	76.7	58.3	63.1	4.8	44	-	-	<input type="radio"/>
16	Noise levels	75.5	29.7	39.1	9.4	29	-	<input checked="" type="radio"/>	<input type="radio"/>
17	Meeting rooms (large)	71.4	51.3	65.5	14.2	24	-	<input type="radio"/>	<input type="radio"/>
18	General tidiness	69.9	57.2	82.7	25.5	5	-	<input type="radio"/>	<input type="radio"/>
19	Wired in-office network connectivity	69.7	68.1	72.9	4.8	44	-	<input type="radio"/>	<input type="radio"/>
20	Air quality	69.6	34.0	49.6	15.6	20	-	<input checked="" type="radio"/>	<input type="radio"/>
21	Computing equipment, mobile (laptop, tablet, etc.)	68.7	63.3	80.7	17.4	18	-	<input type="radio"/>	<input type="radio"/>
22	Office lighting	66.4	54.5	72.1	17.6	17	-	<input checked="" type="radio"/>	-
23	Parking (car, motorbike or bicycle)	65.3	49.3	55.6	6.3	39	-	<input checked="" type="radio"/>	<input type="radio"/>
24	Quiet rooms for working alone or in pairs	64.1	25.8	46.7	20.9	12	-	<input type="radio"/>	<input type="radio"/>
25	Remote access to work files or network	63.0	59.2	64.3	5.1	43	-	<input type="radio"/>	<input type="radio"/>
26	General Décor	62.3	40.9	75.8	34.9	4	-	<input type="radio"/>	-
27	Security	57.5	68.7	79.2	10.5	28	-	<input type="radio"/>	<input type="radio"/>
28	People walking past your workstation	55.9	31.2	39.6	8.4	32	-	<input type="radio"/>	<input type="radio"/>
29	Informal work areas / break-out zones	55.9	36.0	72.4	36.4	2	-	<input type="radio"/>	-
30	Ability to personalise my workstation	55.7	46.2	39.6	-6.6	38	-	<input type="radio"/>	-

Can noise annoyance be measured?

- Study of the variance in individual noise annoyance reactions (Smith and Jones, 1992)



- How to include this (big) psychological dimension when designing offices?

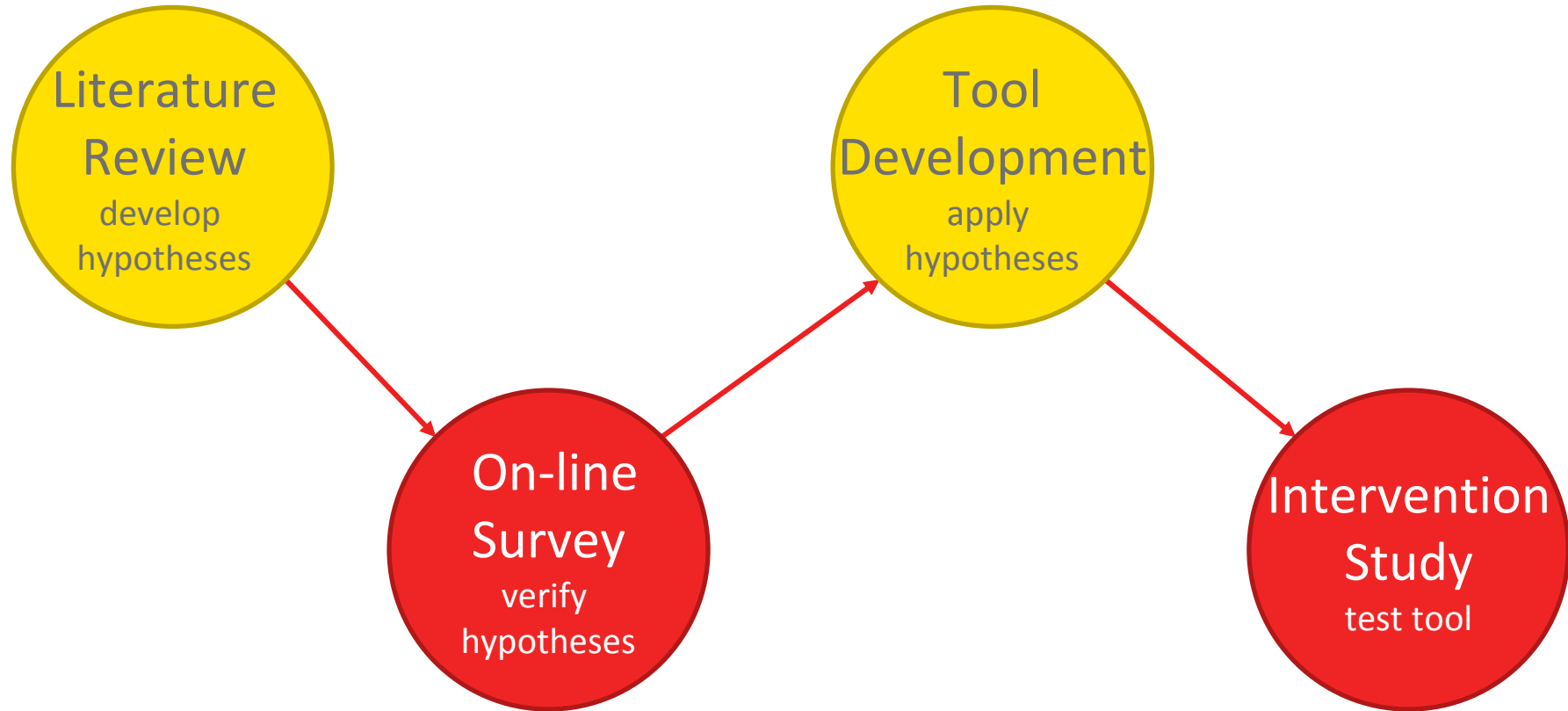
What is psychoacoustics?

