

**Technics**

# WELLNESS AT WORK

## Biometrics Study

Rediscover Music

**Technics**

## What is wellness at work?

A state of mental engagement and focus. A feeling of calm and clarity. An ability to get work done accurately and efficiently.

It's work without the added stress of technology that isn't working for you.

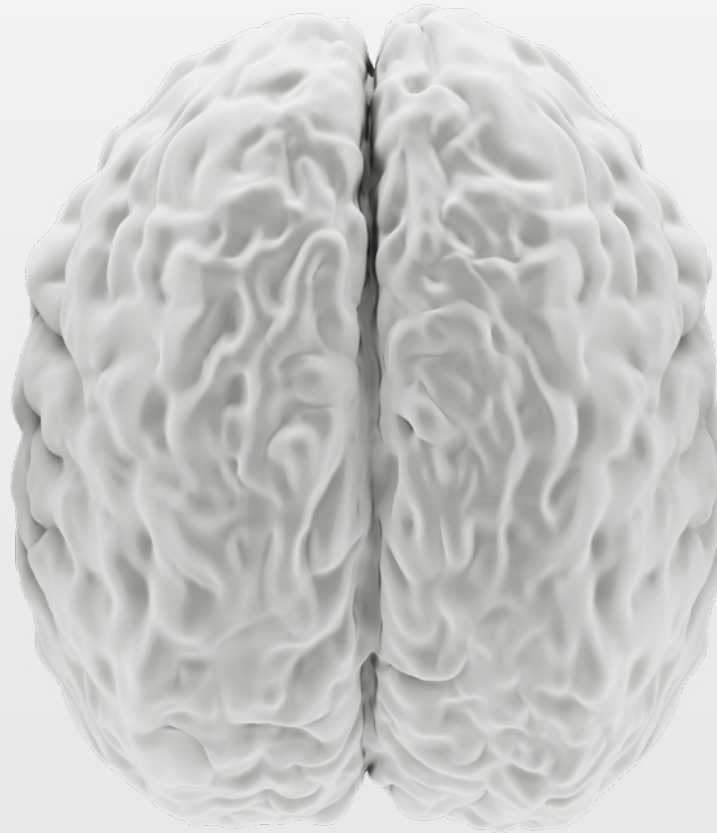
**It's sound quality you can count on.**



# Wellness at Work Sound Study Overview

## BACKGROUND

Technics partnered with Porter Novelli and HCD Research to uncover the **importance of sound quality in contributing to overall wellness at work**. The study was designed to show that **poor sound quality can have an impact on our mood and physiology**, an especially important concept to understand as the future of work evolves to depend ever more on remote audio quality vs. in person meetings.



## RESEARCH APPROACH

To capture the **actual effect on emotional and physical state**, HCD Research **designed a study using biometric technology to capture physiological indicators – like heart rate – and self-assessment scales to measure emotional state – like anxiety or bewilderment** – among working professionals who participate in video and conference calls as part of their day-to-day work.



# What We Measure: Physiological Response



## **GALVANIC SKIN RESPONSE**

(indicator of arousal through changes in sweat gland activity)

## **HEART RATE**

(indicator of stress through the variations in time interval between heartbeats)



# What We Measure: Physiological Response

Self-assessment scales measured respondents' emotional state. In the Self-Assessment Manikin scales, participants were asked to rate how they feel after each exercise by selecting a figure drawing that most closely aligned with their mood state.

