

Listener perception of changes in historically informed performance of solo Baroque music due to room acoustics

JJCAAS 2023 @ IRCAM



Nolan Eley, Catherine Lavandier, Théodora Psychoyou, Brian FG Katz

Background

Background

- 3 Flutists, 4 violists

Background

- 3 Flutists, 4 violists
- 2 rooms:

Background

- 3 Flutists, 4 violists
- 2 rooms:
 - Salon des Nobles (Versailles)

Salon des Nobles



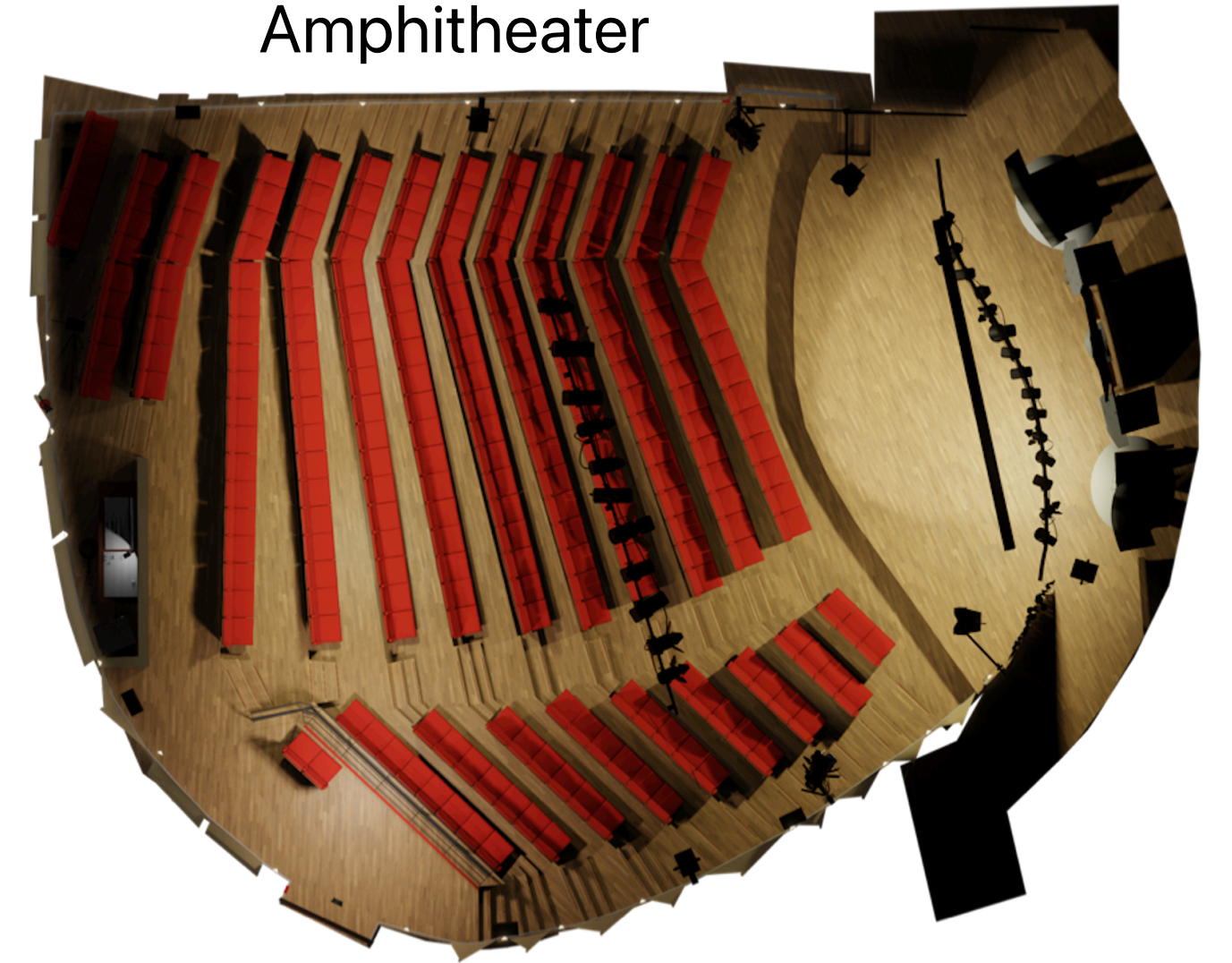
Background

- 3 Flutists, 4 violists
- 2 rooms:
 - Salon des Nobles (Versailles)
 - Amphitheater (Cité de la Musique)

Salon des Nobles

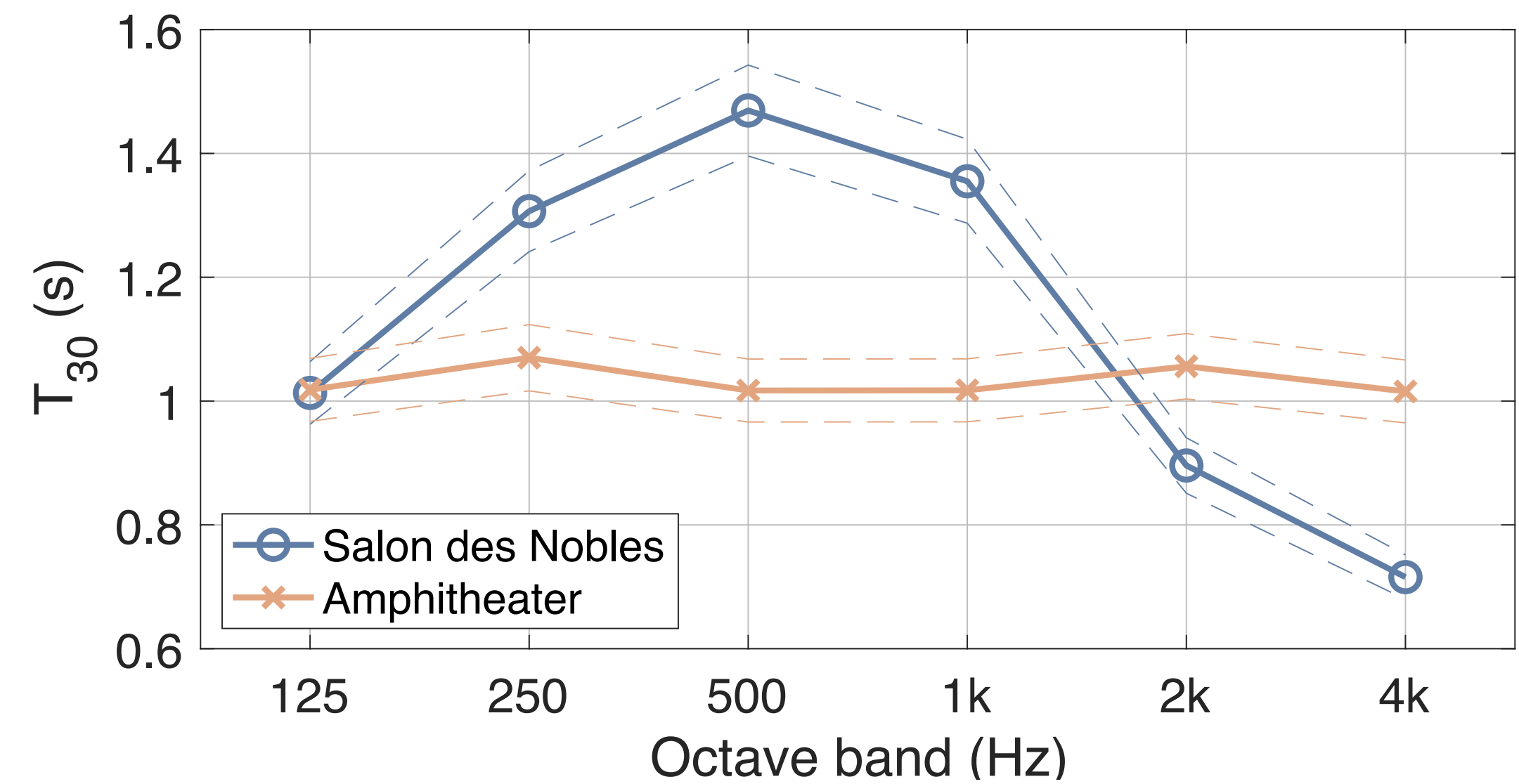
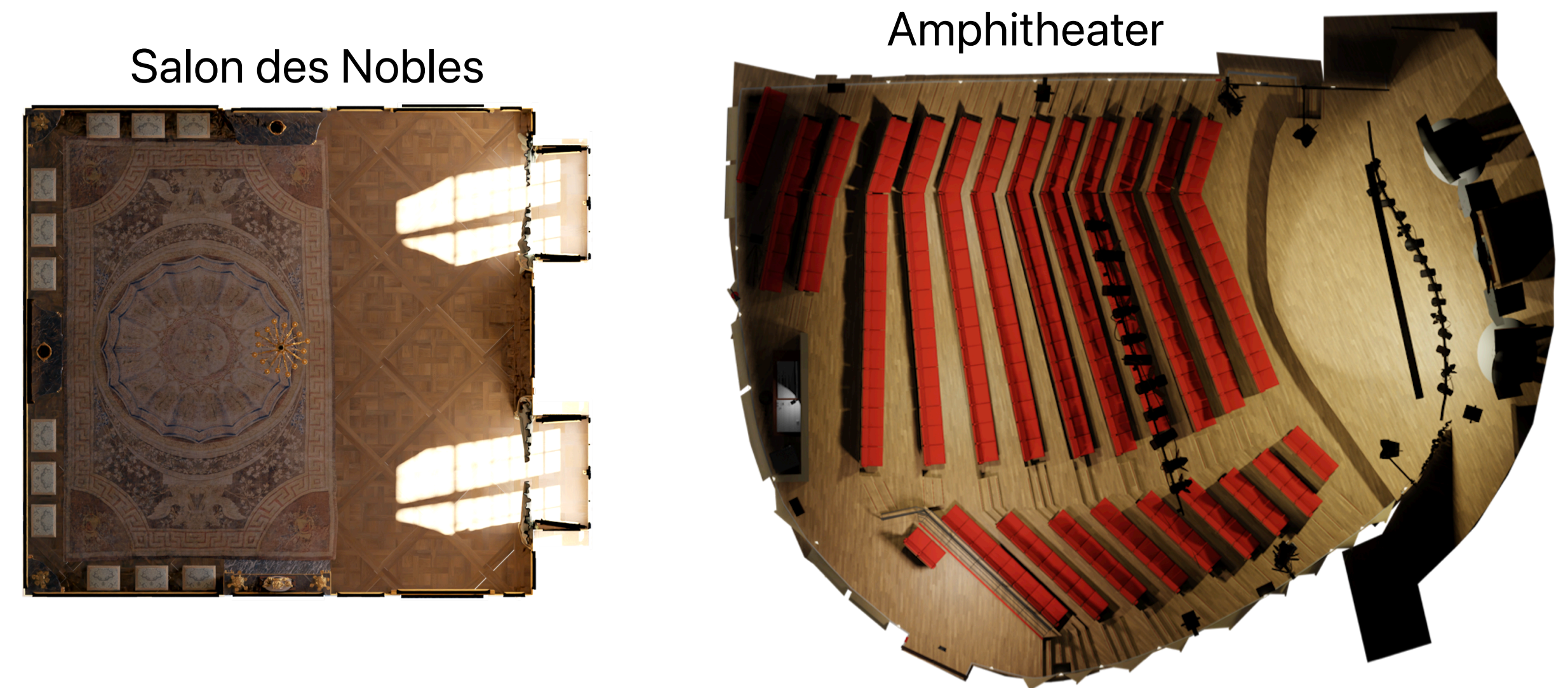


