

Overcoming Communication Barriers: An evaluation of communication devices for healthcare providers wearing powered air-purifying respirators (PAPRs)

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Introduction

The COVID-19 pandemic has resulted in an increased use of Powered Air Purifying Respirators (PAPRs) by health care providers to mitigate the risk of viral transmission, especially for aerosol-generating procedures. In this study, we evaluate communication devices that could be used concurrently with PAPRs to promote improved communication.

Methods

We tested two devices: a Bluetooth earpiece, and a throat microphone that operated over mobile networks, against a control scenario in a simulated operating room environment with participants donning PAPRs. Participants read a short paragraph to each other, transcribed short phrases, and evaluated the scenarios according to speech intelligibility, ease of use, and comfort of the communication modality.

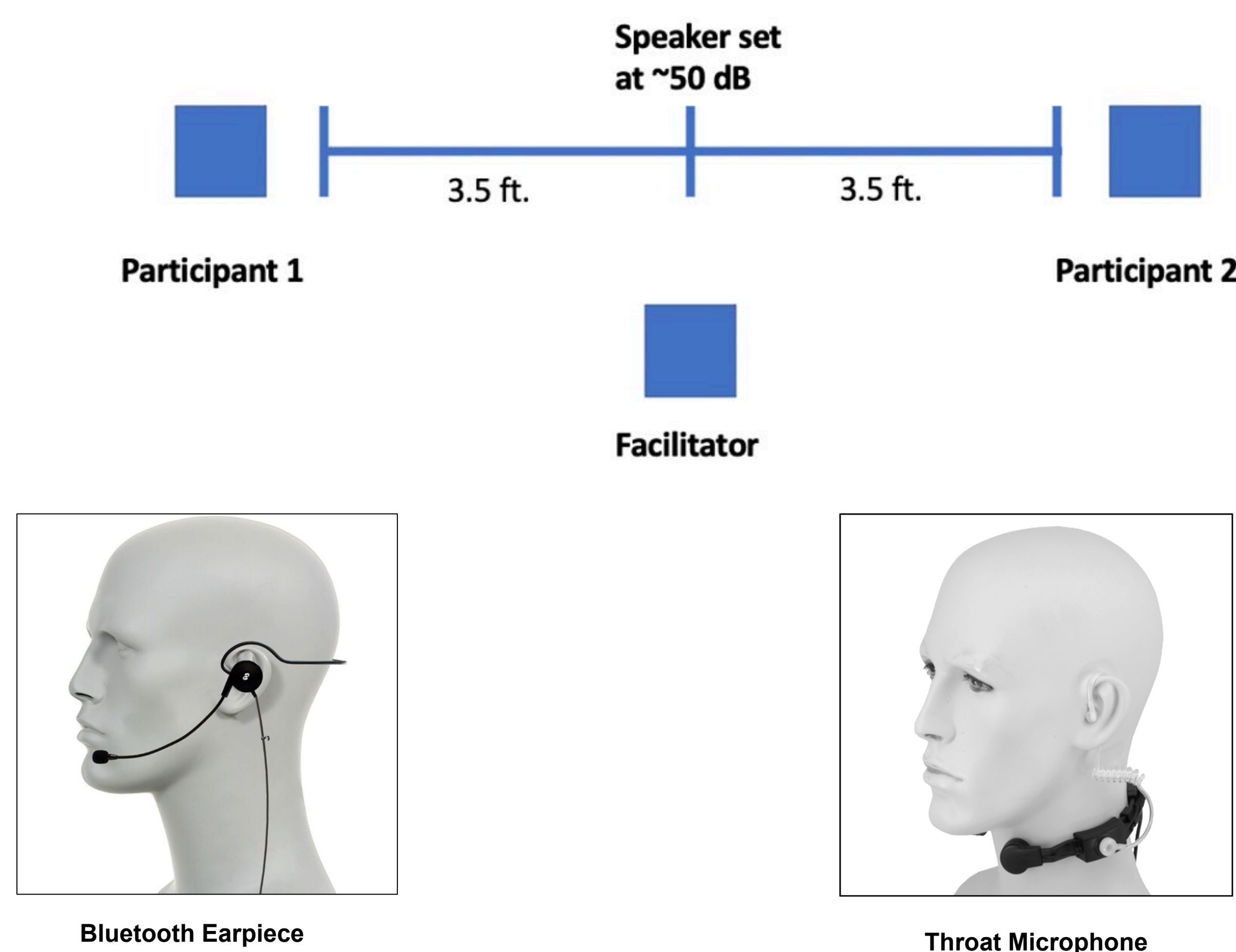


FIGURE 1. Simulation setup

Results

There were 30 participants of varying PAPR experience. The Bluetooth headset had the most accurate transcriptions, followed by control, and lastly the neckpiece (94.7% vs 88.4% vs 76%, $p < 0.001$). The Bluetooth was preferred both independently, and in comparison with the other two modalities.

