

Proyecto PAI SAJE SONORO 2010

Outputs

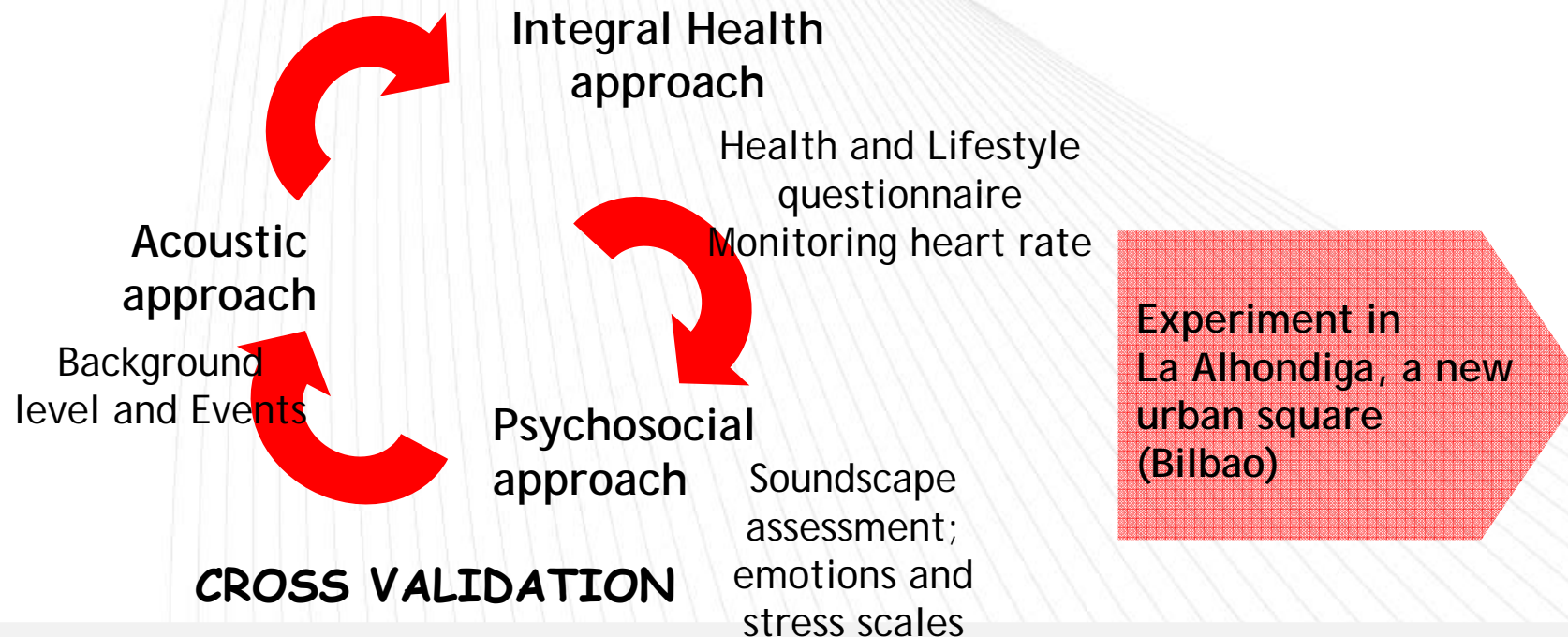


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PAISAJE SONORO 2010: OBJECTIVES

- Definition of a methodology to assess soundscapes, combining acoustics analysis and questionnaires regarding perception, emotion and health.
- Contribute to emphasize the positive effect of soundscape on human health, demonstrating its ability to increase the effect of restoration linked to staying in urban areas



PAISAJE SONORO 2010: THE EXPERIMENT

Two objectives:

- Check the sensitivity of different assessment indicators to build a consistent procedure for Soundscape analysis.
- Verify that staying in a better soundscape contributes to wellbeing, in terms of restoration, conceived as a better recover from stress.

Group of 10 person from Tecnalia

Two situations, distinguished only by its acoustic quality:

- The first one is a natural situation in the square;
- In the second one, we introduce an artificial audio, recorded previously in the same place, but ensuring the presence of some more events and a slightly higher noise level (only 2 dB).

The group split in two evaluated both situations (the order was changed each time).