Amphitheater



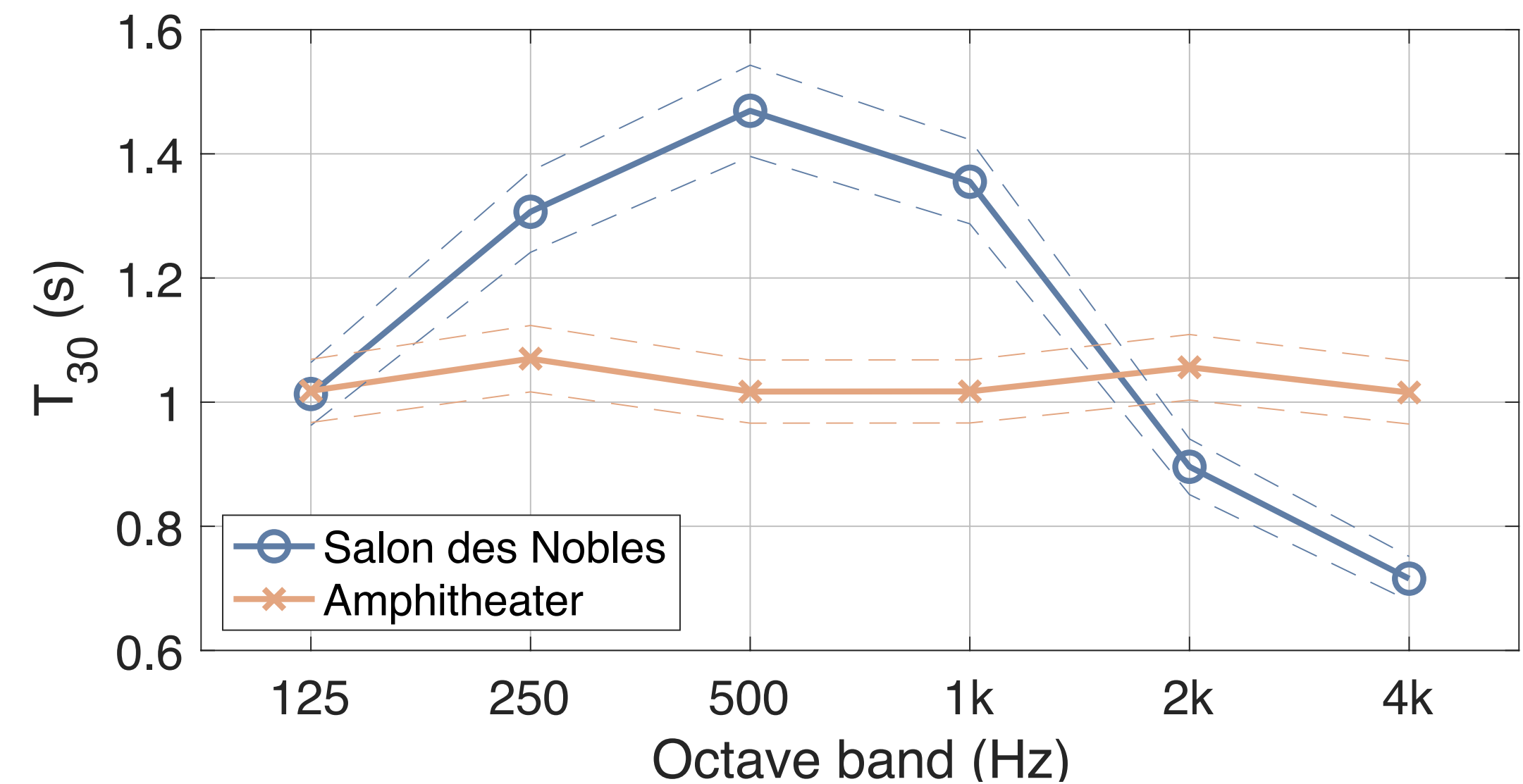
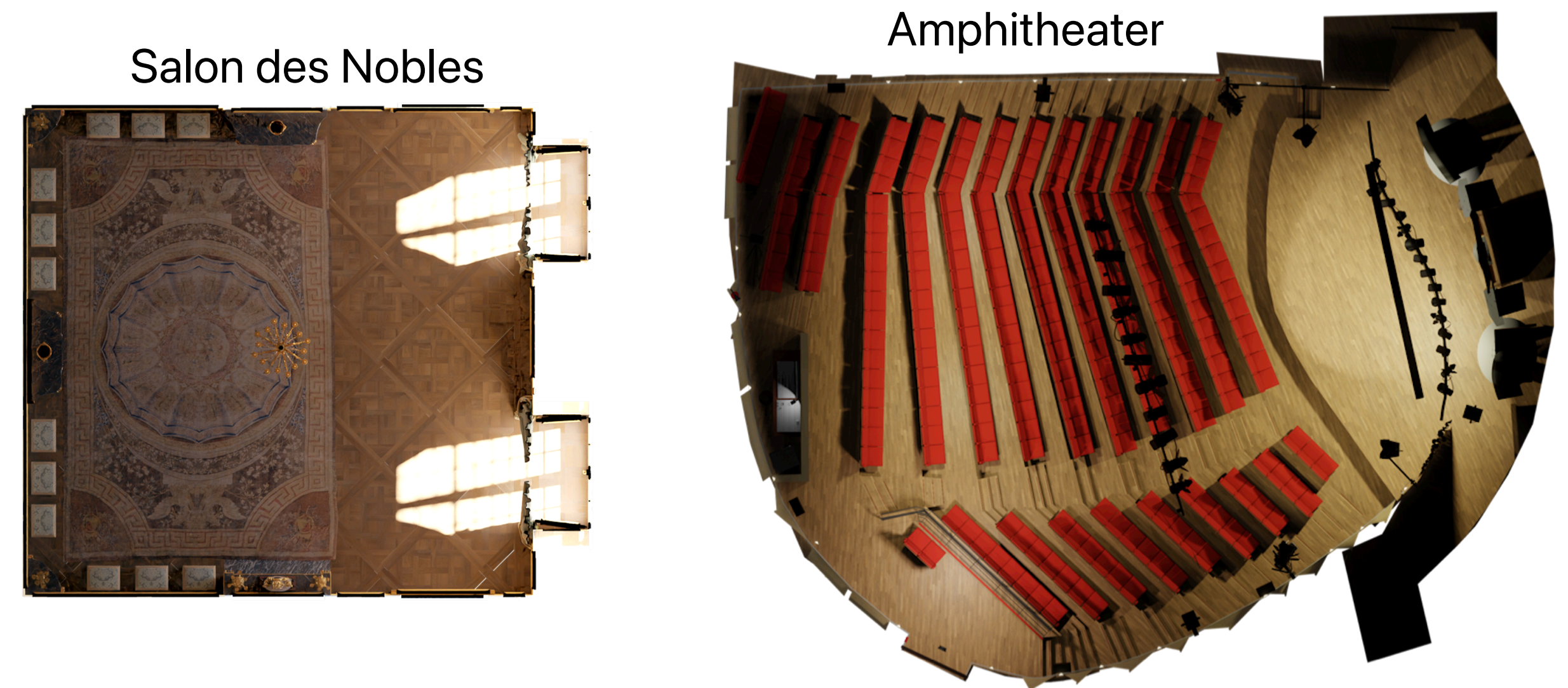
Background

- 3 Flutists, 4 violists
- 2 rooms:
 - Salon des Nobles (Versailles)
 - Amphitheater (Cité de la Musique)