UNPLEASANT



PLEASANT

CALM



AGITATED

CONTROLLED



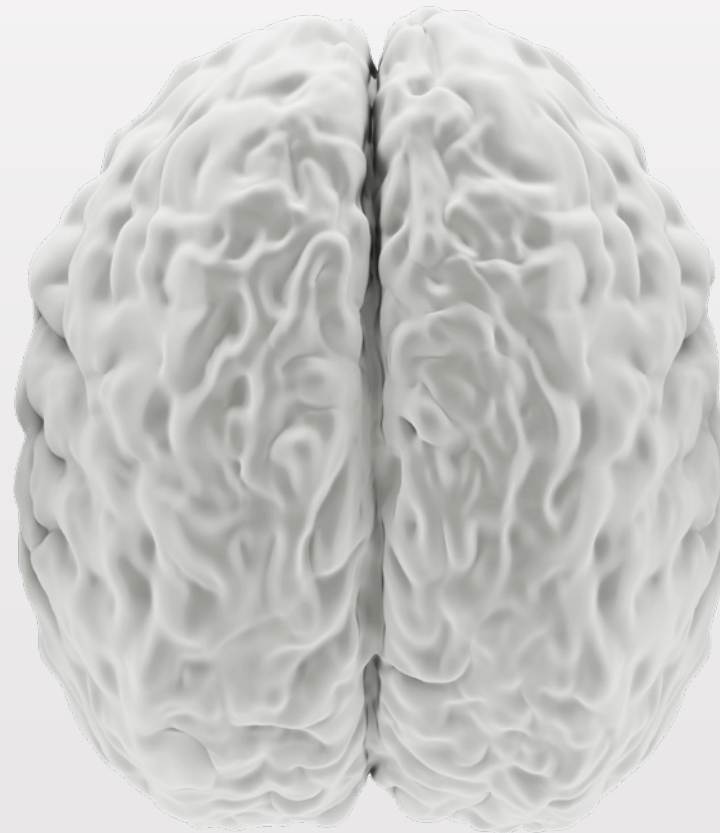
DOMINANT

# Two-Phase Sound Study Design

## AUDIO

**Measured physiological responses to poor sound scenarios – sound drops, audio distortions, background noise.**

Participants listened to randomized high-quality and poor-quality audio clips and then completed comprehension questions about the clips. To amplify findings, they were told they would be scored on their comprehension performance with an opportunity to win a prize (all participants were awarded a pair of Panasonic wireless headphones).



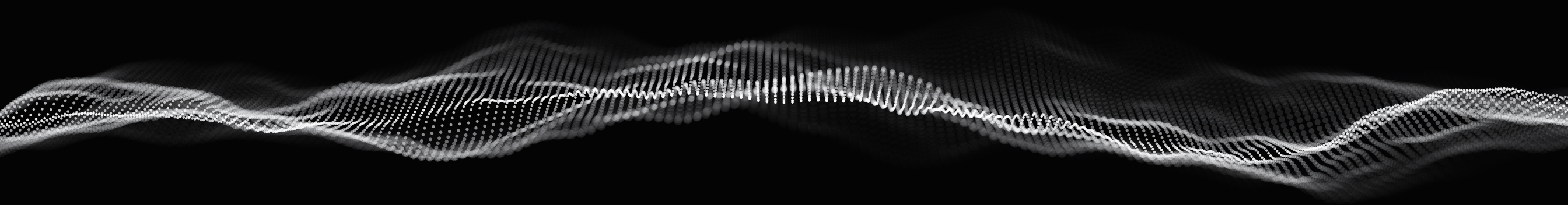
## VOICE

**Measured emotional responses to the inability to be heard by a third party.**

A “virtual moderator” prompted participants with questions about the audio comprehension exercise they just completed. They were asked to record their responses on the computer by voicing their answer to each question. Upon recording their spoken answers, the moderator randomly responded with a good recording quality message or a bad recording quality message that also asked participants to repeat their response.

Follow-up self-assessment questions to each phase further measured frustration and mood, and a 5-minute post-study interview gathered participant feedback on their audio and voice experience.

# KEY FINDINGS





A young woman with curly brown hair is walking on a city street. She is wearing a tan coat over a grey top and has earbuds in her ears. She is holding a black smartphone in her right hand and a brown paper coffee cup in her left hand. She is smiling and looking to her right. The background shows a city street with buildings and cars.

# 1. Sound Quality Is A Critical Aspect Of Our Jobs

# Sound quality is vital for effective two-way communication, especially during the pandemic.

When asked during the exit interview about the importance of sound quality in the context of their jobs, most participants mentioned that it was **one of the most, if not the most, important** aspects.

This is especially the case in the context of the pandemic, where a large portion of respondents are working from home.

When asked if audio quality or voice quality was more important, most respondents mentioned that **both are equally important** for effective communication. They need to be able to hear others, but it's equally important for their responses to be heard, as well.

## KEY TAKEAWAY

Participants reported that sound quality was one of the most, if not the most, important aspects of their job – especially during the pandemic when many are working from home.



“ I deal with a lot of customers and customer service, answering questions, and I deal with the clients that I work one-on-one with. Them **not being able to hear, that’s 100% of my business and quality. That’s everything that I do.**



“

...with the pandemic and everything,  
[sound quality] is **more important**, the  
video calls and just the calls in general...  
now I think it's much more important  
than it was previously.



A young woman with brown hair in a ponytail is sitting at a table in a cafe. She is wearing a white long-sleeved shirt and has a small earbud in her left ear. She is smiling and looking off to the side, holding a smartphone in her hands. The background is a blurred cafe interior with warm lighting and other patrons.