In addition to acoustic and psycho-social assessment, the experiment included the performance of **some cognitive tests to create stress** in the individuals to be able to evaluate their recovery.

We created two situations with different values for the **Sound Atmosphere Indicator**

Natural SSC+, and SSC with extra - sound.

Comparing the assessment made in the two situations.

- The PLACE, when Natural SSC, is perceived as more pleasant (agradable), quiet (tranquilo) and common (común).

Staying in urban recreation areas

- Plays a perceived Restorative Effect compared to stress at work.
 - It Generates Positive emotional feelings: Calm.
 - It Reduces Negative emotions: Anger (Enojo).
- In the Natural SSC, those effects are higher.
 - The monitored health indicator shows that in Natural SSC restoration to induced stress is more intense and faster.

PAISAJE SONORO 2010: ACOUSTIC APPROACH

SELECTED INDICATORS

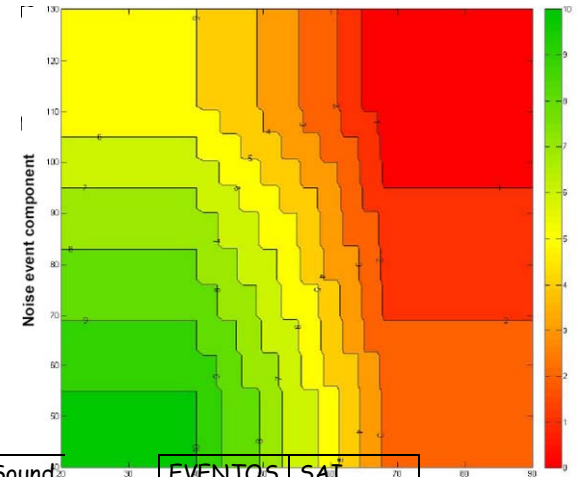
Sound Atmosphere Indicator (Bruitparif):

non natural events (low frequencies) + background level

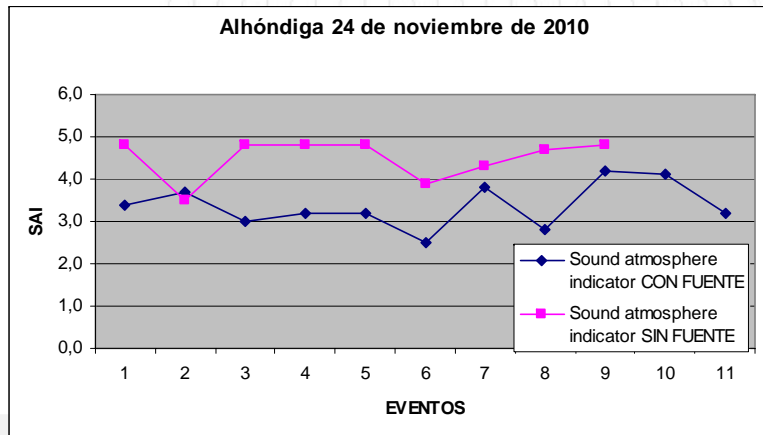
Tecnalia applied a procedure to be able to consider number of events and/or their energy

RESULTS

approx. difference of 2 dBA



EVENTOS Sin fuente	SAI Sound atmosphere indicator	EVENTOS Con fuente	SAI Sound atmosphere indicator
11:26:16	4,8	12:18:29	3,4
11:29:37	3,5	12:20:02	3,7
11:30:40	4,8	12:22:52	3,0
11:34:52	4,8	12:22:57	3,2
11:36:10	4,8	12:23:02	3,2
11:39:39	3,9	12:23:07	2,5
11:40:33	4,3	12:25:18	3,8
11:42:59	4,7	12:26:38	2,8
11:45:11	4,8	12:27:48	4,2
		12:28:51	4,1
		12:29:43	3,2



	24-nov	average	corrected average
Natural SSC+		4,5	4,3/4,3
SSC with add source -		3,4	3,1/3,0
difference		1,1	1,2/1,3