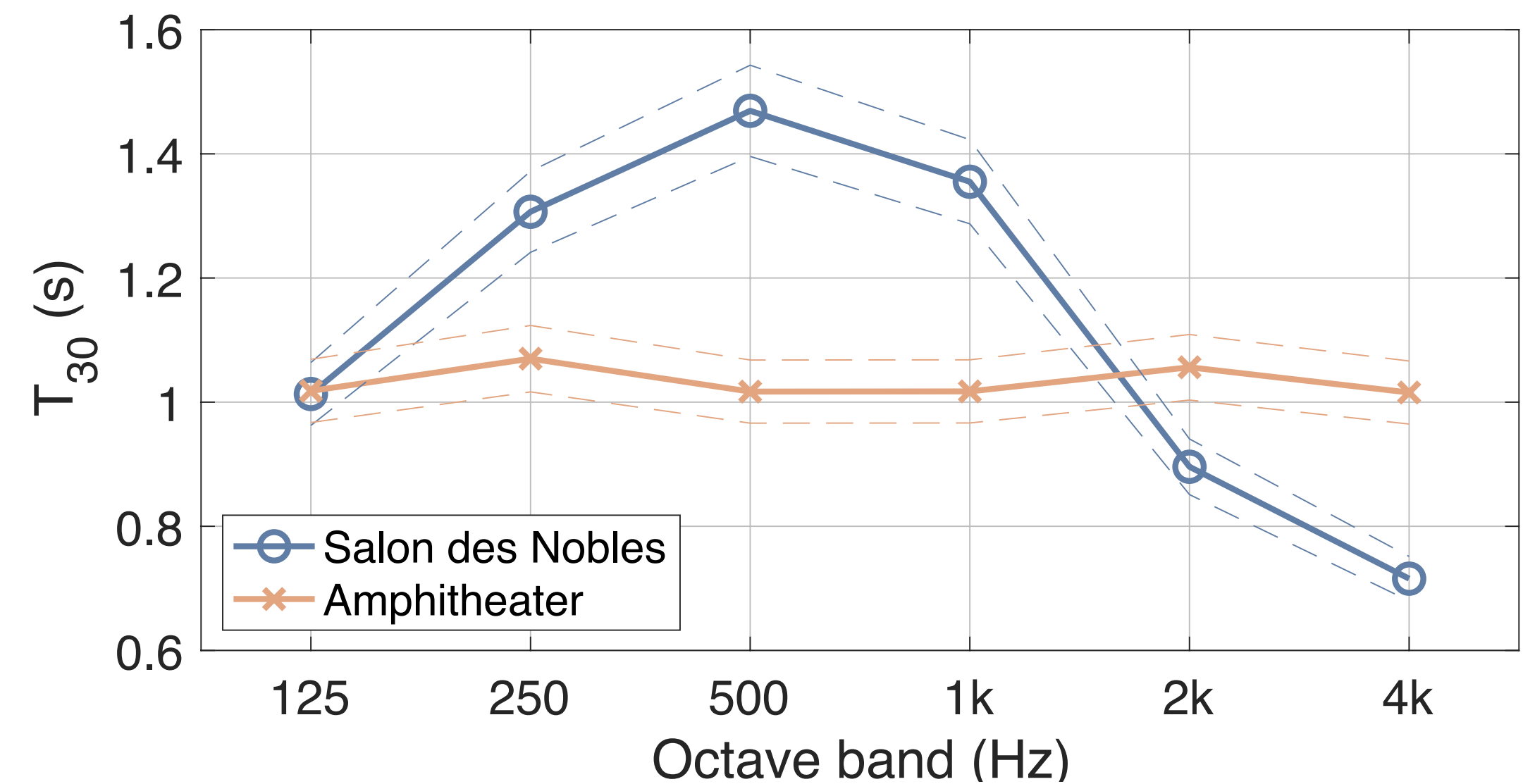
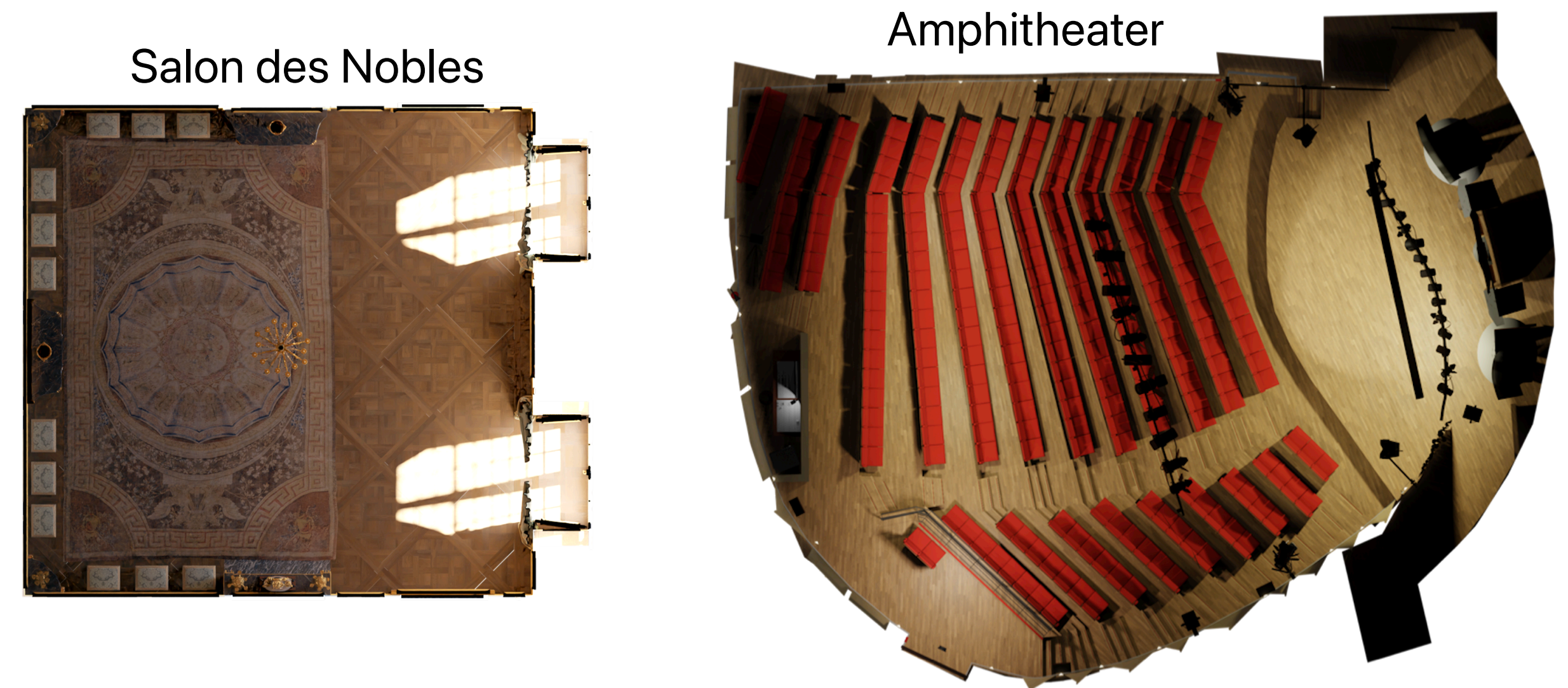
Background

- 3 Flutists, 4 violists
- 2 rooms:
 - Salon des Nobles (Versailles)
 - Amphitheater (Cité de la Musique)
- Analyzed via:



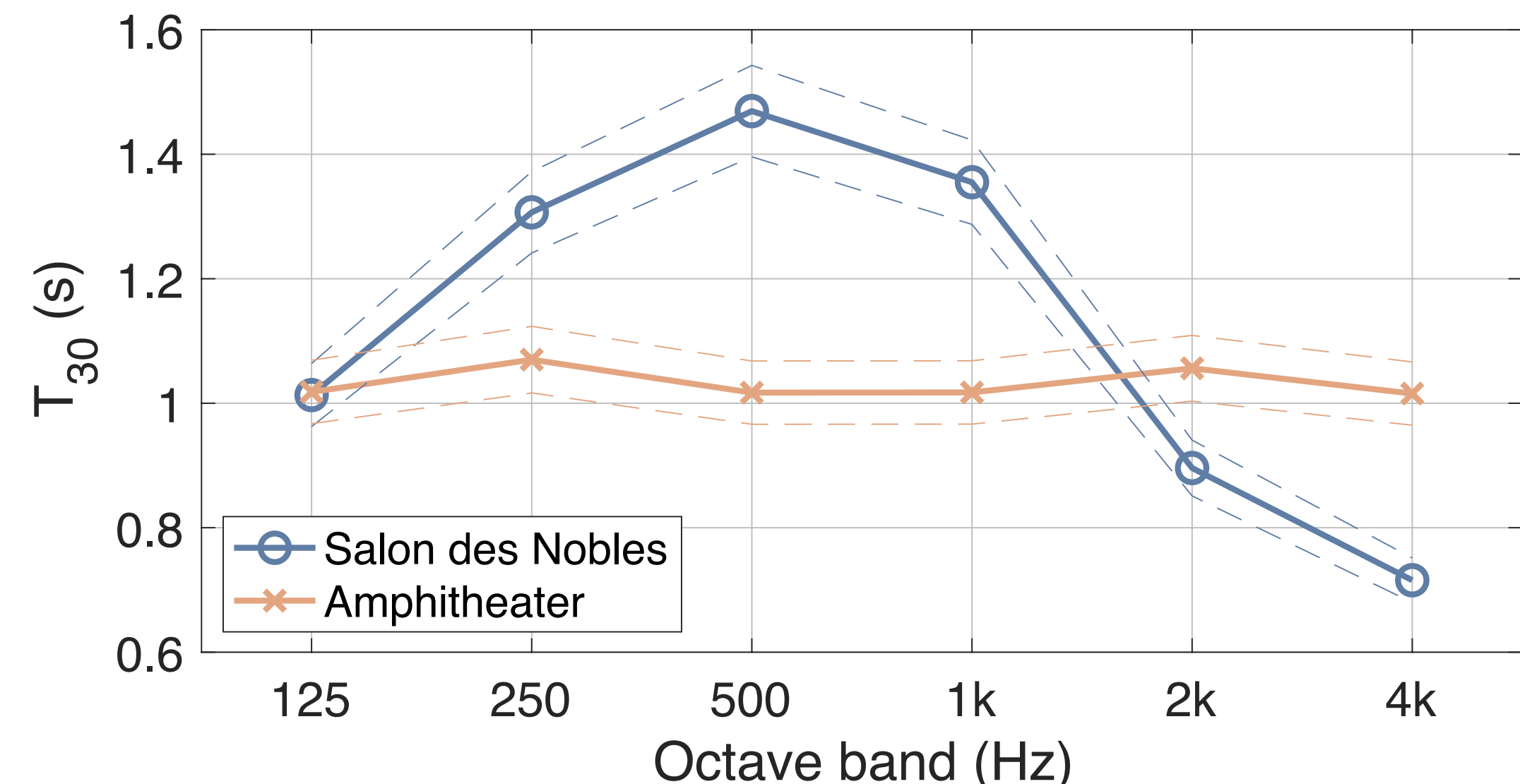
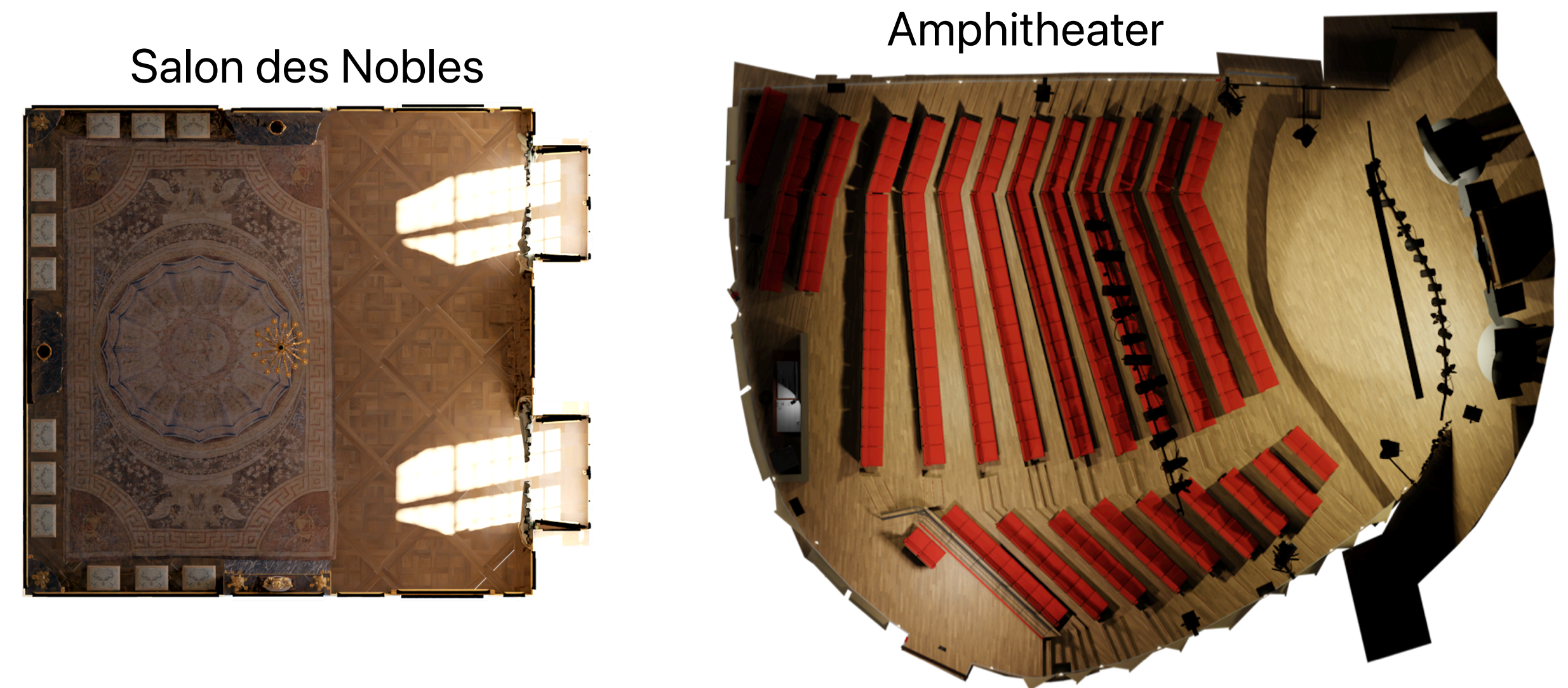
Background