## 2. High-Quality Sound Promotes Wellness



# High-quality sound elicits feelings of pleasantness, calm and dominance.

Nearly **60% of participants** feel calm while listening to high-quality audio. Additionally, participants were **4x as likely** to say high-quality audio made them feel pleasant, vs. poor-quality audio, and were **3x as likely** to say the same about high-quality voice.

Scale*		HIGH-QUALITY AUDIO	POOR-QUALITY AUDIO	HIGH-QUALITY VOICE	POOR-QUALITY VOICE
Unpleasant vs. Pleasant	Unpleasant	3%	28%	7%	31%
	Pleasant	28%	7%	55%	17%
Agitated vs. Calm	Agitated	7%	21%	17%	24%
	Calm	59%	28%	24%	31%
Controlled vs. Dominant	Controlled	10%	52%	7%	38%
	Dominant	17%	7%	48%	21%

## KEY TAKEAWAY

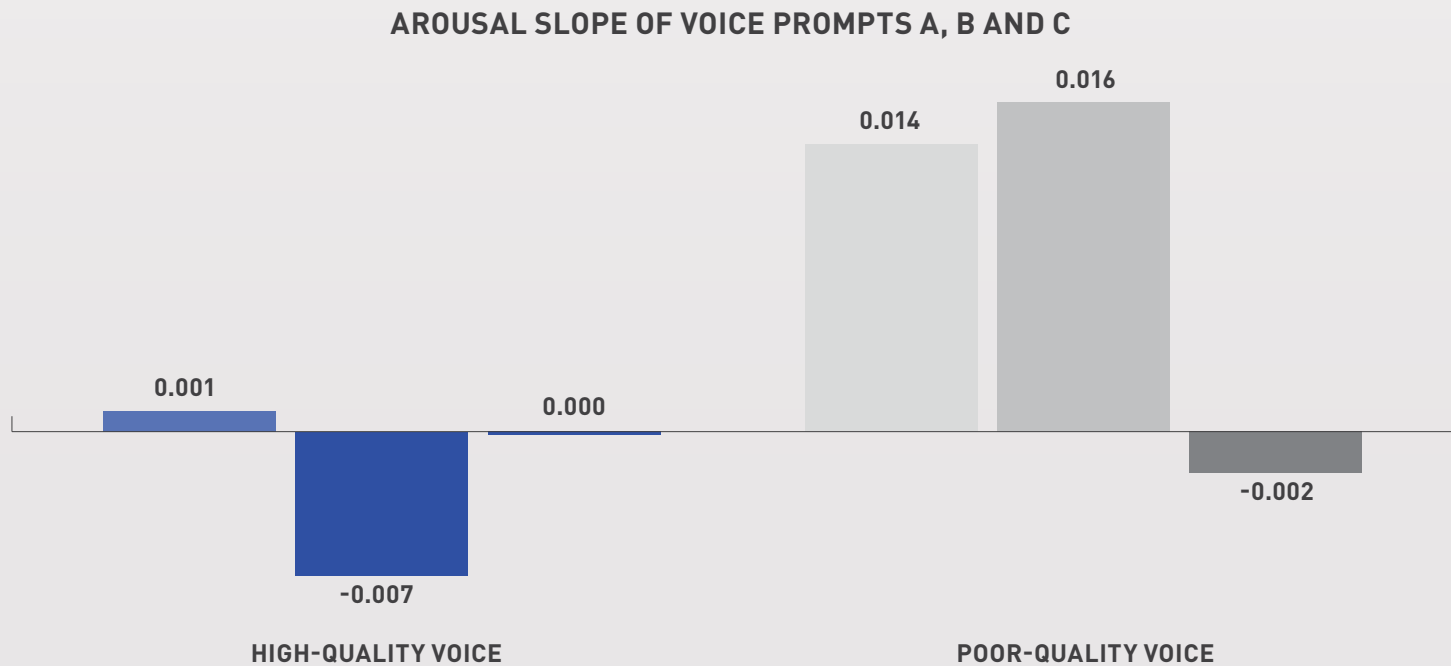
Compared to poor-quality sound, high-quality sound is 3-4x as likely to make people feel pleasant.

\*Scales range from Unpleasant (1) - Very happy (9); Calm (1) - Agitated (9); Controlled (1) - Dominant (9). The table presents the percentages who selected the top 3 boxes and bottom 3 boxes.



# Arousal level further reinforces that high-quality voice elicits feelings of calm

A high-quality voice experience saw a **negative arousal slope**, or slope that approaches 0, meaning that arousal was generally decreasing or remained steady. This indicates that **participants feel calmer, and were less likely to be agitated**, when voice quality was high.