PAISAJE SONORO 2010: ACOUSTIC APPROACH

SELECTED INDICATORS

Tranquility rating prediction tool (University of Bradford):

$$(FORMULA C)_{TR} = 9,68 + 0.041 NCF - 0,146 LAeq.$$

The group was sit looking to opposite orientations



not crossed with experiment outputs

approx. difference of 2 dBA



DAY 24

	SSC +	SSC -	DIFF DUE TO ACOUSTIC ENV
TOWARDS ALHONDIGA	4,0	3,7	0,3
TOWARDS STREETS	2,9	2,6	
DIFFERENCE DUE TO VISUAL SCAPE	1,1		

DAY 29

	SSC +	SSC -	DIFF DUE TO ACOUSTIC ENV
TOWARDS ALHONDIGA	4,0	3,4	0,6
TOWARDS STREETS	2,9	2,3	
DIFFERENCE DUE TO VISUAL SCAPE	1,1		

PERCEPTION INDICATORS

Personal Data

Selection Based on our experience

- Sociodemographic data
- Satisfaction in different areas of life
- Noisiness and annoyance of noise sources in different common environments
- Relaxation: activities and places

Health and Life Styles

- Sources: Health and lifestyles Surveys
 - Ministry of Health
 - Regional Government
- Most relevant items were selected to identify possible contaminant factors

SOUNDSCAPES

- Revision 2009
 - + COST + Internoise 2010...
- Semantic Differential Scale

Emotions

Contribution from UPV-EHU, Social Psychology and Methodology of Behavioural Science Dep.