- 3 Flutists, 4 violists
- 2 rooms:
 - Salon des Nobles (Versailles)
 - Amphitheater (Cité de la Musique)
- Analyzed via:
 - Musician questionnaires



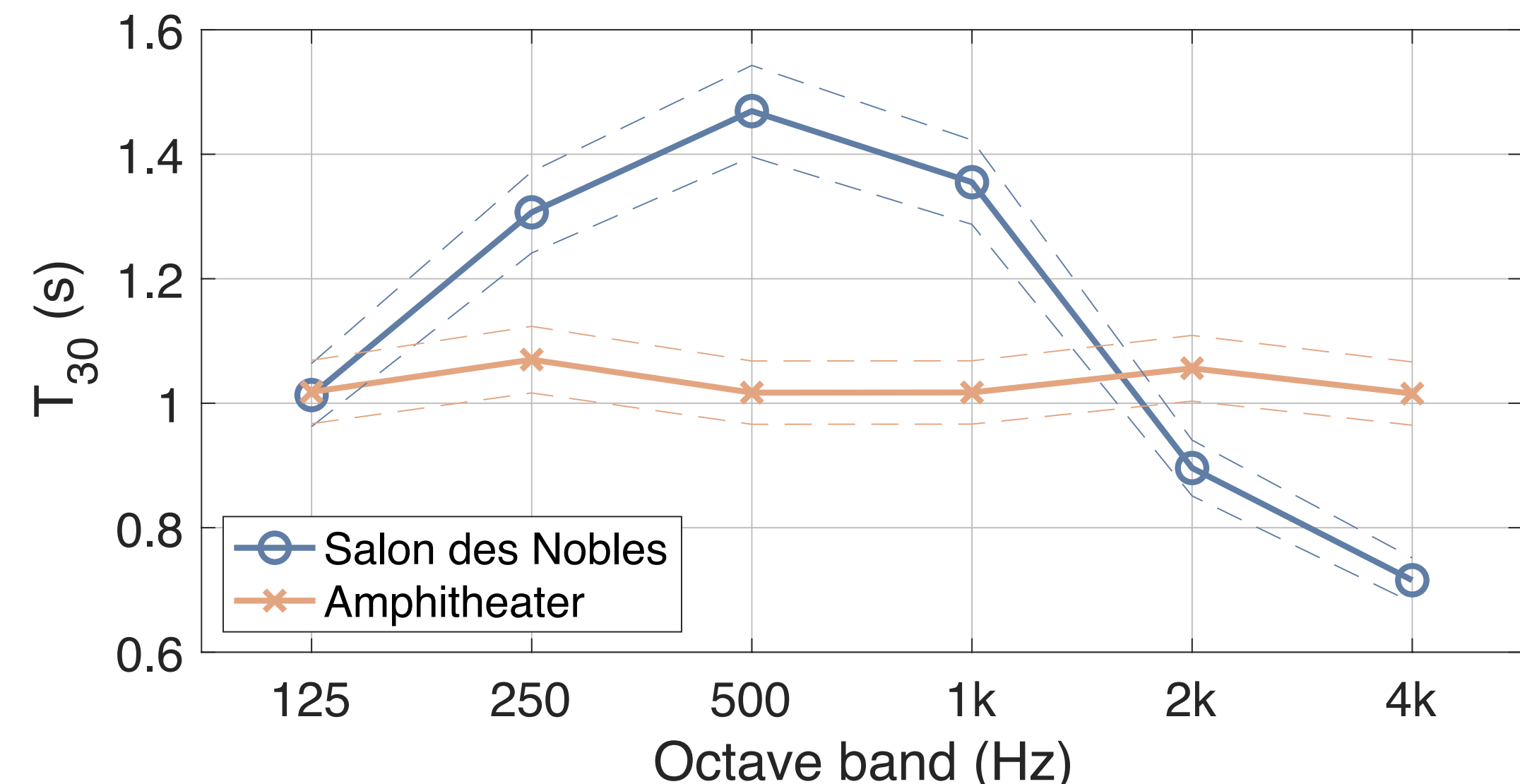
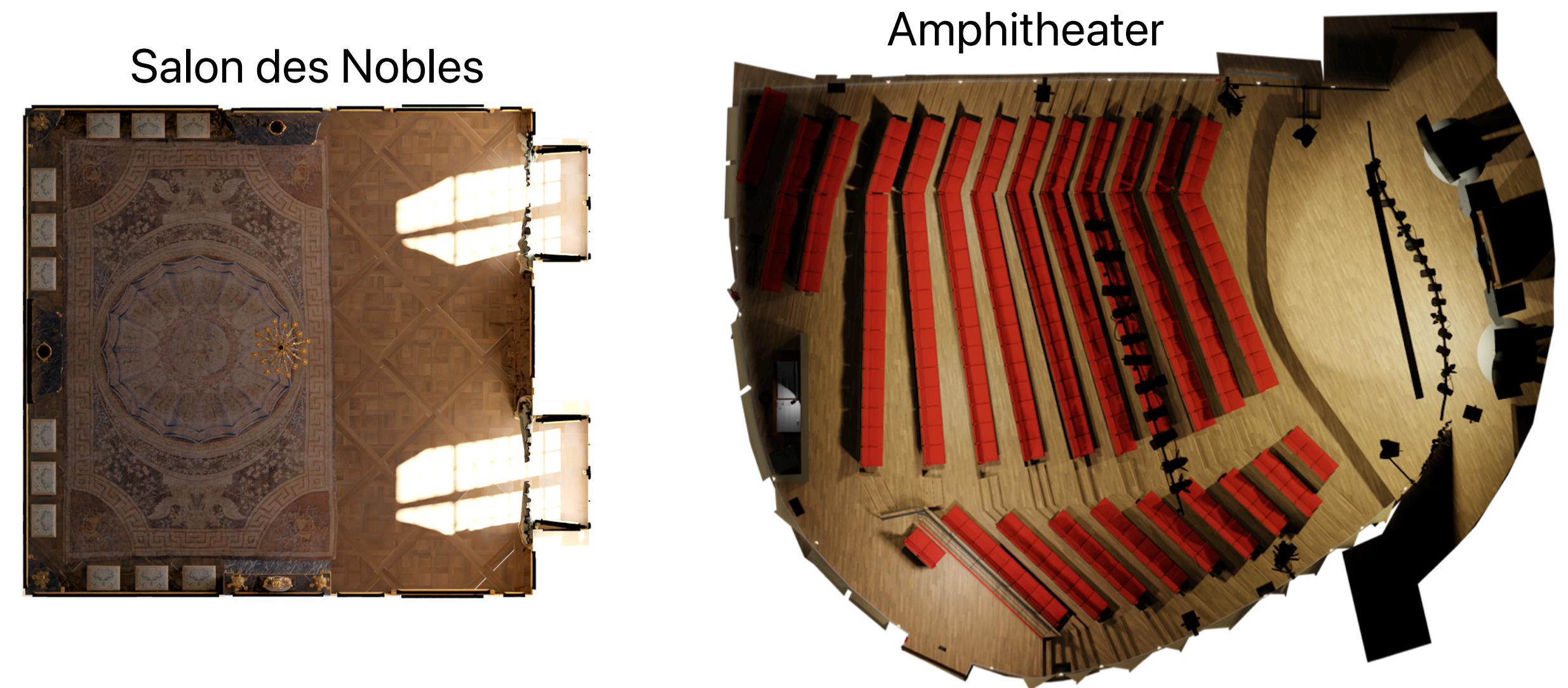
Background

- 3 Flutists, 4 violists
- 2 rooms:
 - Salon des Nobles (Versailles)
 - Amphitheater (Cité de la Musique)
- Analyzed via:
 - Musician questionnaires
 - Acoustics of Salon des Nobles supported playing