Gender Distribution	n (%)
Male	15 (50)
Female	15 (50)

TABLE 1. Demographic spread of participants (n=30)

		PAPR Experience		
		None	Some (1-10 uses)	Very (>10 uses)
Final Year Medical Student	4 (13.3)	2	2	
RN	7 (23.3)	2	2	3
PA	6 (20)		1	5
MD	13 (43.3)		7	6
		4 (13.3)	12 (40)	14 (46.6)

TABLE 2. Professional roles and PAPR experience, n (%)

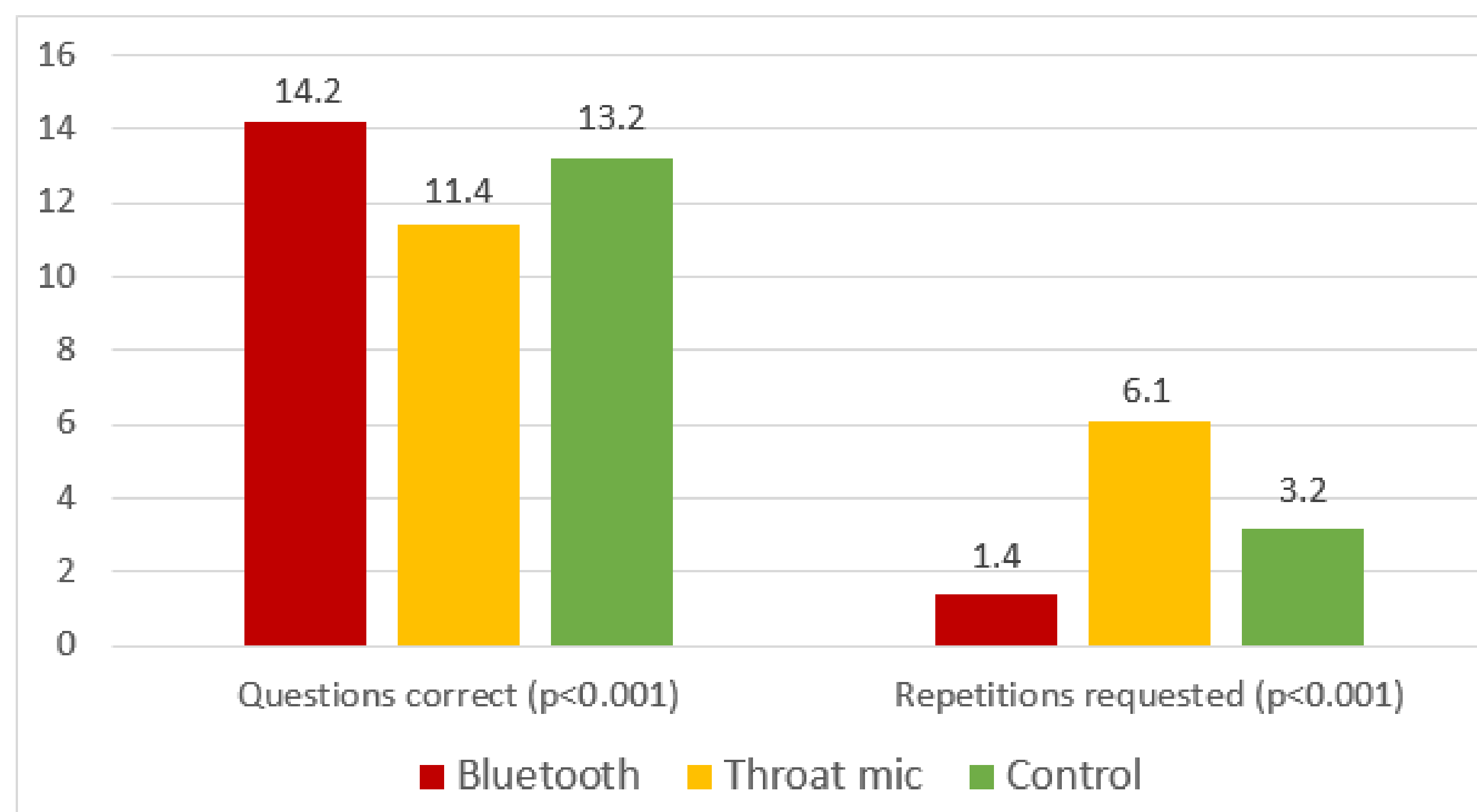


FIGURE 2. Objective assessment of communication modes