- Fredrickson (Emotion Scale 2009)
 - ↓EVA (Visual Analog Scale) with 4 emotions

Stress

Contribution from DeustoSalud

- Stress Perception Scale
 - ↓EVA of Stress

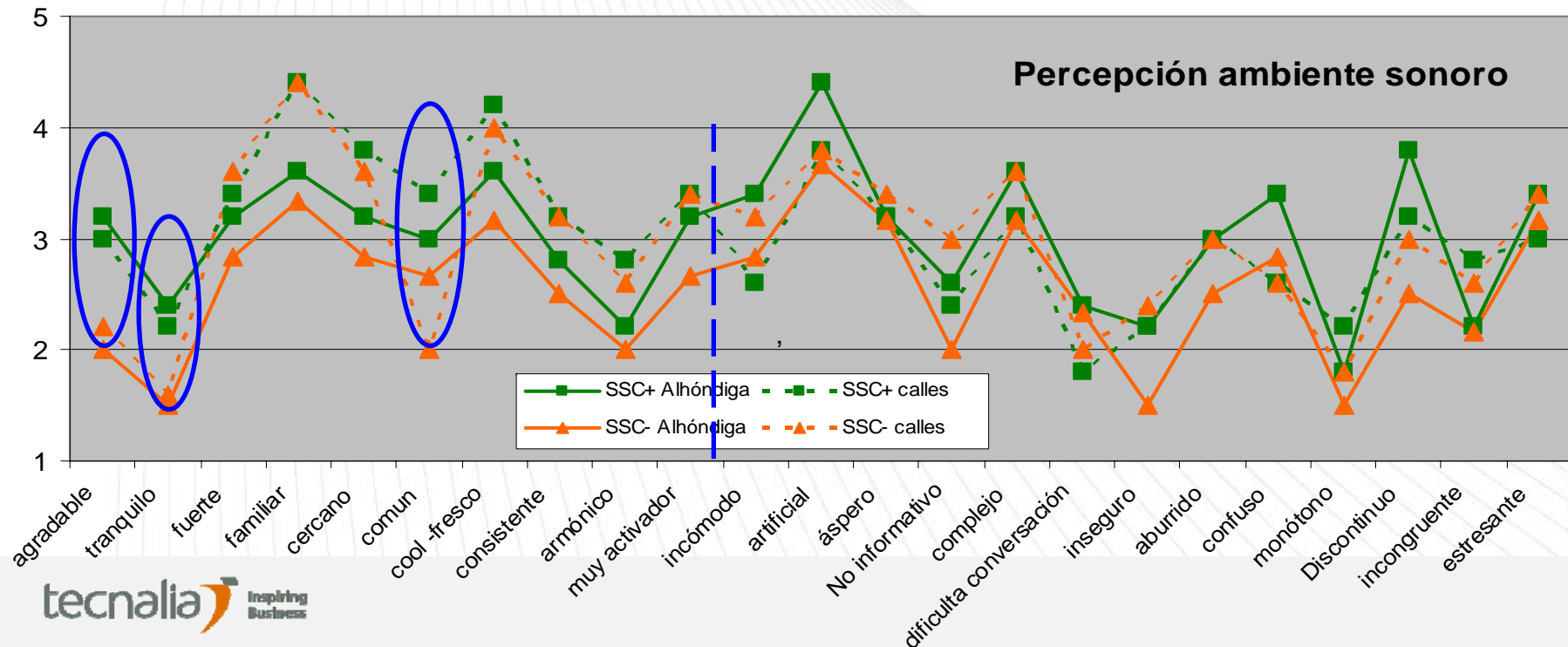
HEALTH

PAISAJE SONORO 2010: PSICOSOCIAL APPROACH

RESULTS ABOUT SOUNDSCAPE PERCEPTION

Natural SSC+ (without extra sound)

- The PLACE: is perceived as more **pleasant (agradable)**, **quiet (tranquilo)** and **common (común)**
