

Solo vs. duet in different virtual rooms: On the consistency of singing quality across conditions



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QUESTIONS

What we know so far...

...about solo singing:

- Occasional singers: Two main criteria of pitch accuracy¹
- Operatic singers: Many criteria in interaction²

...about ensemble singing:

- Intonation is barely affected by simulated room acoustics
- Tempo and timing precision gets affected when singing in comparatively reverberant virtual rooms³

1. Are there any differences between singing “solo” vs. “canon” vs. “unisono” with regard to pitch and timing accuracy?
2. How do different simulated room acoustical conditions influence singing performances?
3. Are there any interactions between singing condition and acoustical feedback?

METHODS

Participants & Procedure

- Three duets with female singers (N = 6)
- Three different melodies
- Separate recordings using Headset microphones
- All trials under three different simulated room acoustical conditions

Material

Die Sonne geht auf
Kanon zu 4 Stimmen

Shalom chaverim
aus Israel

HELLO, HOW ARE YOU

Acoustic Simulation

- Recordings at the Communication Acoustic Simulator (CAS)
- Three different simulated acoustical spaces:
 1. No manipulation
 2. Small room (RT = 1.47 s)
 3. Church (RT = 4.21 s)

RESULTS

SUMMARY

Pitch

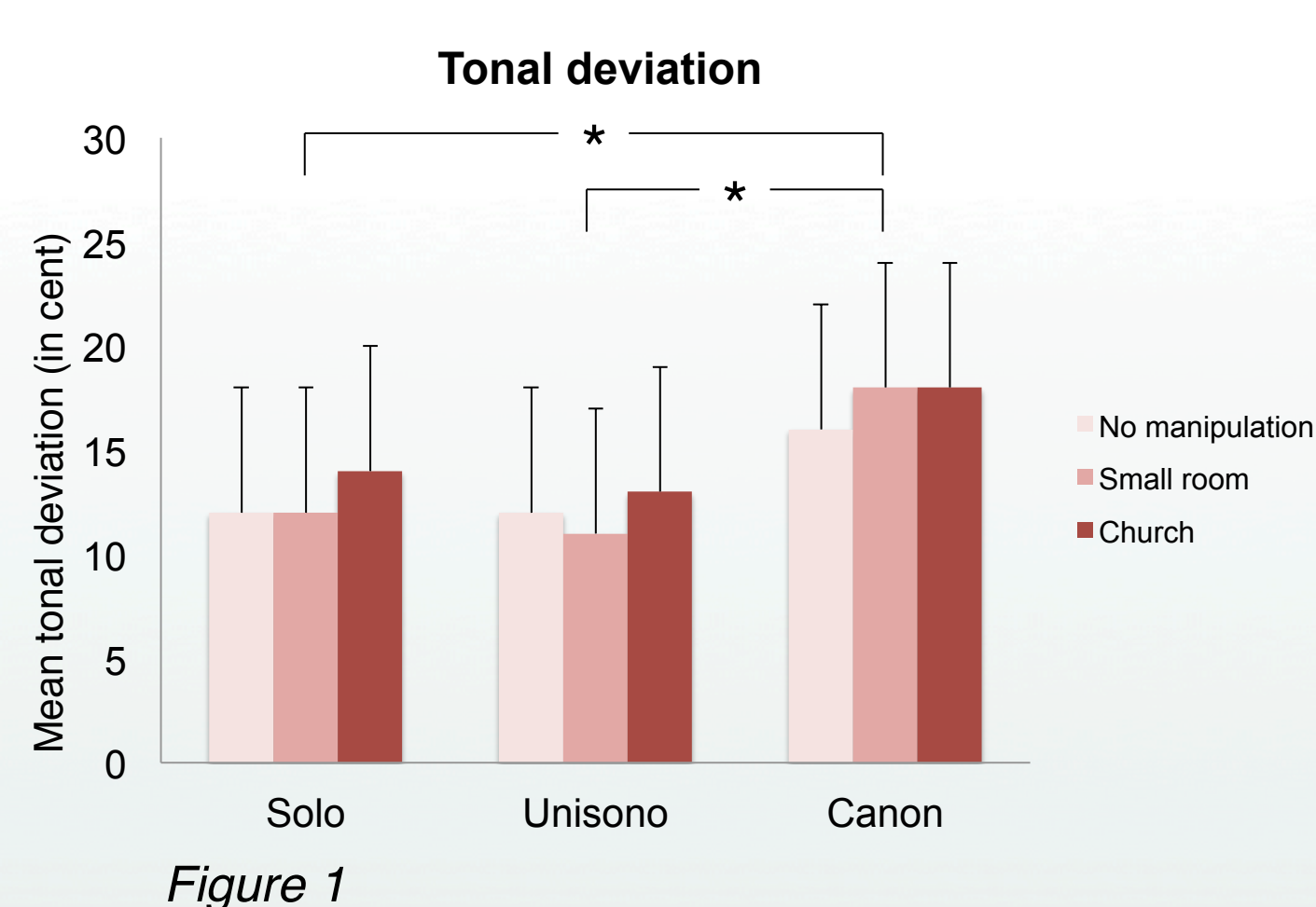


Figure 1

Timing