Conclusion

Communication devices have the potential to bridge or worsen communication barriers. Appropriate devices can promote enhanced safety for providers donning PAPRs. Further research is needed to identify the optimal device for use in the clinical environment.

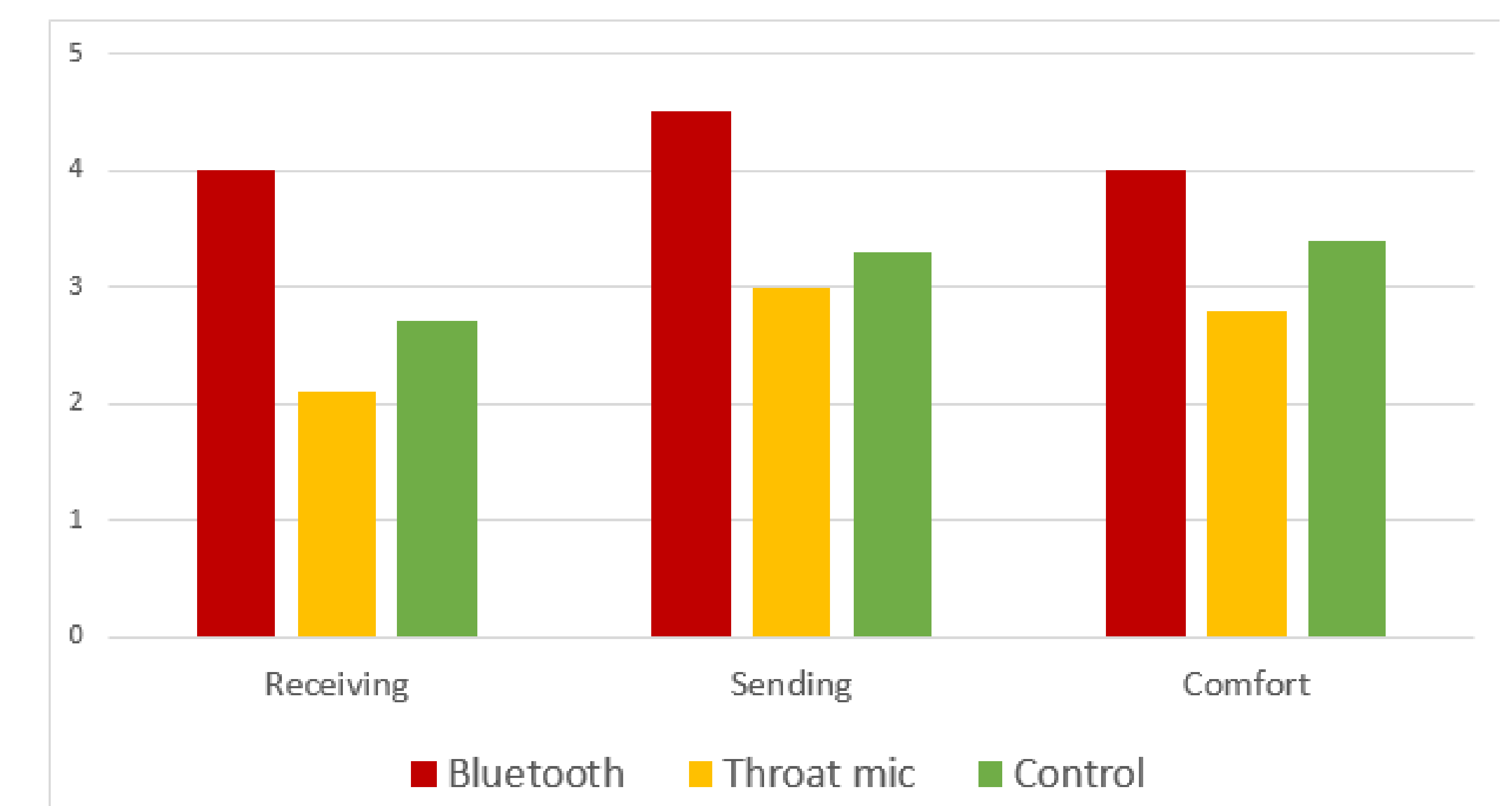


FIGURE 3. Subjective assessment of communication modes (5-point Likert scale)