- Some less complex (complejo), stressful (estresante), rough (áspero) and uncomfortable (incómodo).
- It difficulties little less conversation



PAISAJE SONORO 2010: PSICOSOCIAL APPROACH

SELECTED INDICATORS TO ASSESS Restorative Effect (Emotions and Stress)

Joy, Calm,

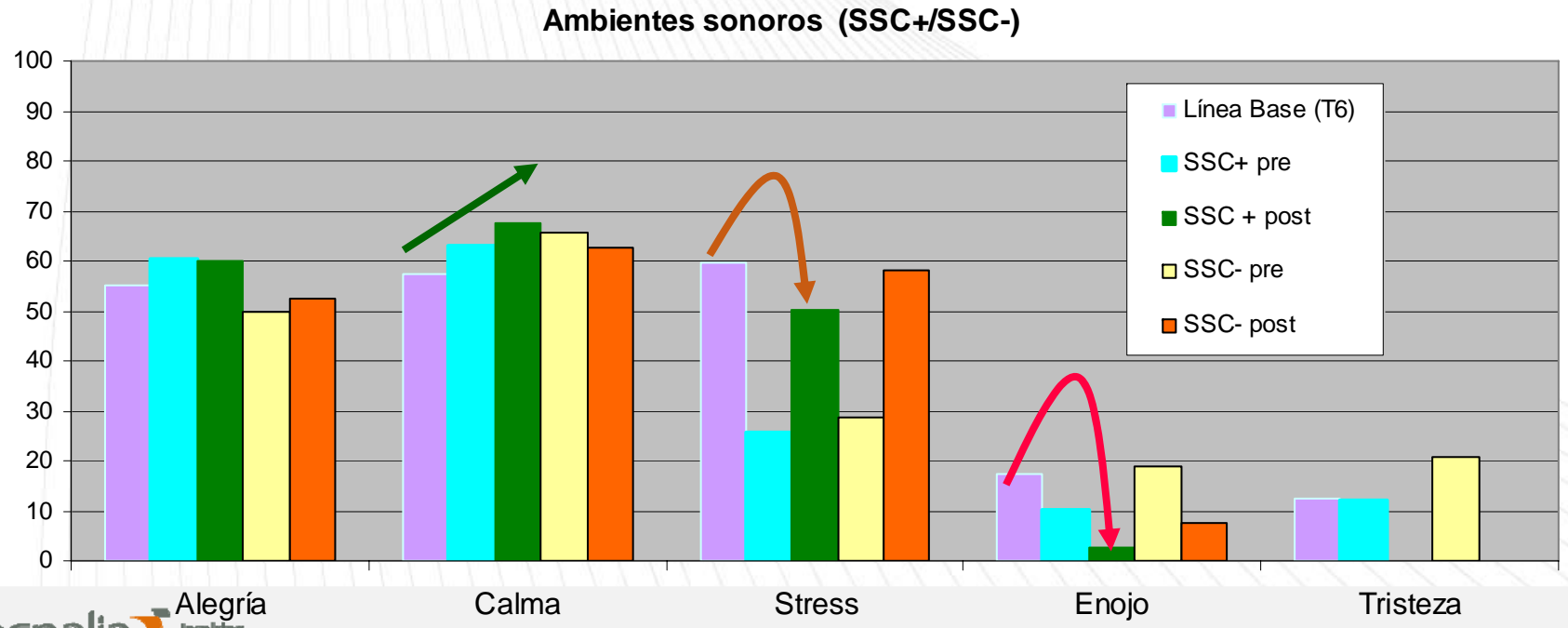
Anger, Sadness

↓EVA
(Visual Analog Scale)