## KEY TAKEAWAY

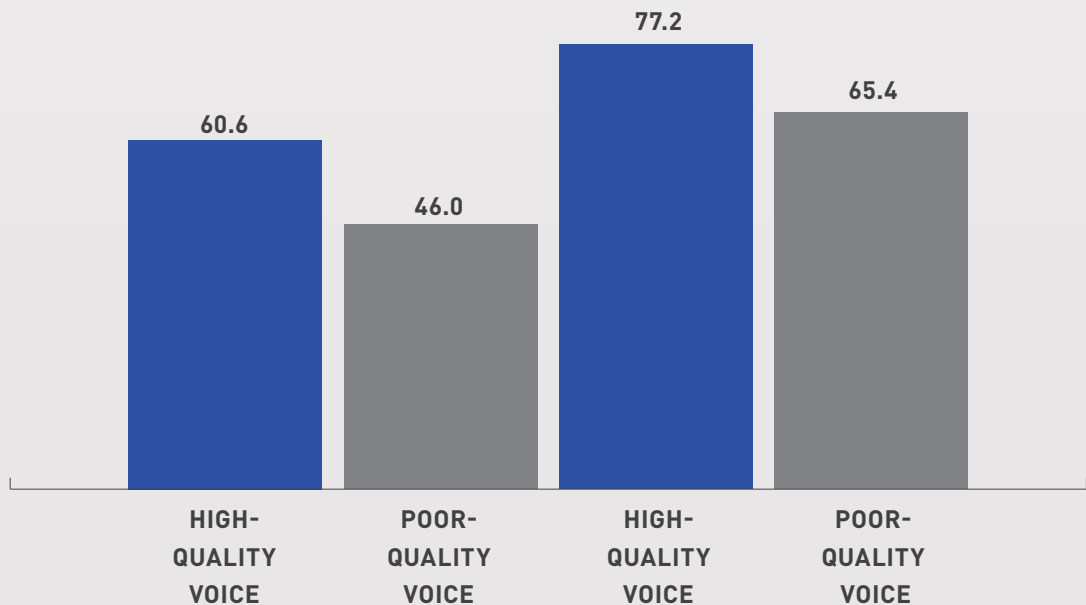
High-quality voice biometric arousal scores were closer to zero, indicating participants felt calmer and were less likely to be agitated when voice quality was high.

Note: Positive numbers (or slope) indicates that arousal was generally increasing.  
Negative numbers (or slope) indicates that arousal was generally decreasing

# High-quality sound also allows for greater focus on work

Participants mentioned that it was **harder to concentrate** with the poor-quality sound compared to high-quality sound. **Focus scores were 32% higher** for high-quality audio and 18% higher for high-quality voice.

SELF-ASSESSMENT FOCUS SCALE\* - MEAN  
[0-100 Scale]



## KEY TAKEAWAY

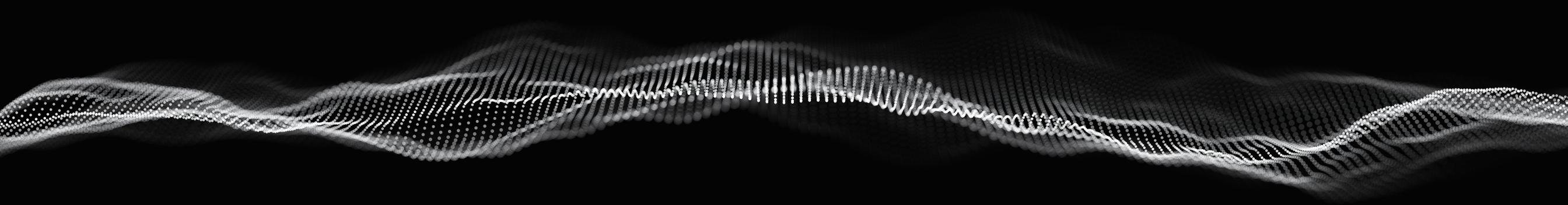
Participants’ reported ability to focus was 18%-32% higher for high-quality sound vs. poor-quality sound.

“ The [high-quality audio] was  
**pretty soothing.** I heard everything.



“ I was more **engaged** with the  
[high-quality audio].