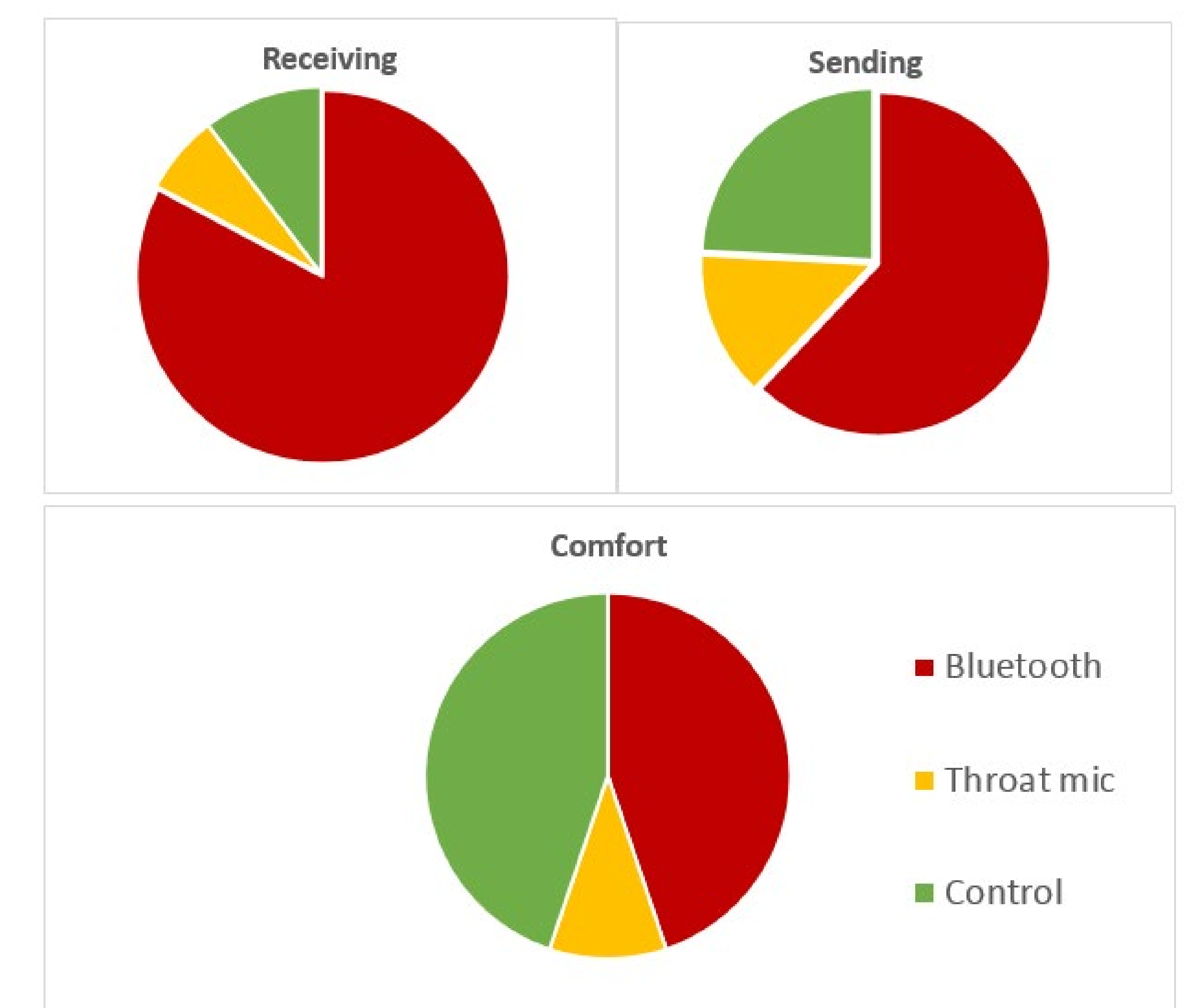


FIGURE 4. Number of participants who ranked mode of communication first for given category, compared to the other two