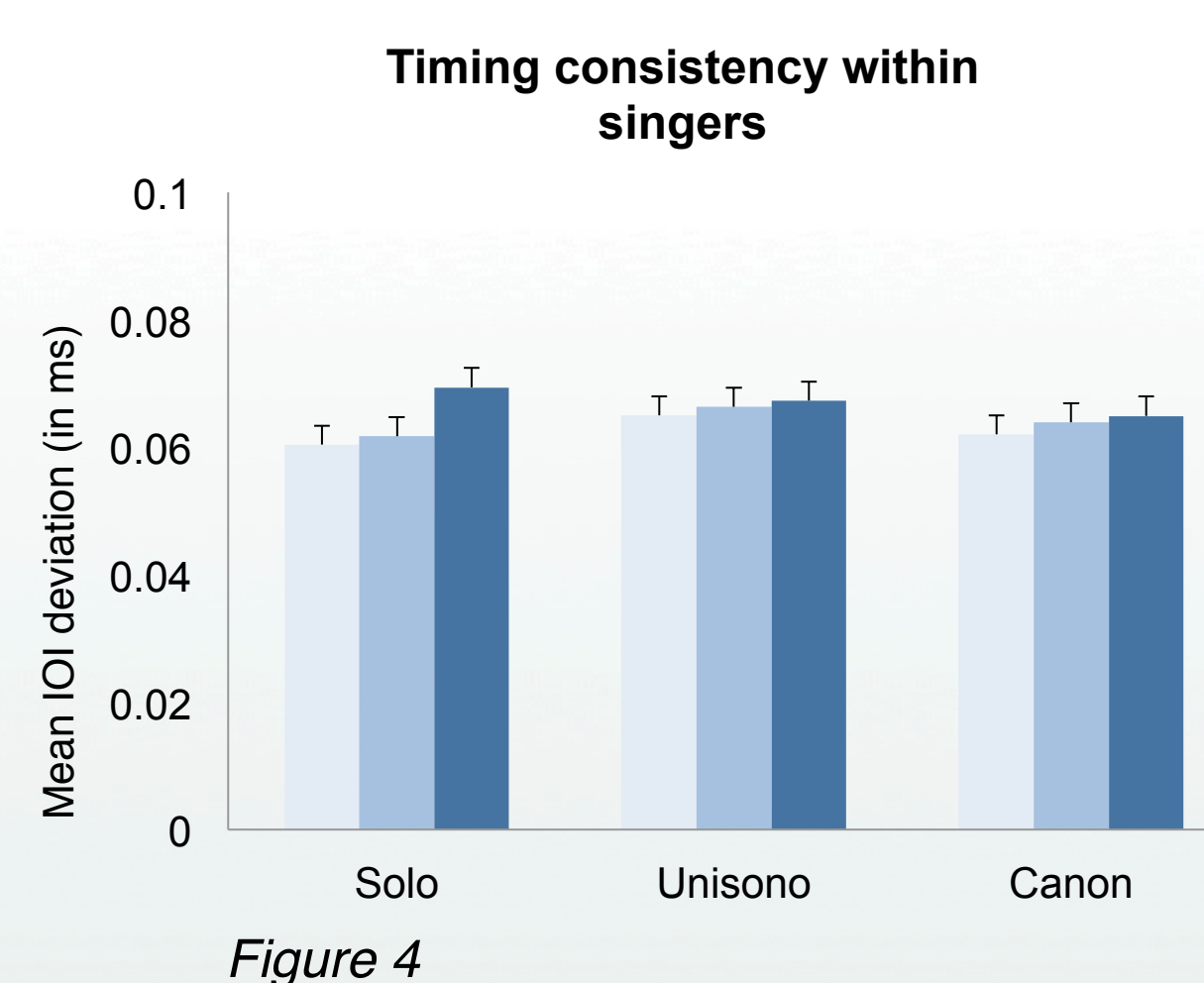


Figure 4

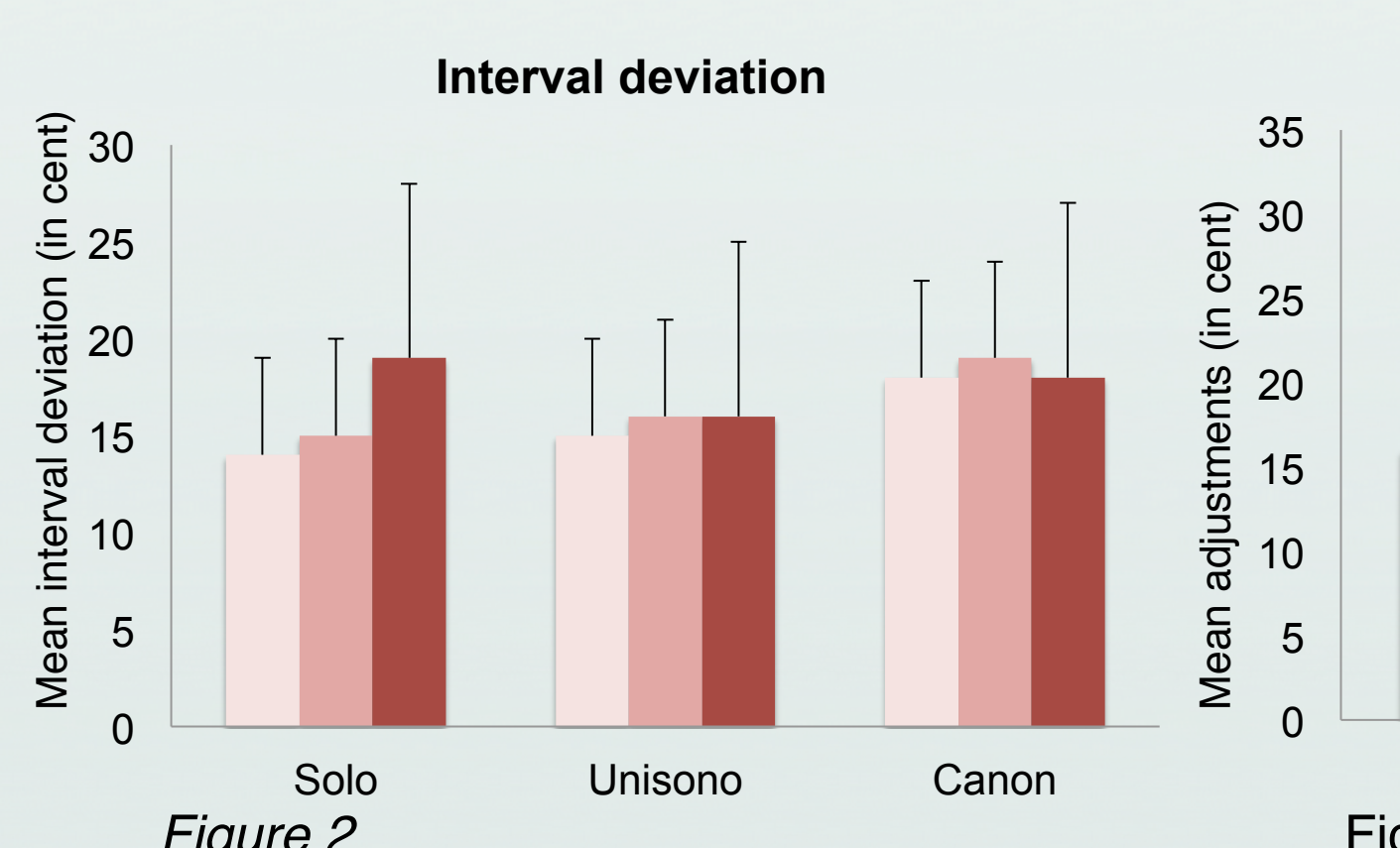


Figure 2

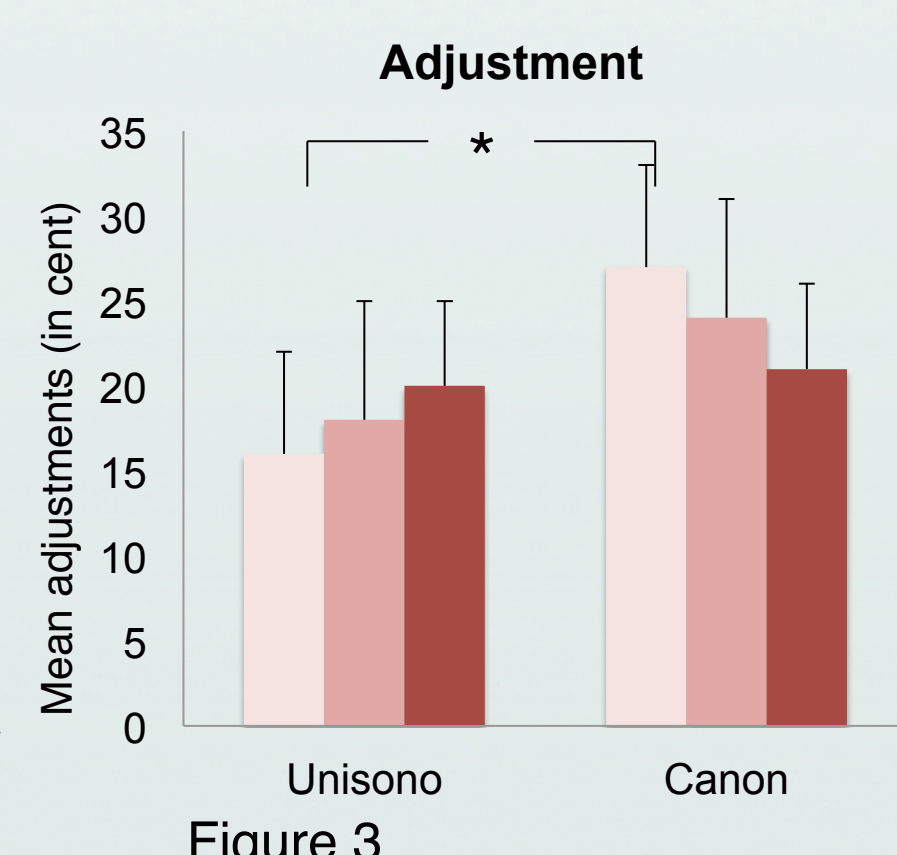


Figure 3

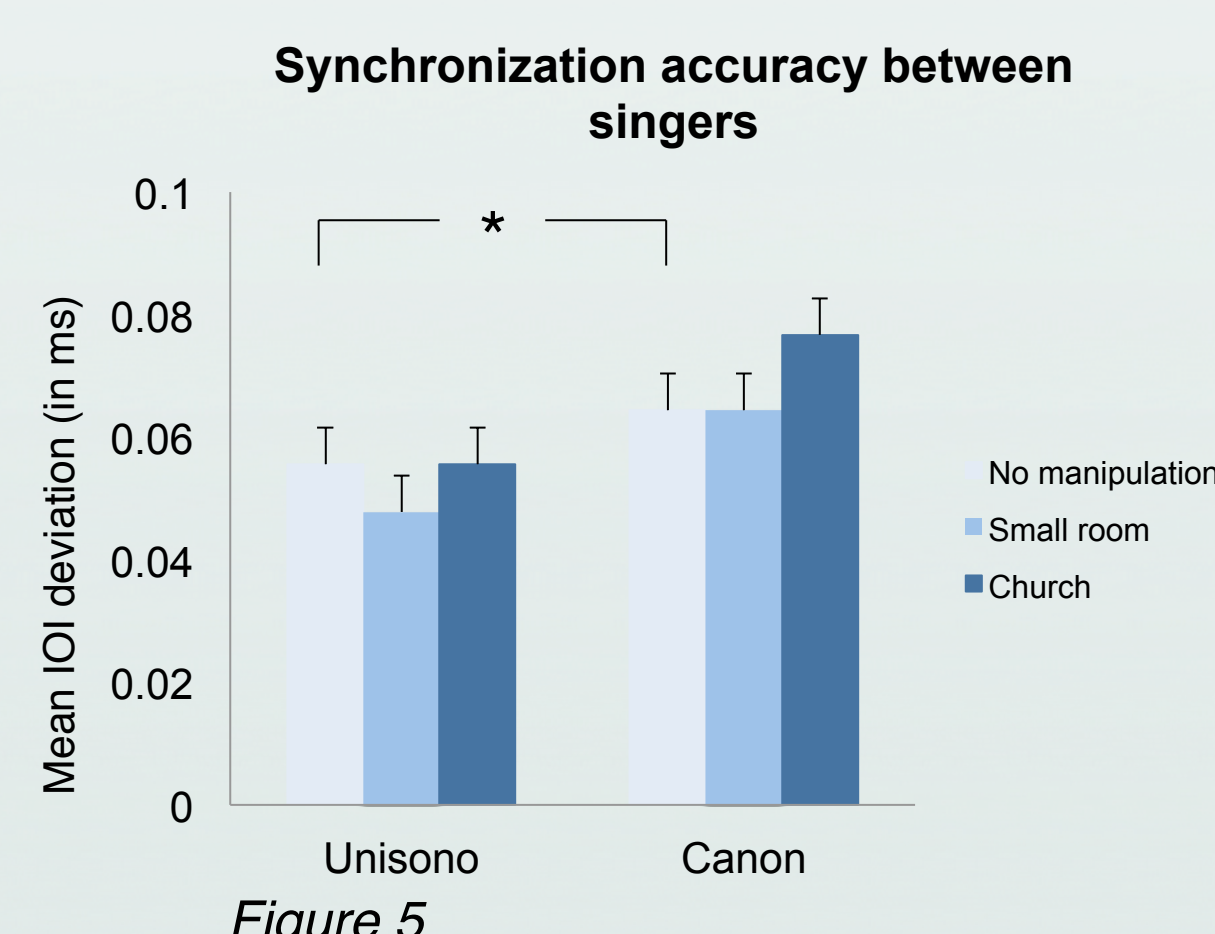


Figure 5

1. Pitch and synchronization differ between singing conditions (Solo, Unisono, Canon):
→ YES

Pitch accuracy was better in Solo and Unisono compared to Canon (Figure 1), while tonal adjustments between singers were better in Unisono compared to Canon (Figure 3). Synchronization was more accurate when singing Unisono compared to Canon (Figure 5).

2. Acoustical feedback has an influence on pitch and timing:
→ NO

No influence of room acoustics on pitch (Figure 1, 2, 3) and timing (Figure 4, 5).

3. There is an interaction between singing conditions and room acoustical simulations:
→ NO

No interaction between the different singing conditions and room acoustical simulations in highly trained singers.

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