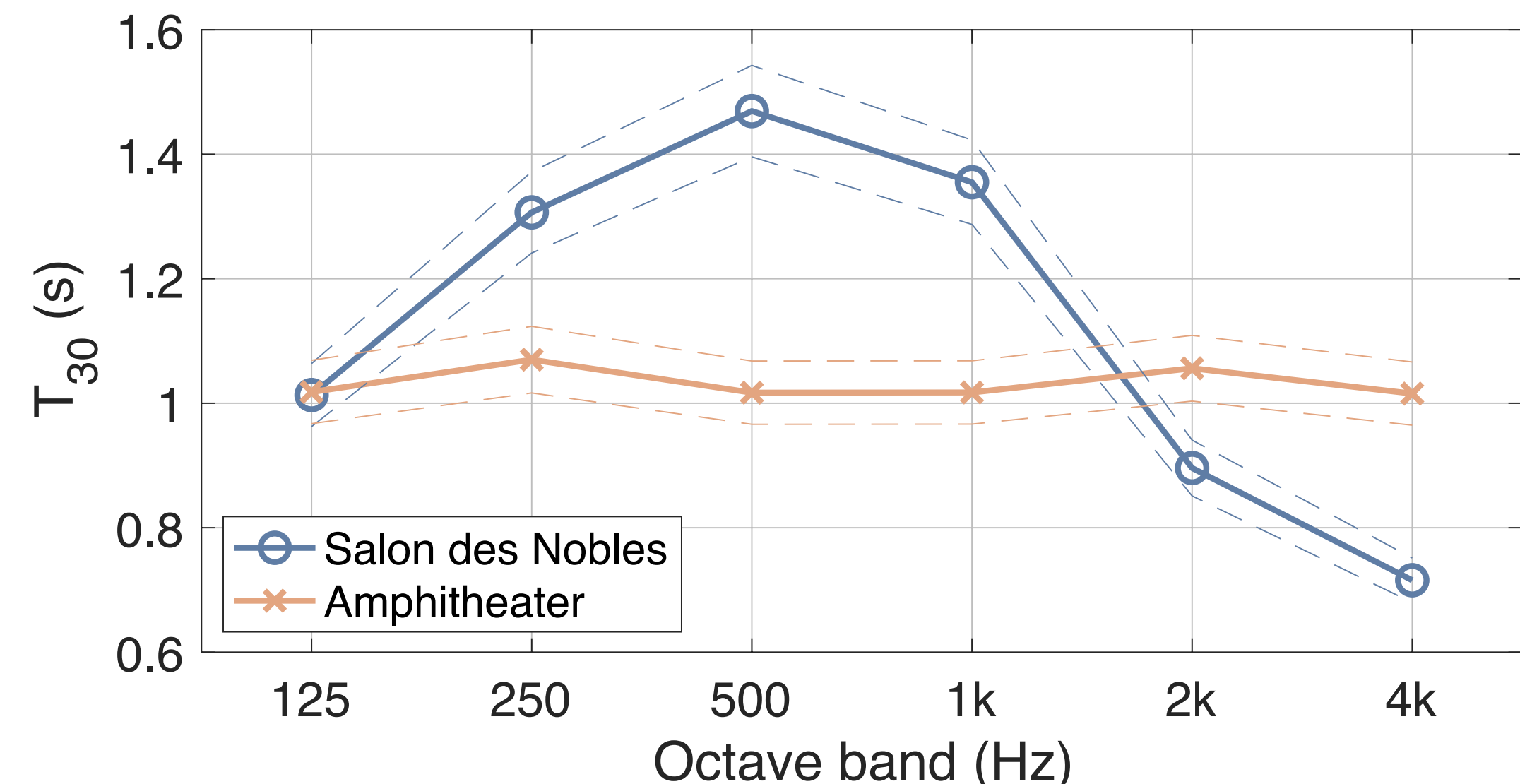
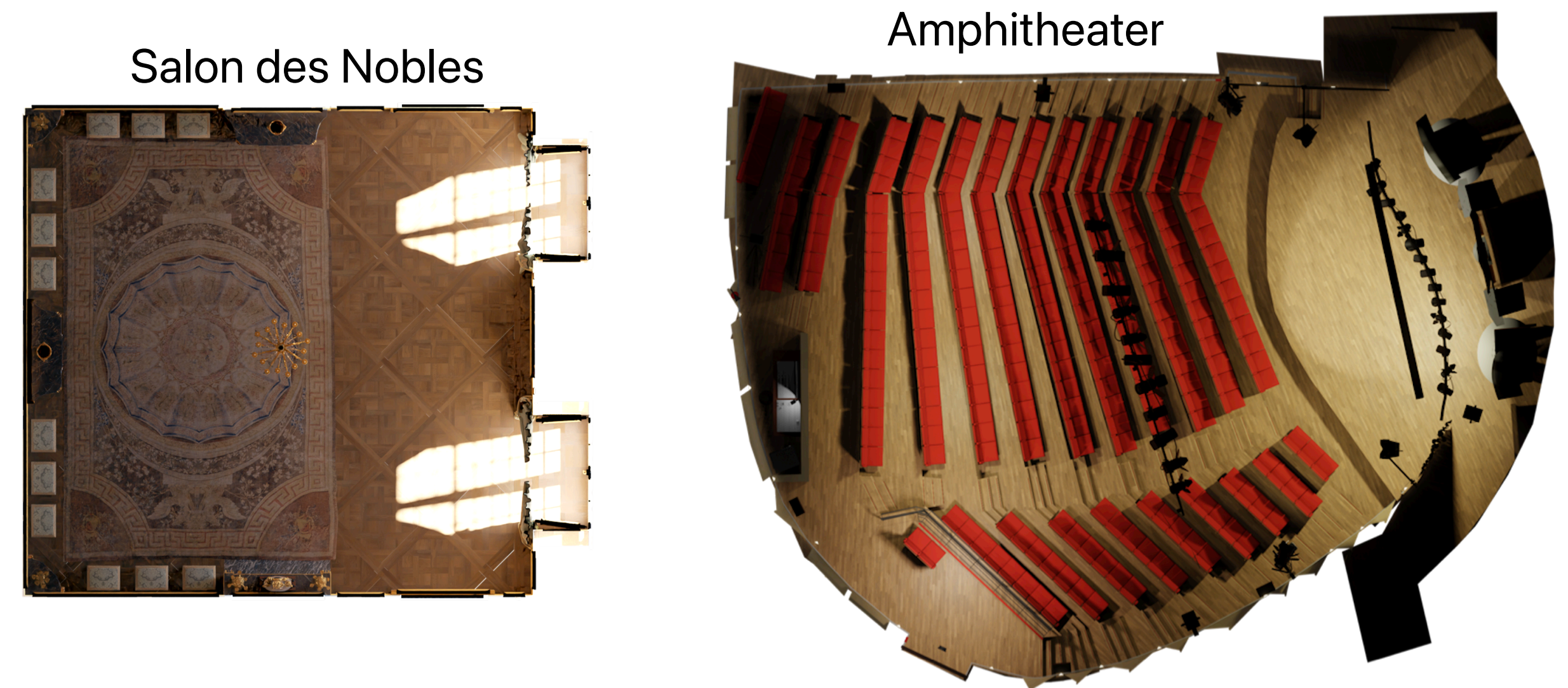
Background

- 3 Flutists, 4 violists
- 2 rooms:
 - Salon des Nobles (Versailles)
 - Amphitheater (Cité de la Musique)
- Analyzed via:
 - Musician questionnaires
 - Acoustics of Salon des Nobles supported playing
 - Objective analysis



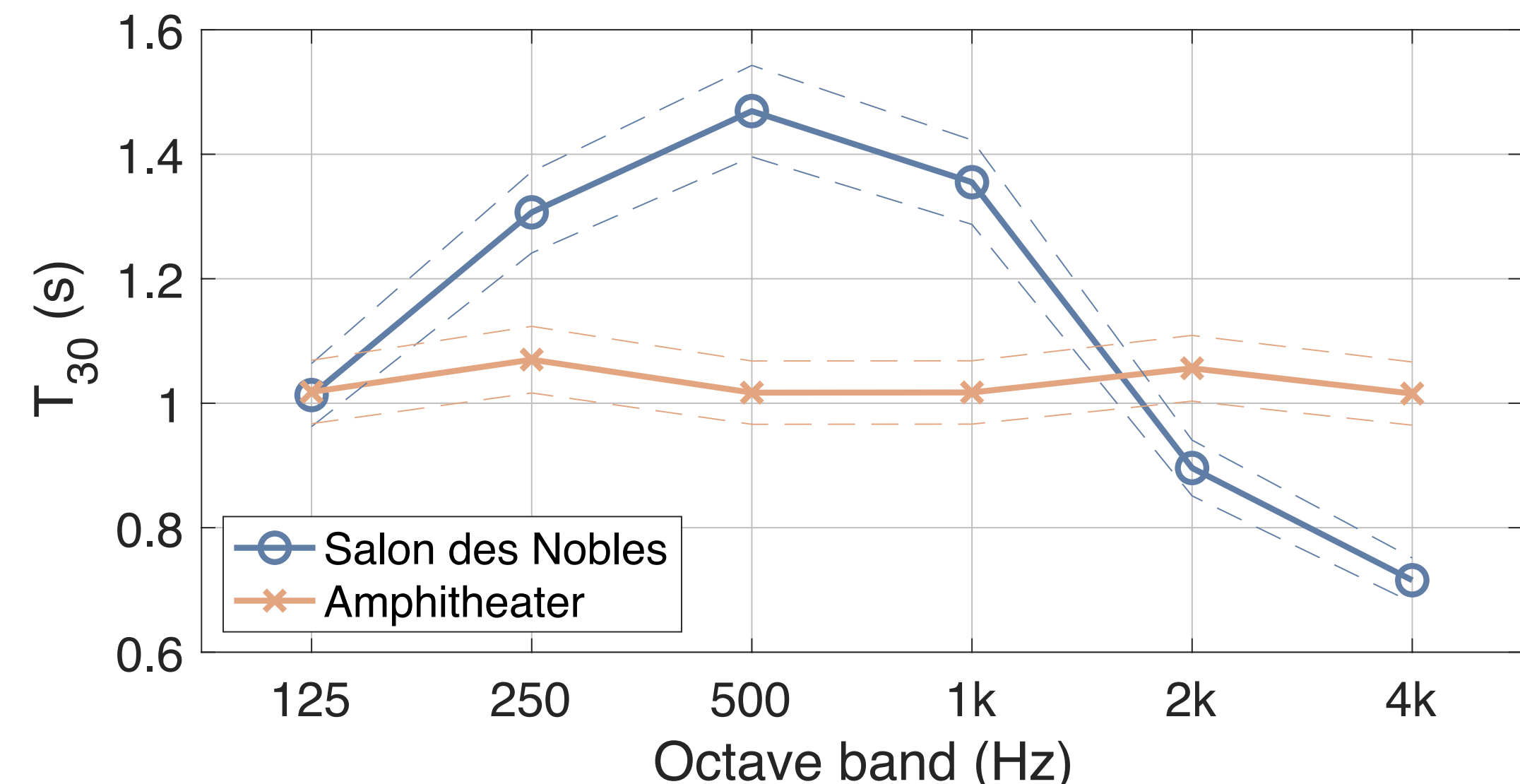
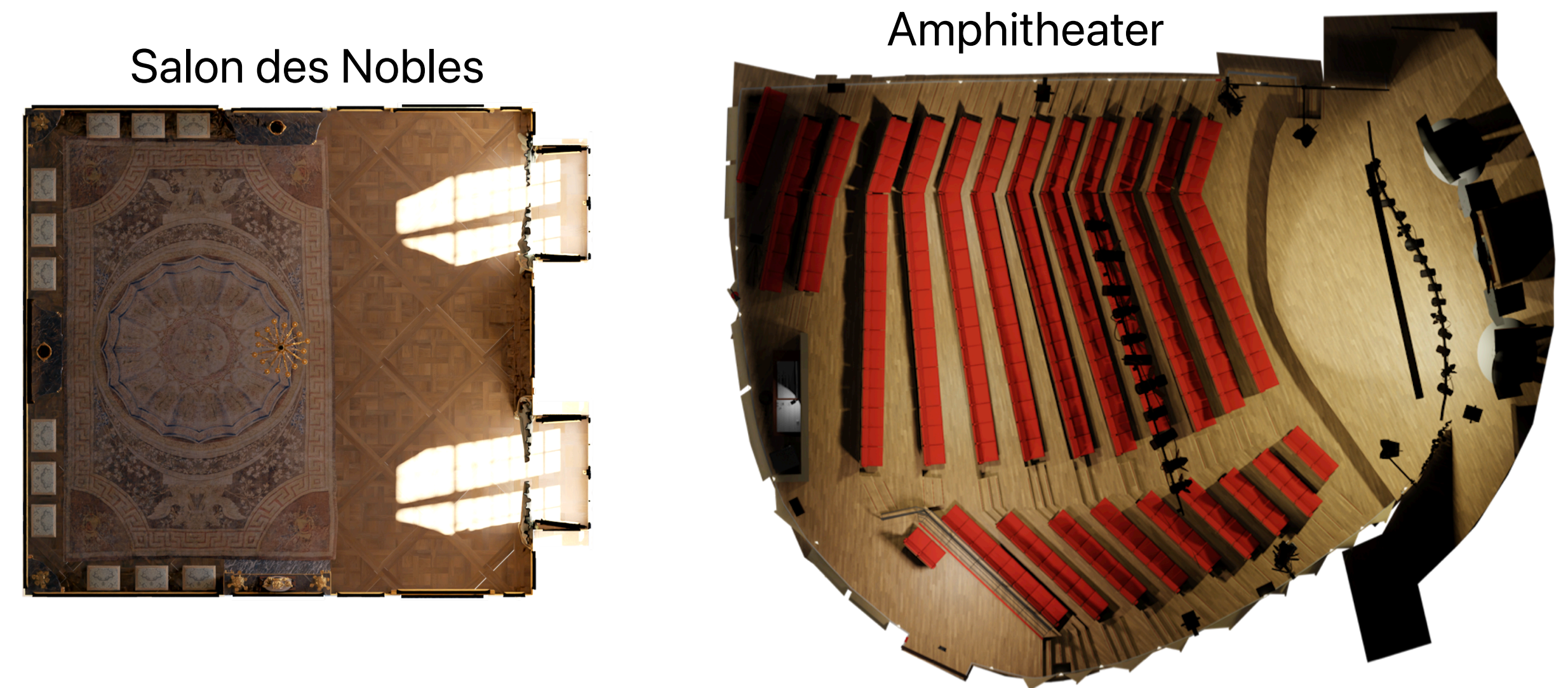
Background