“Psychoacoustics is the scientific study of the psychological and physiological responses associated with sound”

Study of how people perceive, interpret and react to sound



Evidence based approach



>150 research papers
>500 survey responses

Psychoacoustics

Tasks and work activity



Context and attitude



Perceived control and predictability



Personality and mood



OCEAN – Big 5 personality inventory



Personality differences



- ✓ Performance (%)
- ✓ Productivity
- ✓ Concentration
- ✗ Distraction
- ✗ Speech interference
- ✓ Stress
- ✓ Wellbeing










Stable



Neurotic

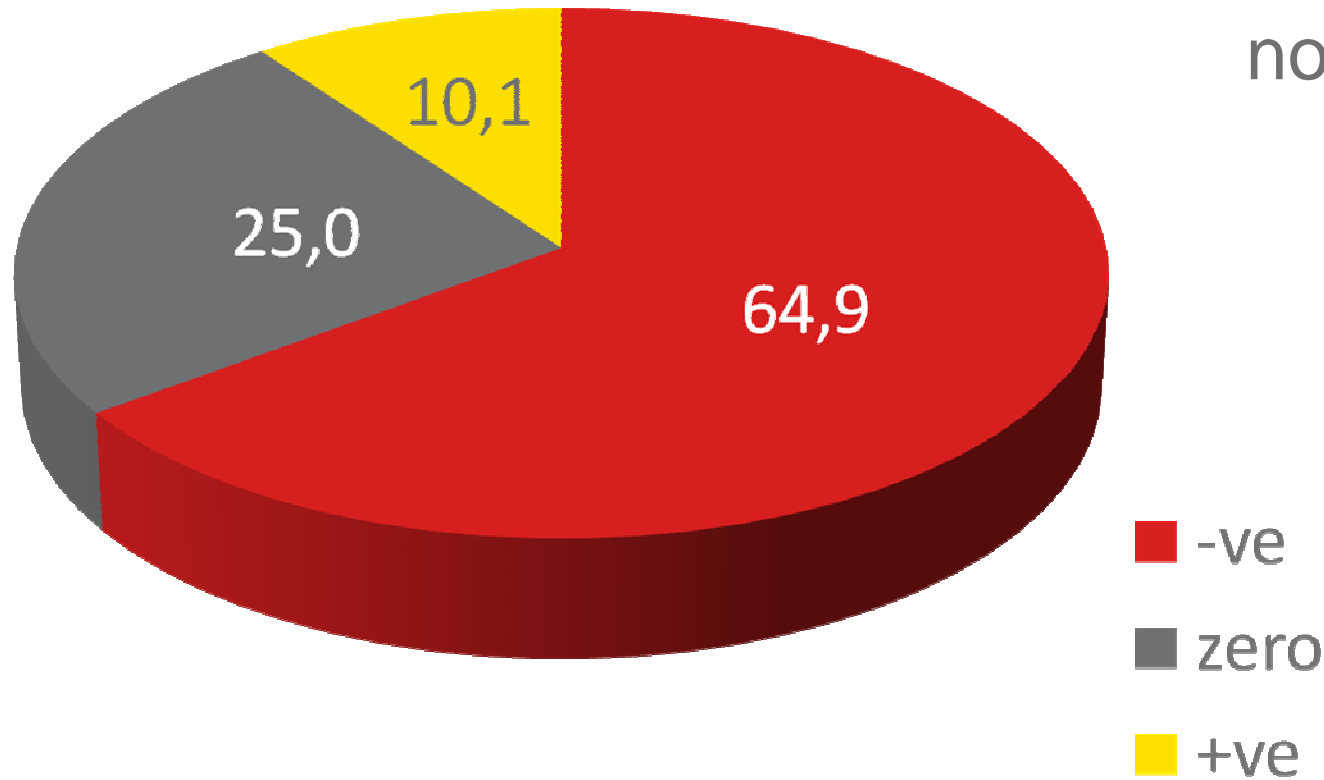
- ✗ Performance (%)
- ✓ Productivity
- ✓ Concentration
- ✗ Distraction
- ✓ Speech interference
- ✓ Stress
- ✓ Wellbeing