RESULTS

Emotions → It Generates Positive emotional feelings: **Calm**
It Reduces Negative emotions: **Anger (Enojo)**

Stress → (Base Line: high levels linked to work)
In addition to recovering from stress, it improves the Base Line



SELECTED INDICATORS (collaboration with DEUSTOSALUD)

- ✓ Heart Rate Variability.
- ✓ Respiratory rate and EMG responses.
- ✓ SCL (Skin conductance level).
- ✓ Cortisol levels in saliva.

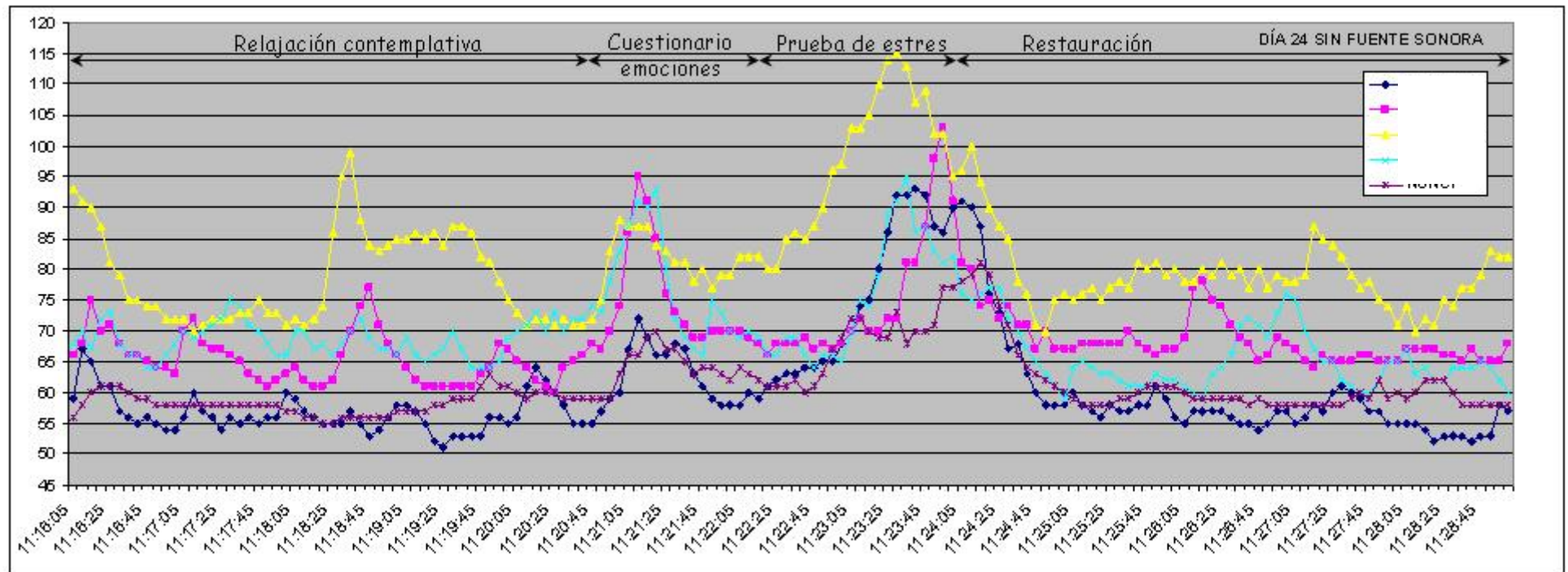


5 equipment



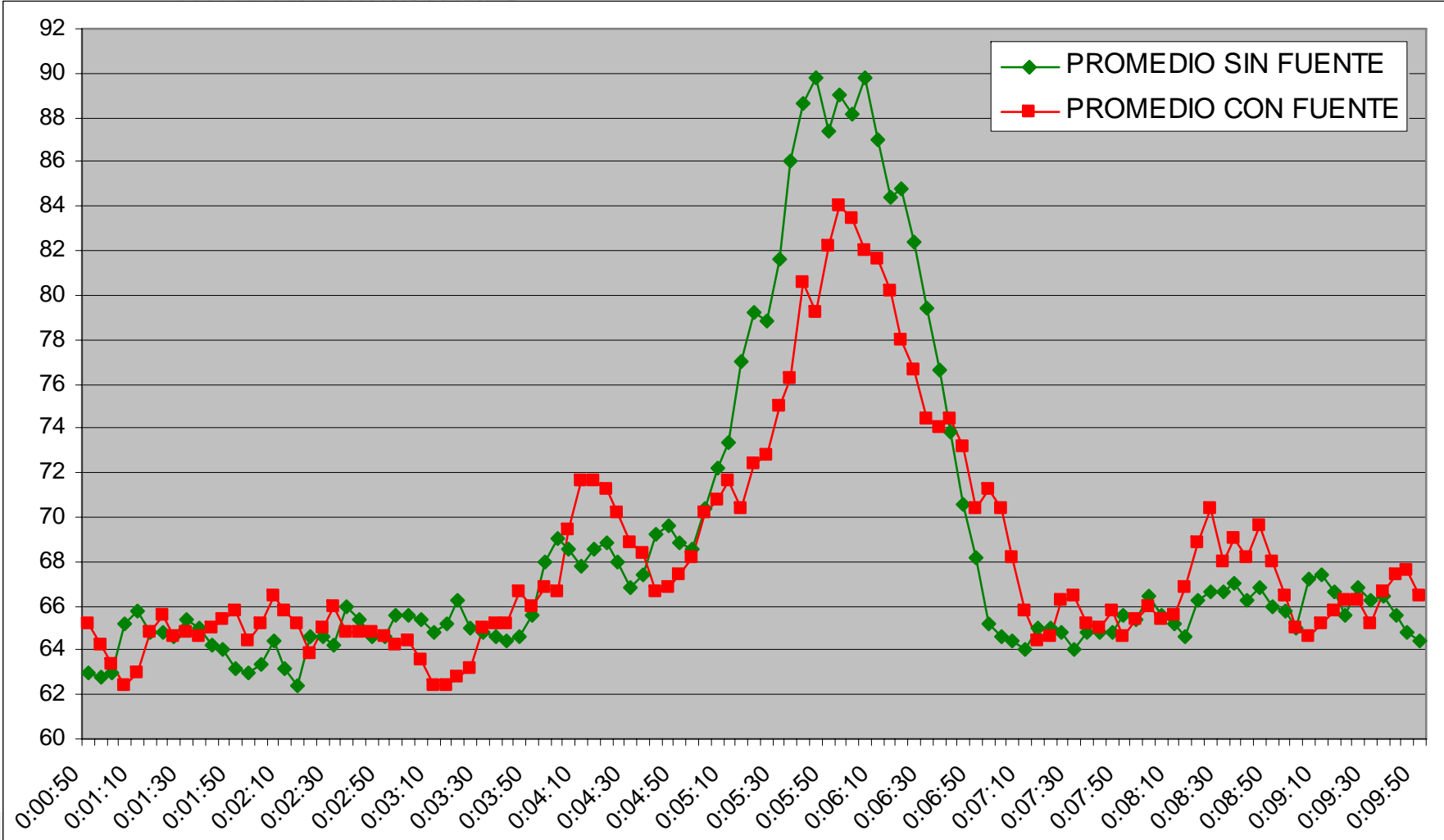
PAISAJE SONORO 2010: HEALTH APPROACH

RESULTS (collaboration with DEUSTOSALUD)