**BUT POOR SOUND QUALITY...**



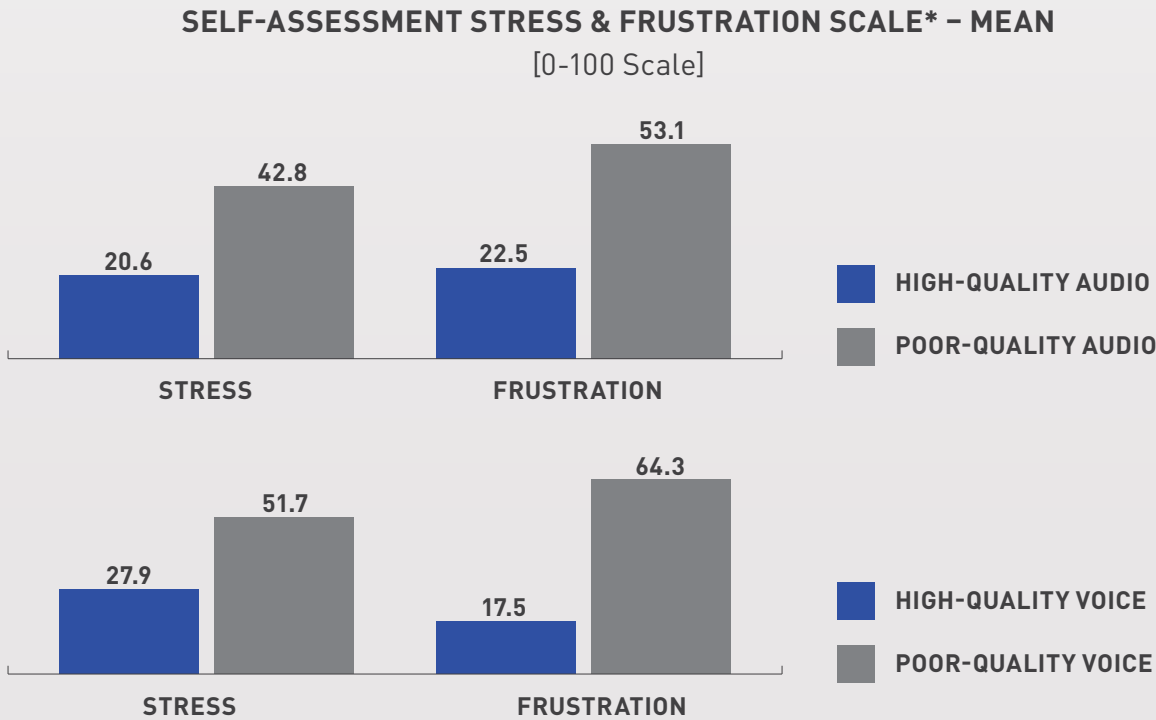
A woman with curly hair is sitting at a desk, wearing large white headphones. She has her right hand pressed against her forehead and her eyes are closed, suggesting stress or fatigue. In front of her is a silver laptop. To the right of the laptop is an open book with a yellow highlighter resting on it. To the left of the laptop, there is a white mug with a green band and a smartphone. The background is a bright, out-of-focus indoor space with a window and some greenery.

### 3. Negatively Affects Emotional & Physical States



# Poor-quality sound causes stress and frustration

Self-assessment scores show participants to overall be more **stressed and frustrated** while listening to poor-quality audio and when their voices could not be heard. Participants reported **2x as much stress and frustration** when encountering poor-quality audio and **2-4x as much stress and frustration**, respectively, when encountering poor-quality voice.



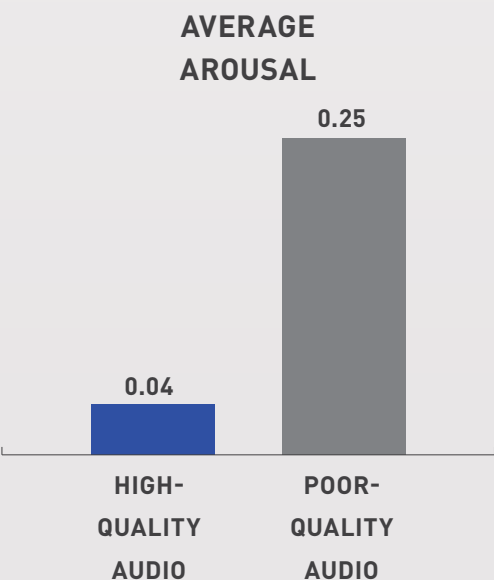
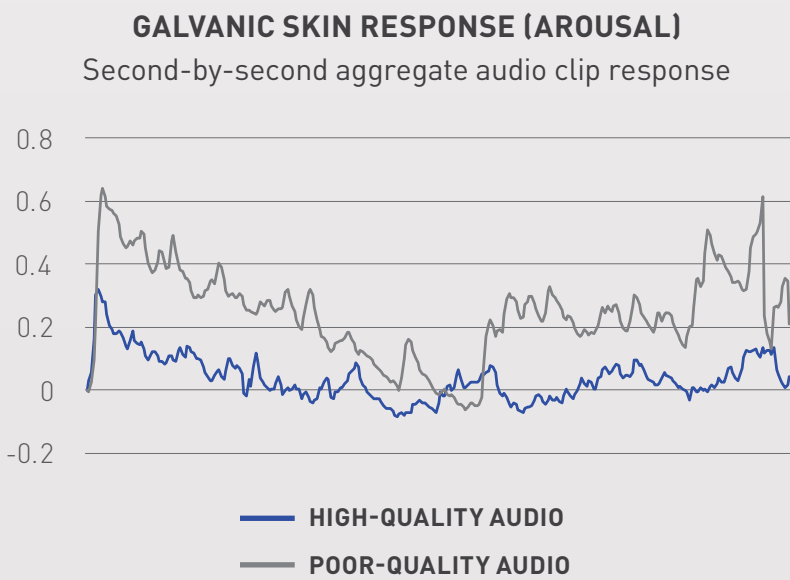
## KEY TAKEAWAY