- 3 Flutists, 4 violists
- 2 rooms:
 - Salon des Nobles (Versailles)
 - Amphitheater (Cité de la Musique)
- Analyzed via:
 - Musician questionnaires
 - Acoustics of Salon des Nobles supported playing
 - Objective analysis
 - 3 dimensions: phrasing, tone production, and vibrato



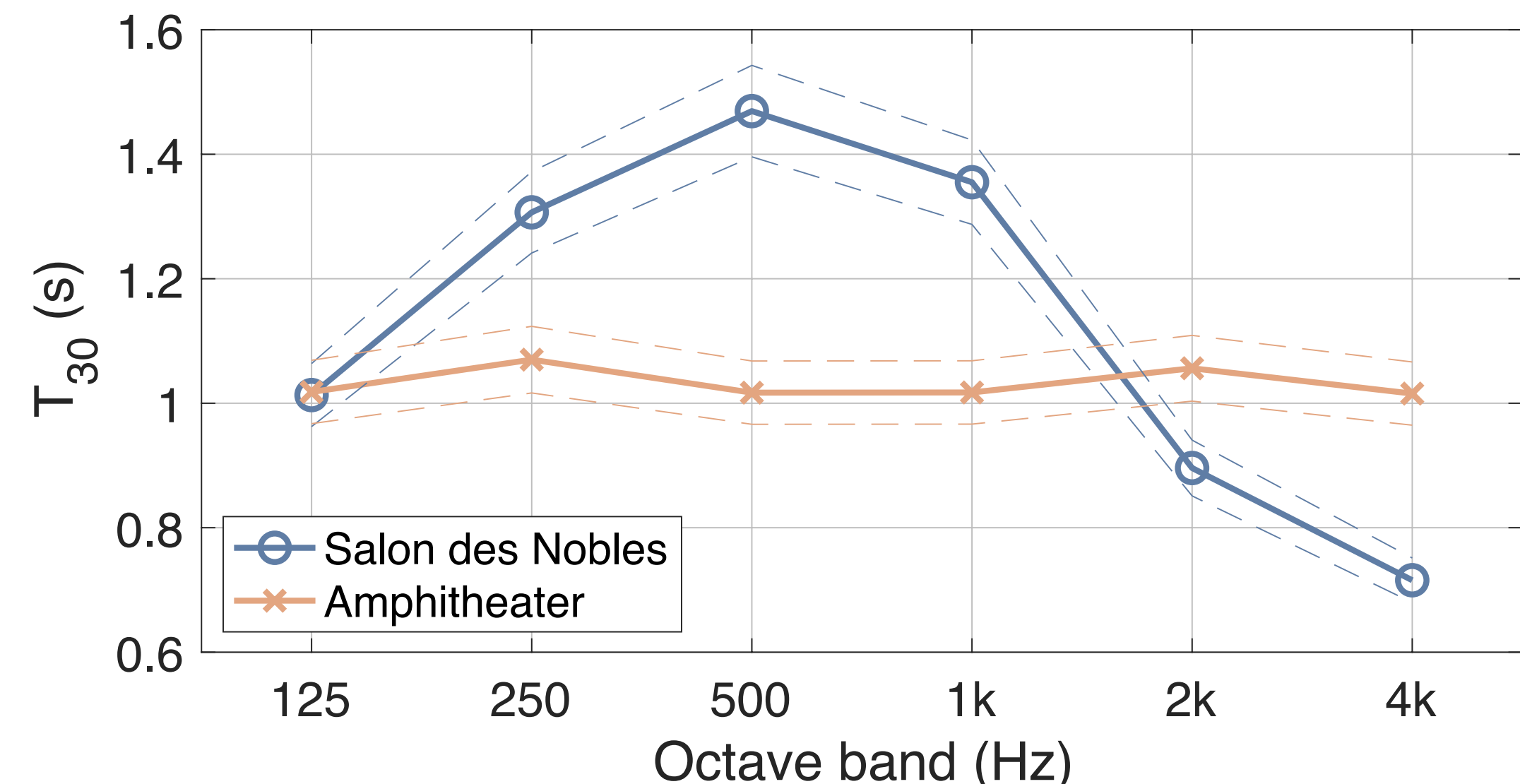
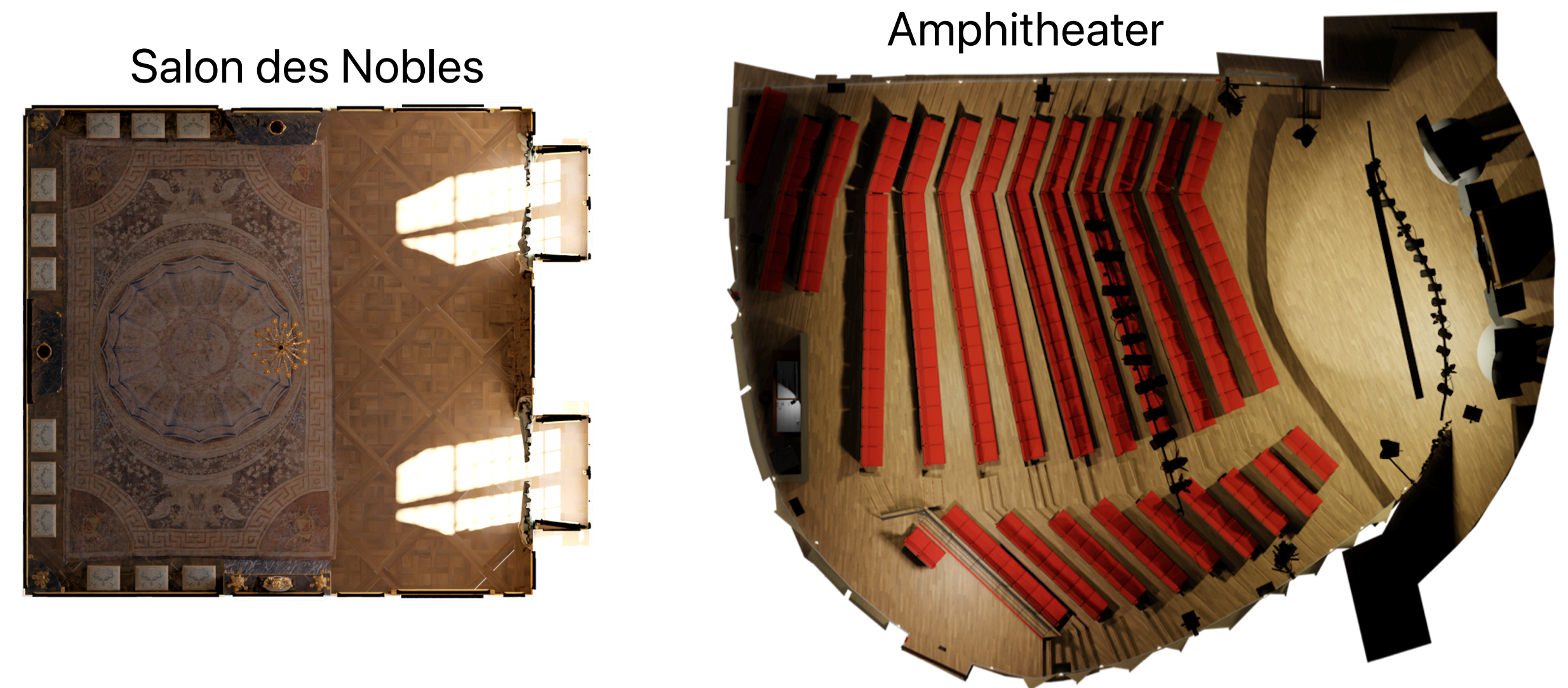
Background

- 3 Flutists, 4 violists
- 2 rooms:
 - Salon des Nobles (Versailles)
 - Amphitheater (Cité de la Musique)
- Analyzed via:
 - Musician questionnaires
 - Acoustics of Salon des Nobles supported playing
 - Objective analysis
 - 3 dimensions: phrasing, tone production, and vibrato
 - Observed differences between rooms



Background

- 3 Flutists, 4 violists
- 2 rooms:
 - Salon des Nobles (Versailles)
 - Amphitheater (Cité de la Musique)
- Analyzed via:
 - Musician questionnaires
 - Acoustics of Salon des Nobles supported playing
 - Objective analysis
 - 3 dimensions: phrasing, tone production, and vibrato
 - Observed differences between rooms
 - Listener ratings



Listening test experiment design

Listening test experiment design

- 8 rating categories: ^{1, 2, 3}
 - Phrasing
 - Continuous—Articulated
 - Strict—Flexible
 - Mechanical—Varied
 - Tone production
 - Forced—Light
 - Muddy—Clear
 - Straight—Uneven
 - Baroque-expressiveness
 - Not at all—Very

[1] D. Fabian and E. Schubert, "Baroque expressiveness and stylishness in three recordings of the D minor Sarabanda for solo violin by J.S. Bach," *Music Performance Research*, vol. 3, pp. 36–56, Jan. 2009.

[2] E. Schubert and D. Fabian, "A taxonomy of listeners' judgments of expressiveness in music performance," in *Expressiveness in music performance: Empirical approaches across styles and cultures*, D. Fabian, R. Timmers, and E. Schubert, Eds. Oxford University Press, 2014, pp. 283–303.

[3] E. Schubert and D. Fabian, "The dimensions of baroque music performance: a semantic differential study," *Psychology of Music*, vol. 34, no. 4, pp. 573–587, Oct. 2006.

Listening test experiment design

- 8 rating categories: ^{1, 2, 3}
 - Phrasing
 - Continuous—Articulated
 - Strict—Flexible
 - Mechanical—Varied
 - Tone production
 - Forced—Light
 - Muddy—Clear
 - Straight—Uneven
 - Baroque-expressiveness
 - Not at all—Very
- 20 musically-educated participants

[1] D. Fabian and E. Schubert, "Baroque expressiveness and stylishness in three recordings of the D minor Sarabanda for solo violin by J.S. Bach," *Music Performance Research*, vol. 3, pp. 36–56, Jan. 2009.