Task & personality

Personality	Task	Quiet	Noisy
Introvert	Simple		
	Complex		
Extrovert	Simple		
	Complex		

Noise affects performance

Mean effect of noise = -5.1%



Contributing variables

Personality type +

Work activity +

Place of work +

Perceived control +

Design features +

Individual factors =

41% PSYCHOLOGICAL +

25% SOUND LEVEL =

66% variance



Include psychoacoustics in office design: survey

- For all office occupants: 8 sections, around 10-15 minutes
- Quick and tailored diagnosis:
 - Acoustic treatment in the workplace
 - Layout and zoning
 - People and behaviors



Psychoacoustics Survey

Office Noise Evaluation

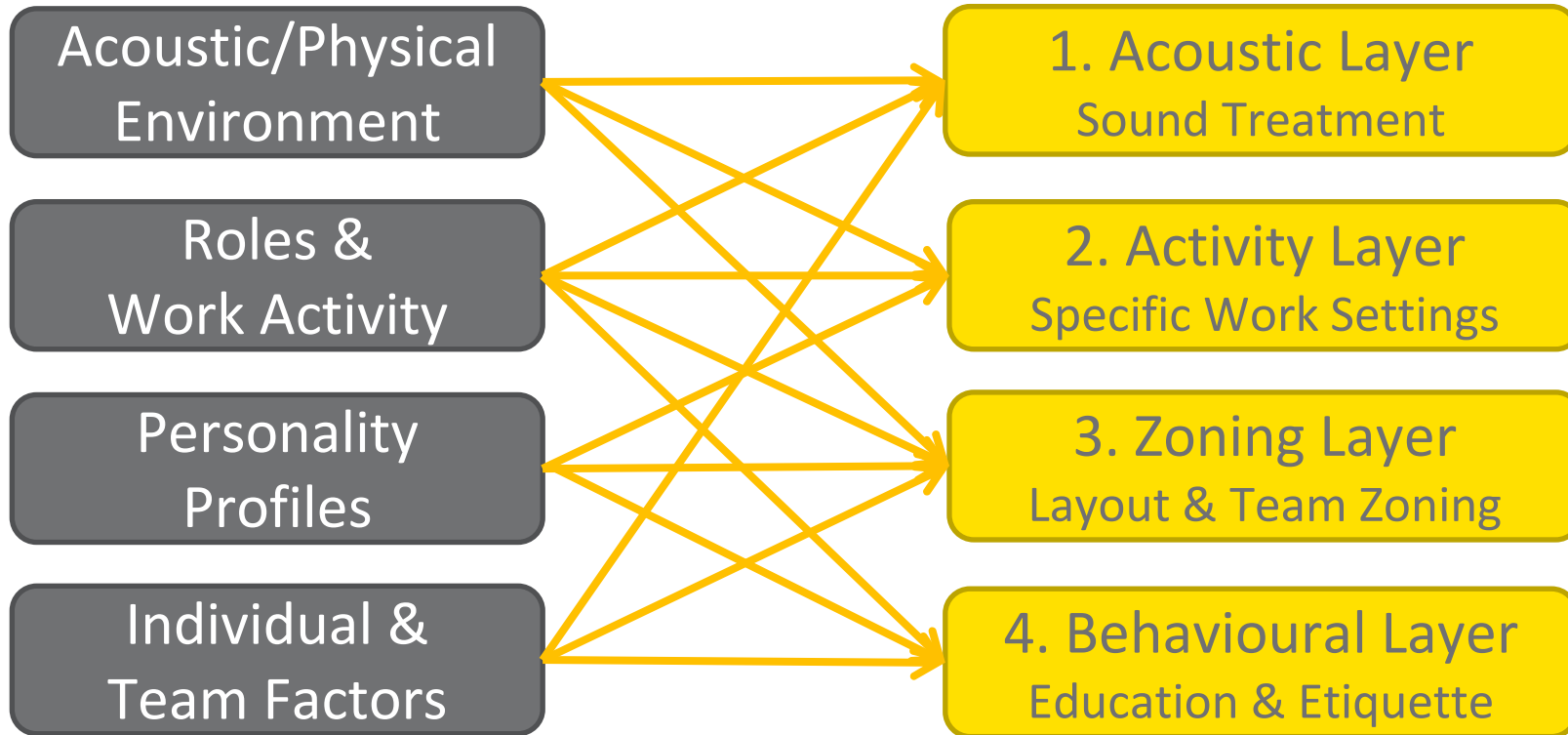
This questionnaire is being used as part of an independent evaluation of noise in the office. It is being conducted by Ecophon acoustic consultants. Your responses will be used anonymously to provide guidance on how to improve the noise in your offices.



Activity based acoustic design methodology

Evaluation

Solutions



People-centred approach

Displace

Avoid

Reduce

Educate



Activity Based Acoustic Design

Enhance the workplace

1 Activity

2 People

3 Space

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Thank you

Saint-Gobain Ecophon

Frans Davidsson

Concept Development Manager Office
Environment