Self-reported stress and frustration are 2-4x as high for poor-quality sound vs. high-quality sound.

\*Scale ranges from "Not At All Stressed/Frustrated" (0) to "Extremely Stressed/Frustrated" (100).

# Poor-quality sound drives negative physiological responses

Reported states of stress and frustration were validated by participants' bodies, as poor-quality sound led to increases in physical reactions like heart rate and skin sweat. In particular, the poor-quality audio elicited **greater fluctuations in heart rate and higher levels of arousal (average arousal for poor-quality audio is 5x as high as that for high-quality audio)**, suggesting more **stress and frustration** with not being able to clearly hear the clip.



## KEY TAKEAWAY

Average arousal – a physical indicator of stress and frustration – is 5x as high when audio quality is poor.

“ I got very **frustrated** at some points, especially with the **extra noise in the background**. That made it **harder to focus and more frustrating**.



“ When it was saying it couldn't hear my responses, that was **really frustrating**. I hate repeating myself.



A woman with dark hair tied back, wearing large black over-ear headphones with a yellow stripe, is seated at a desk. She is looking down at a laptop with a weary expression, her right hand resting on her forehead with a blue pen. On the desk in front of her is a teal mug and an open notebook. The background is a blurred office setting with a window showing horizontal blinds.

## 4. Reduces Efficiency

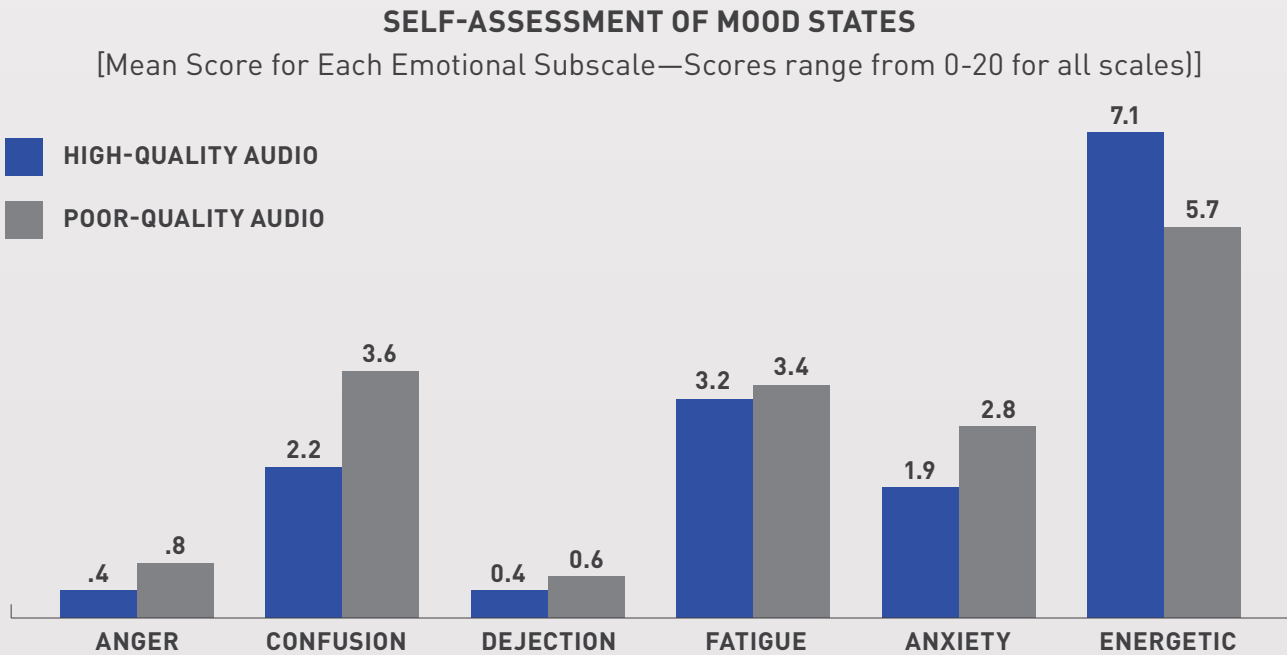


# Poor-quality audio negatively affects mood states

Poor-quality audio leads to **undesirable mood states**, including anger, confusion, dejection, fatigue, anxiety and a reduced sense of energy. Participants’ reported **confusion scores were 64% higher** for poor-quality audio vs. high-quality audio. Conversely, participants’ **energetic scores were 25% higher** for high-quality audio vs. poor-quality audio, suggesting they felt more energetic in tackling the comprehension task when audio was good.

## KEY TAKEAWAY

Participants’ reported confusion was 64% higher for poor-quality audio, while their energy level was 25% lower.





# Poor-quality sound is distracting and diminishes concentration

Compared to the high-quality audio, participants reported they often **found their minds wandering and thinking about other things** when listening to poor-quality audio.

Poor-quality sound is also seen as **time-consuming** as people have to waste time repeating themselves or trouble-shooting.

## KEY TAKEAWAY

Participants found poor-quality sound distracting and time-consuming.



When the second clip played, and I could hear the beach interference in the beginning, I knew I was going to have to pay extra attention because I couldn't really hear what was going on. I felt like I **was more attentive**, but it was harder to follow. My **concentration broke more**.



You're trying to be productive. **You don't want to have people repeat things.** You have to accomplish your goal in a short time. **You don't really have the time to go back and say, 'what did you say?'** Then somebody else speaks over that person, and it's a vicious circle of, 'what did you say?'

A man with a beard and dark hair is sitting at a wooden desk in a modern office. He is wearing large white over-ear headphones and a dark grey zip-up sweater. He has his eyes closed and is resting his head on his right hand, which is pressed against his temple, indicating stress or fatigue. His left hand is on a white keyboard. In front of him is a silver laptop displaying lines of code on a dark screen. To the right of the laptop, there is a white desk lamp, a small potted green plant, a metal pen holder with various pens and pencils, a pair of black-rimmed glasses, and a white disposable coffee cup with a brown sleeve. The background is a bright, out-of-focus office space with a window and some shelves.