[2] E. Schubert and D. Fabian, "A taxonomy of listeners' judgments of expressiveness in music performance," in *Expressiveness in music performance: Empirical approaches across styles and cultures*, D. Fabian, R. Timmers, and E. Schubert, Eds. Oxford University Press, 2014, pp. 283–303.

[3] E. Schubert and D. Fabian, "The dimensions of baroque music performance: a semantic differential study," *Psychology of Music*, vol. 34, no. 4, pp. 573–587, Oct. 2006.

Listening test experiment design

- 8 rating categories: ^{1, 2, 3}
 - Phrasing
 - Continuous—Articulated
 - Strict—Flexible
 - Mechanical—Varied
 - Tone production
 - Forced—Light
 - Muddy—Clear
 - Straight—Uneven
 - Baroque-expressiveness
 - Not at all—Very
- 20 musically-educated participants
- Flute: 15 audio examples

[1] D. Fabian and E. Schubert, "Baroque expressiveness and stylishness in three recordings of the D minor Sarabanda for solo violin by J.S. Bach," *Music Performance Research*, vol. 3, pp. 36–56, Jan. 2009.

[2] E. Schubert and D. Fabian, "A taxonomy of listeners' judgments of expressiveness in music performance," in *Expressiveness in music performance: Empirical approaches across styles and cultures*, D. Fabian, R. Timmers, and E. Schubert, Eds. Oxford University Press, 2014, pp. 283–303.

[3] E. Schubert and D. Fabian, "The dimensions of baroque music performance: a semantic differential study," *Psychology of Music*, vol. 34, no. 4, pp. 573–587, Oct. 2006.

Listening test experiment design

- 8 rating categories: ^{1, 2, 3}
 - Phrasing
 - Continuous—Articulated
 - Strict—Flexible
 - Mechanical—Varied
 - Tone production
 - Forced—Light
 - Muddy—Clear
 - Straight—Uneven
 - Baroque-expressiveness
 - Not at all—Very
- 20 musically-educated participants
- Flute: 15 audio examples
- Viol: 21 audio examples

[1] D. Fabian and E. Schubert, "Baroque expressiveness and stylishness in three recordings of the D minor Sarabanda for solo violin by J.S. Bach," *Music Performance Research*, vol. 3, pp. 36–56, Jan. 2009.

[2] E. Schubert and D. Fabian, "A taxonomy of listeners' judgments of expressiveness in music performance," in *Expressiveness in music performance: Empirical approaches across styles and cultures*, D. Fabian, R. Timmers, and E. Schubert, Eds. Oxford University Press, 2014, pp. 283–303.

[3] E. Schubert and D. Fabian, "The dimensions of baroque music performance: a semantic differential study," *Psychology of Music*, vol. 34, no. 4, pp. 573–587, Oct. 2006.

Listening test experiment design

- 8 rating categories: ^{1, 2, 3}
 - Phrasing
 - Continuous—Articulated
 - Strict—Flexible
 - Mechanical—Varied
 - Tone production
 - Forced—Light
 - Muddy—Clear
 - Straight—Uneven
 - Baroque-expressiveness
 - Not at all—Very
- 20 musically-educated participants
- Flute: 15 audio examples
- Viol: 21 audio examples
- 30s - 60s

[1] D. Fabian and E. Schubert, "Baroque expressiveness and stylishness in three recordings of the D minor Sarabanda for solo violin by J.S. Bach," *Music Performance Research*, vol. 3, pp. 36–56, Jan. 2009.

[2] E. Schubert and D. Fabian, "A taxonomy of listeners' judgments of expressiveness in music performance," in *Expressiveness in music performance: Empirical approaches across styles and cultures*, D. Fabian, R. Timmers, and E. Schubert, Eds. Oxford University Press, 2014, pp. 283–303.

[3] E. Schubert and D. Fabian, "The dimensions of baroque music performance: a semantic differential study," *Psychology of Music*, vol. 34, no. 4, pp. 573–587, Oct. 2006.

Listening test experiment design

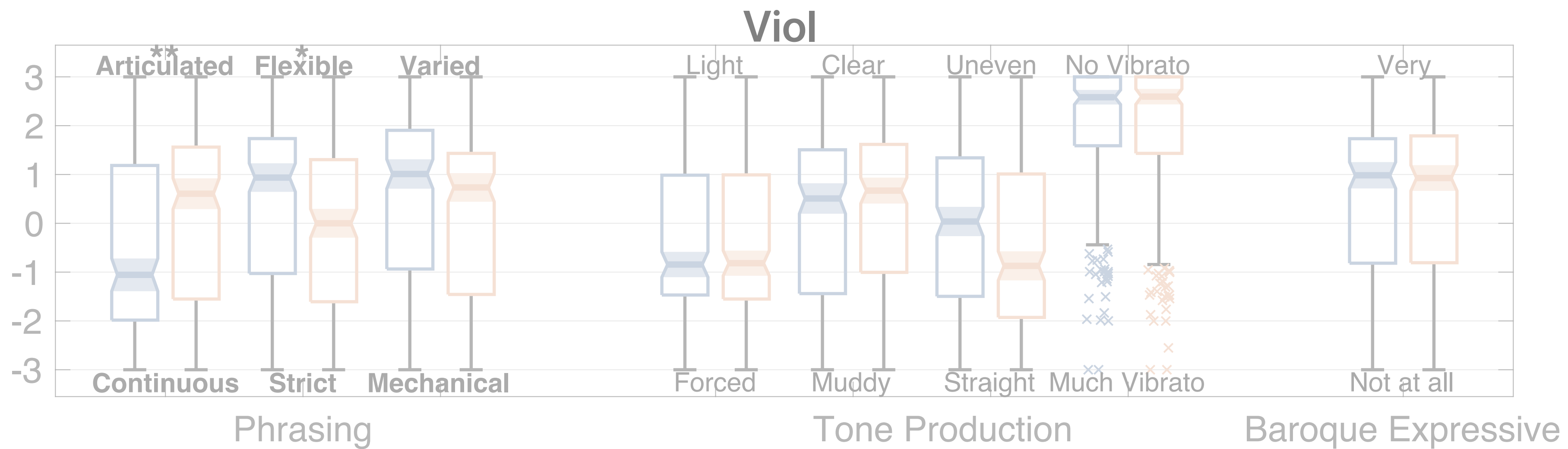
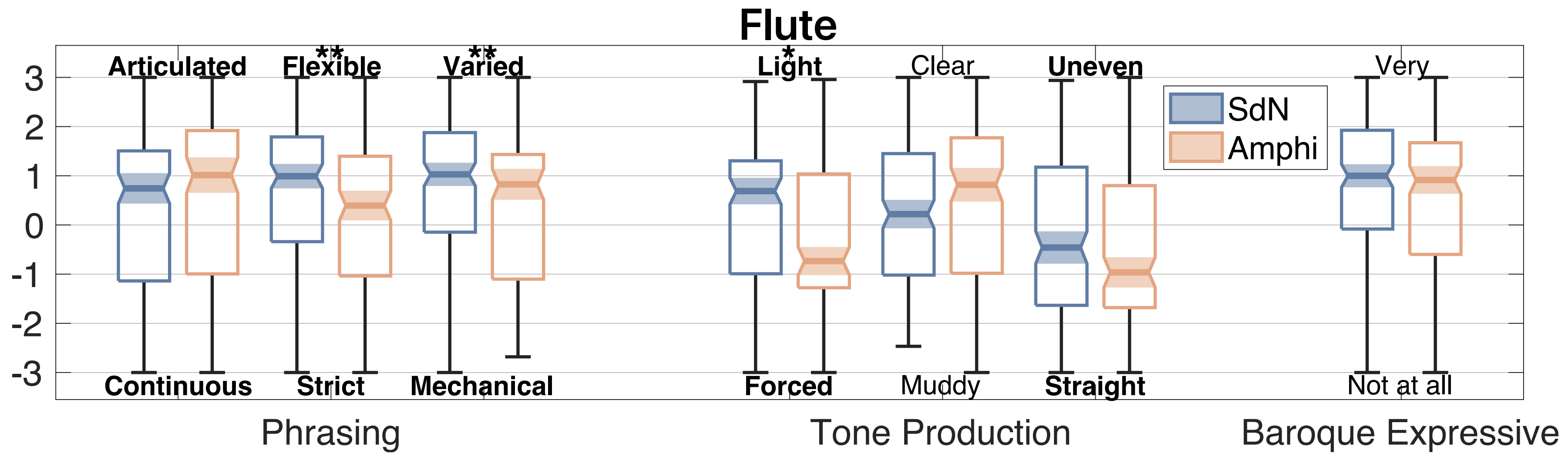
- 8 rating categories: ^{1, 2, 3}
 - Phrasing
 - Continuous—Articulated
 - Strict—Flexible
 - Mechanical—Varied
 - Tone production
 - Forced—Light
 - Muddy—Clear
 - Straight—Uneven
 - Baroque-expressiveness
 - Not at all—Very
- 20 musically-educated participants
- Flute: 15 audio examples
- Viol: 21 audio examples
- 30s - 60s
- MATLAB App Designer

[1] D. Fabian and E. Schubert, "Baroque expressiveness and stylishness in three recordings of the D minor Sarabanda for solo violin by J.S. Bach," *Music Performance Research*, vol. 3, pp. 36–56, Jan. 2009.