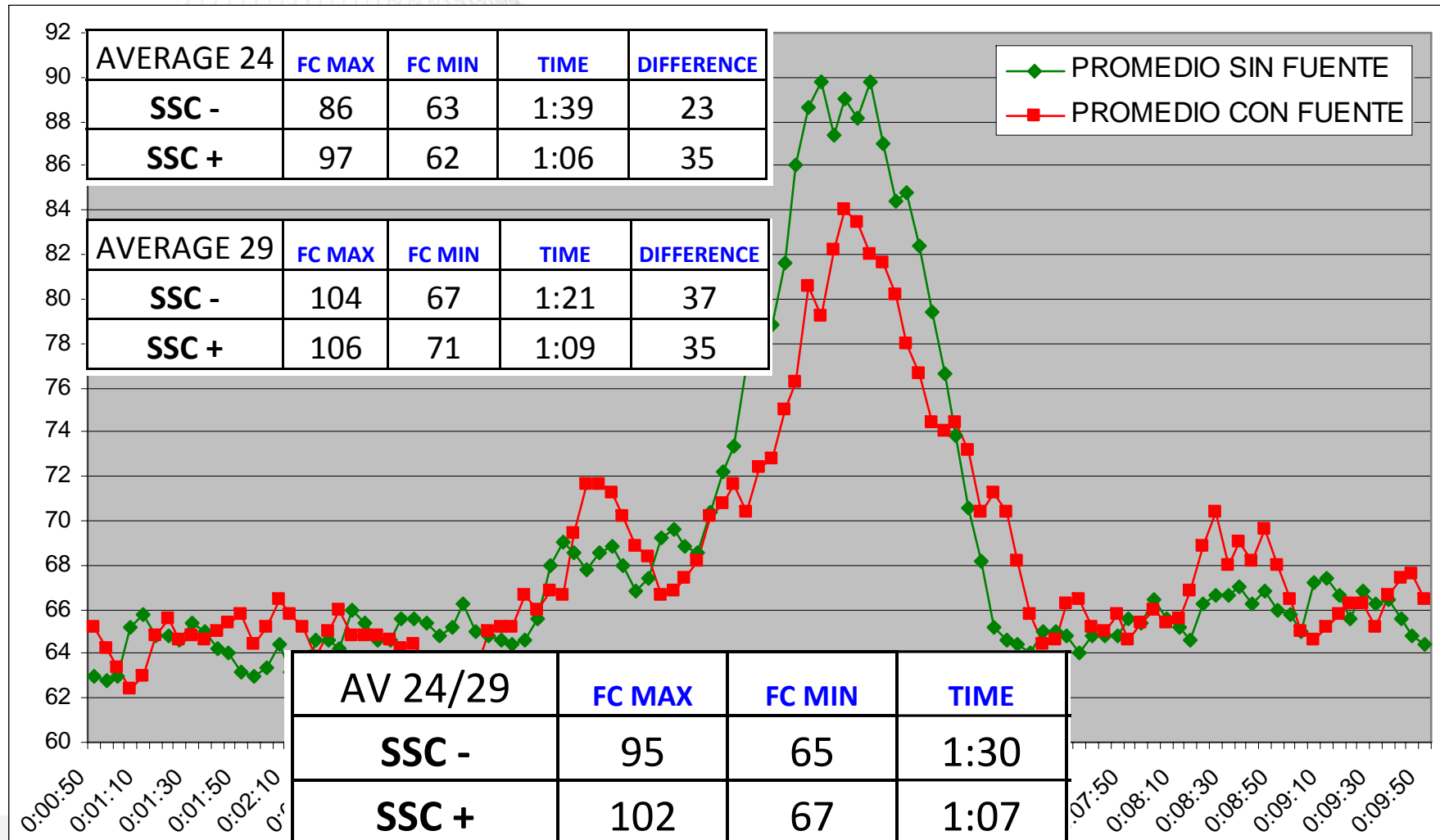
PAISAJE SONORO 2010: HEALTH APPROACH

RESULTS (collaboration with DEUSTOSALUD)



PAISAJE SONORO 2010: HEALTH APPROACH

RESULTS (collaboration with DEUSTOSALUD)



“We have found biologically relevant evidences that show that having a nice soundscape in urban recreation areas contributes to have a restoration to daily stress more intense and faster than in more acoustically polluted areas ”

“We can emphasize that being in acoustic environments rated as “positive ” or “calm” has benefits in perceived health (psychosocial). It not only reduces stress but also increases the positive well-being (emotions)”

TECNALIA provides a methodology for the evaluation of soundscapes that, combining acoustic analysis and psychosocial surveys, facilitates the identification of urban quiet areas to be preserved



Nowadays, only in Spanish.

To be invited, send an e-mail to

igone.garcia@tecnalia.com