5. Decreases Accuracy

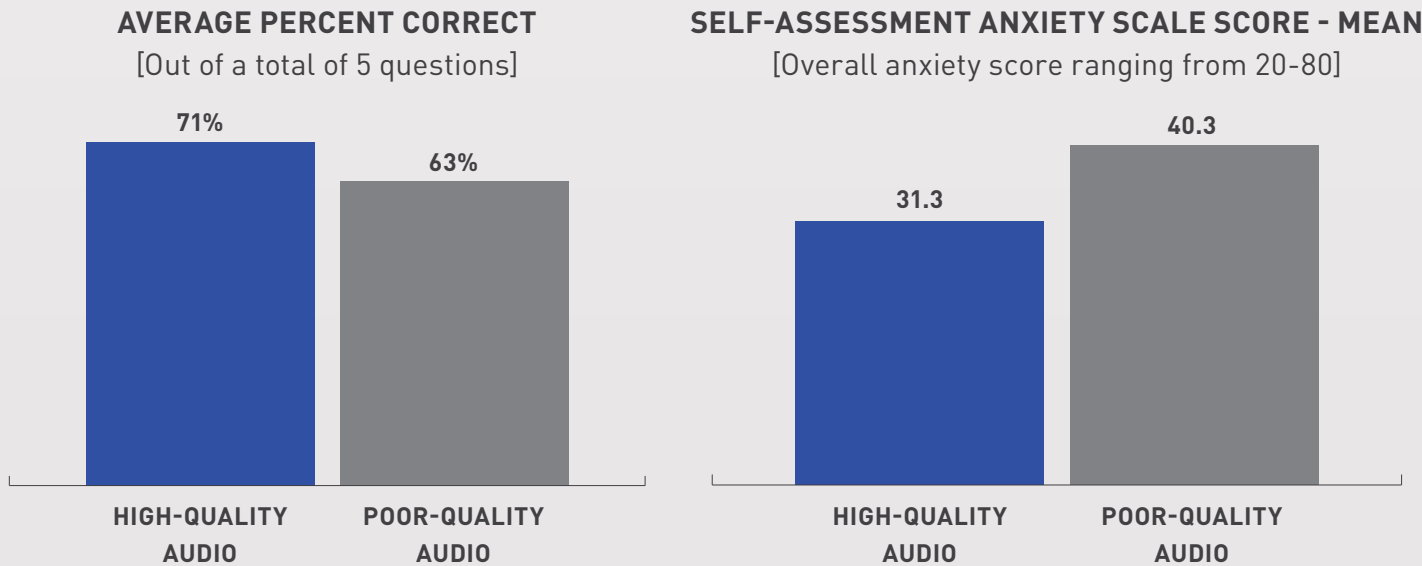


# Poor-quality audio increases anxiety and undermines the ability to perform tasks

Participants generally found the comprehension questions **more difficult** for the poor-quality clips – they were **13% more likely to get answers correct** when listening to high-quality audio. Additionally, participants felt **significantly more anxious (a 29% higher anxiety scale score)** after completing the comprehension questions for poor-quality audio.

## KEY TAKEAWAY

Poor-quality audio led to 13% lower comprehension in task accuracy and a reported 29% higher anxiety.

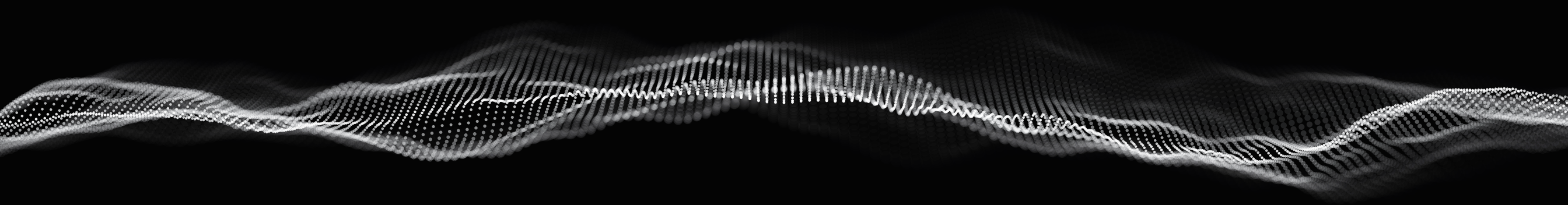


“ I was a little bit **anxious** because I knew I wasn't going to be able to answer the questions **correctly**.

“ It made me a little **anxious** only because I didn't feel like I could perform to the extent that I feel like I could have.



**IN CONCLUSION...**



# Sound quality is a crucial component of wellness at work

High-quality audio and voice contribute to positive emotional and physical factors like:

## **PLEASANT EMOTIONAL STATE**

- A state of pleasant, calm focus and a feeling of being in control

## **TIME EFFICIENCY**

- Ability to perform tasks quickly and energetically without wasting time trouble-shooting, repeating or devolving into negative mood states

## **COMMUNICATION ACCURACY**

- Ability to express yourself clearly and capture others' words accurately



Thank You



# Technics Wellness at Work Study At-a-Glance

## ABOUT THE STUDY:

As a leading producer of premium audio products, Technics wanted to better understand the impacts of poor sound quality, especially on those in an office setting. Technics partnered with Porter Novelli and HCD Research to uncover the importance of sound quality in contributing to overall wellness at work.

## WHY THIS IS DIFFERENT:

To capture the actual effect on emotional and physical state, HCD Research designed a study using biometric technology to capture physiological indicators – like heart rate – and self-assessment scales to measure emotional state – like anxiety or bewilderment – among working professionals who participate in video and conference calls as part of their day-to-day work.

## WHAT WE FOUND:

Study participants reported that sound quality was one of the most, if not the most, important aspects of their jobs, especially in the context of the pandemic, where a large portion of participants are working from home.

High-quality sound promotes wellness. Participants were 3-4x as likely to say high-quality sound made them feel pleasant vs. poor-quality sound. Physiological arousal indicators found participants felt calmer, and were less likely to be agitated, when sound quality was high.

Poor-quality sound negatively affects emotional and physical states. Participants reported 2-4x as much stress and frustration when sound quality is poor, which was validated by their bodies, as poor-quality sound led to increases in physical reactions like heart rate and skin sweat, suggesting more stress and frustration with not being able to clearly hear audio and not being heard.

Poor-quality sound reduces work efficiency and accuracy. Participants reported poor-quality audio leads to undesirable mood states, including anger, confusion, dejection, fatigue, anxiety and a reduced sense of energy, with reported confusion scores 64% higher for poor-quality audio vs. high-quality audio. They also struggled with audio comprehension. When asked to answer questions about what they heard, participants were 13% more likely to get answers correct when listening to high-quality audio.