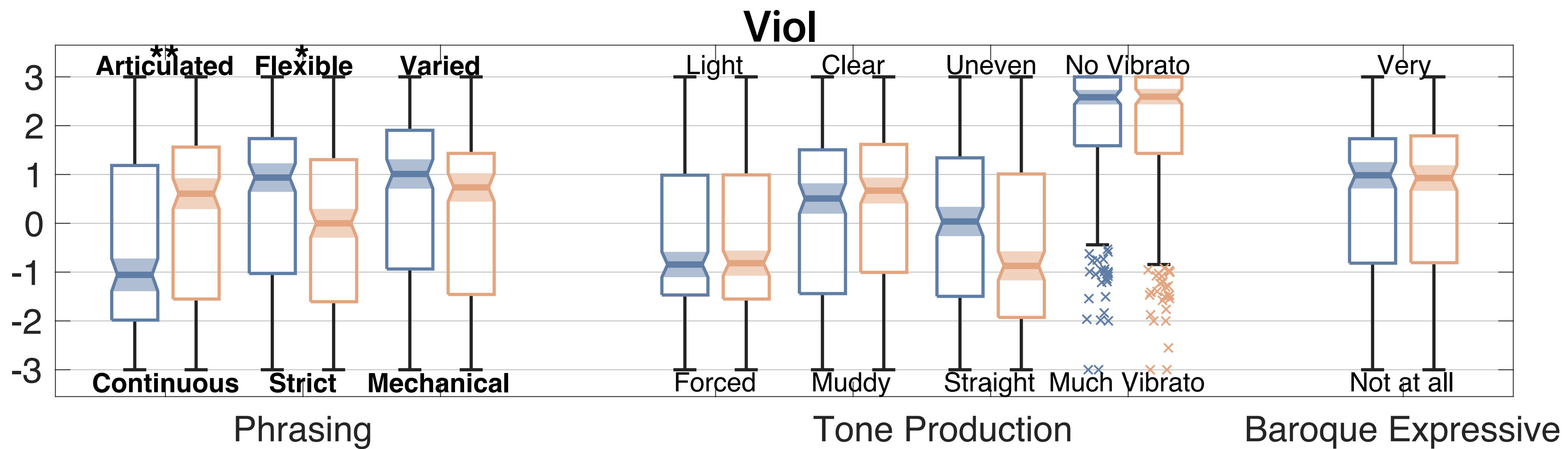
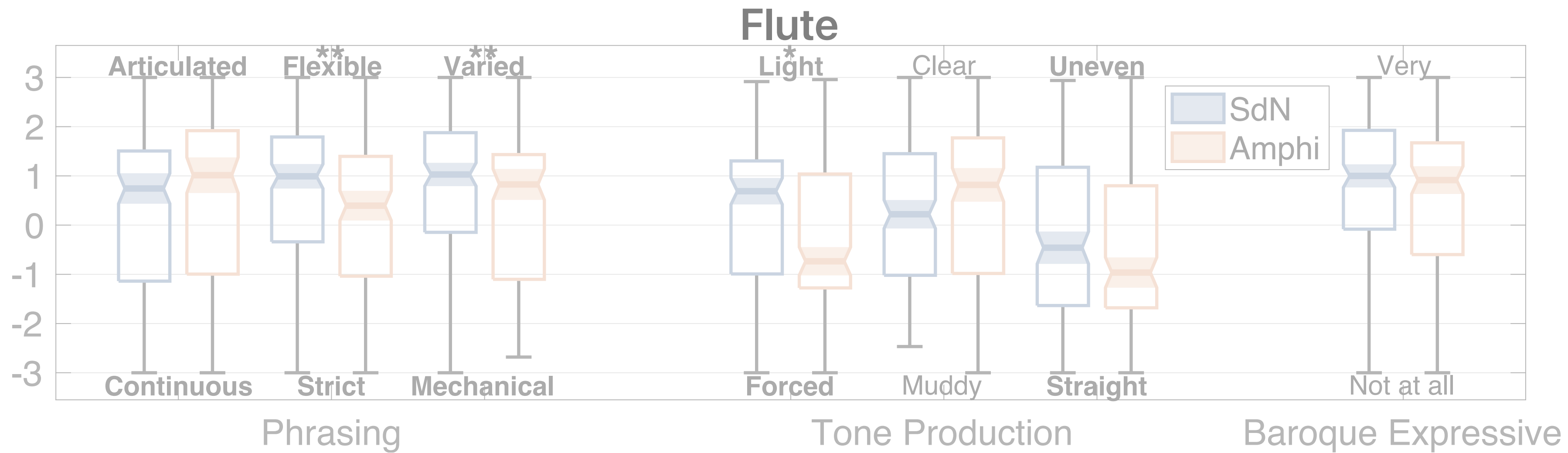
[2] E. Schubert and D. Fabian, "A taxonomy of listeners' judgments of expressiveness in music performance," in *Expressiveness in music performance: Empirical approaches across styles and cultures*, D. Fabian, R. Timmers, and E. Schubert, Eds. Oxford University Press, 2014, pp. 283–303.

[3] E. Schubert and D. Fabian, "The dimensions of baroque music performance: a semantic differential study," *Psychology of Music*, vol. 34, no. 4, pp. 573–587, Oct. 2006.

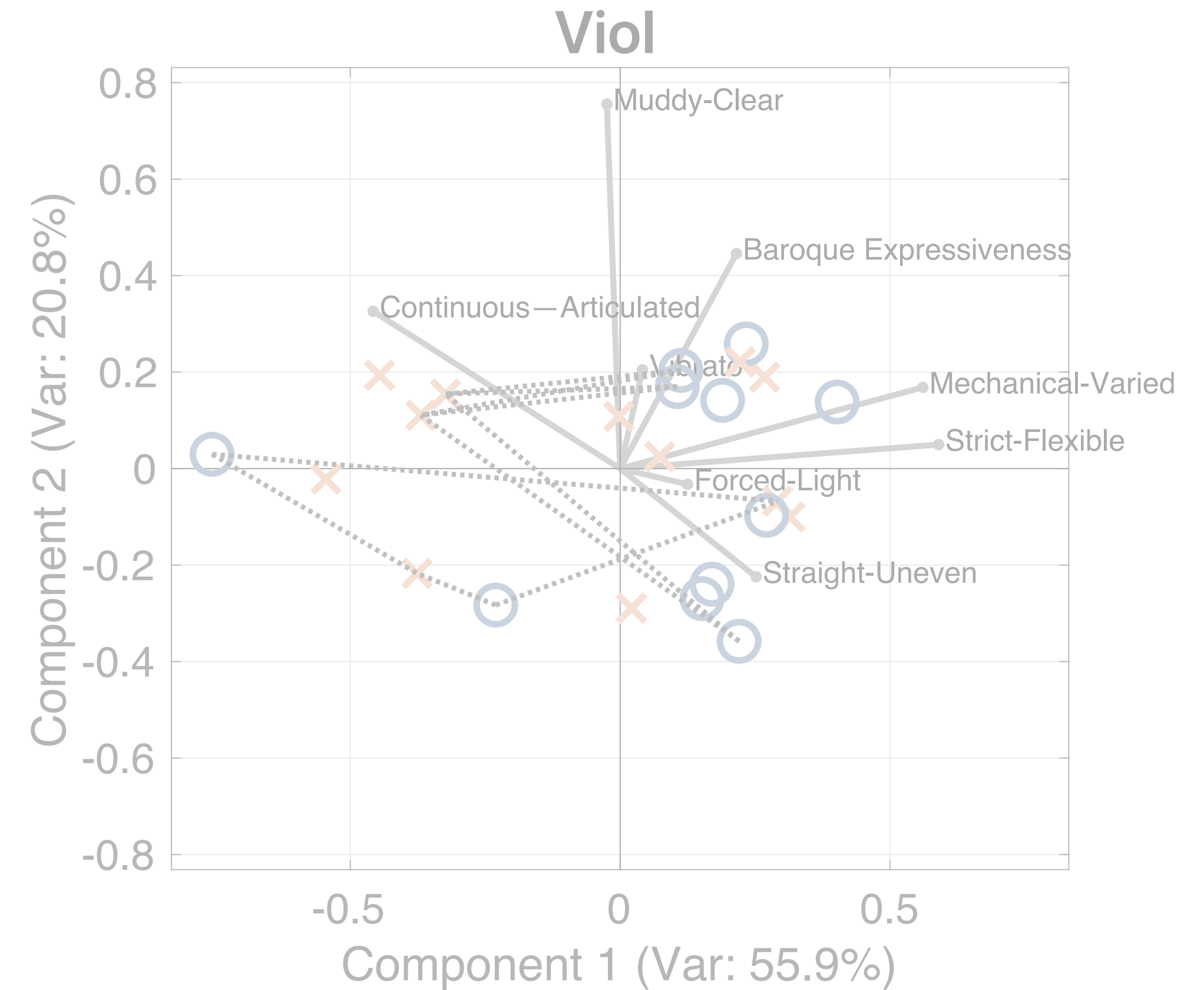
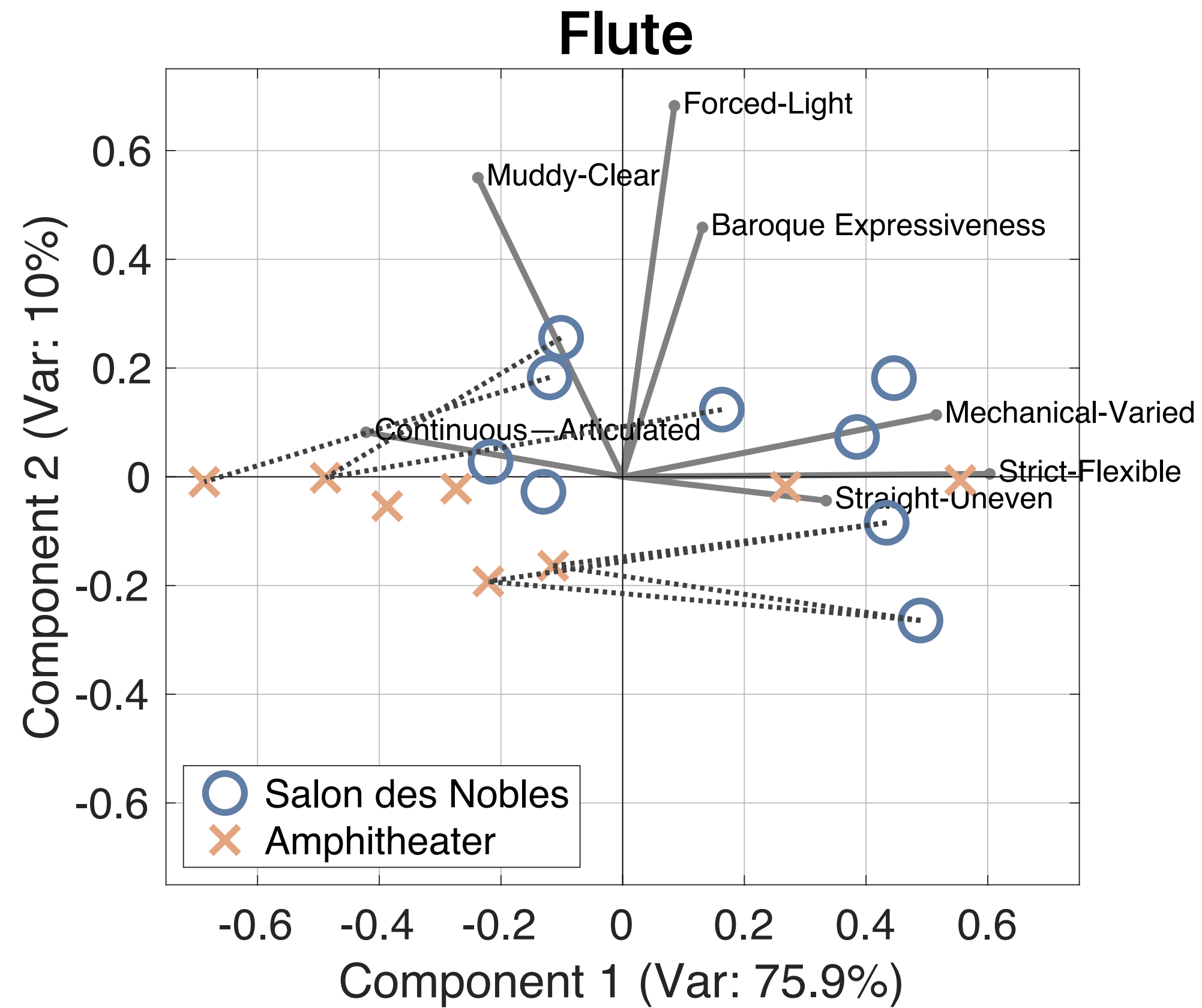
Results - Box plots



Results - Box plots



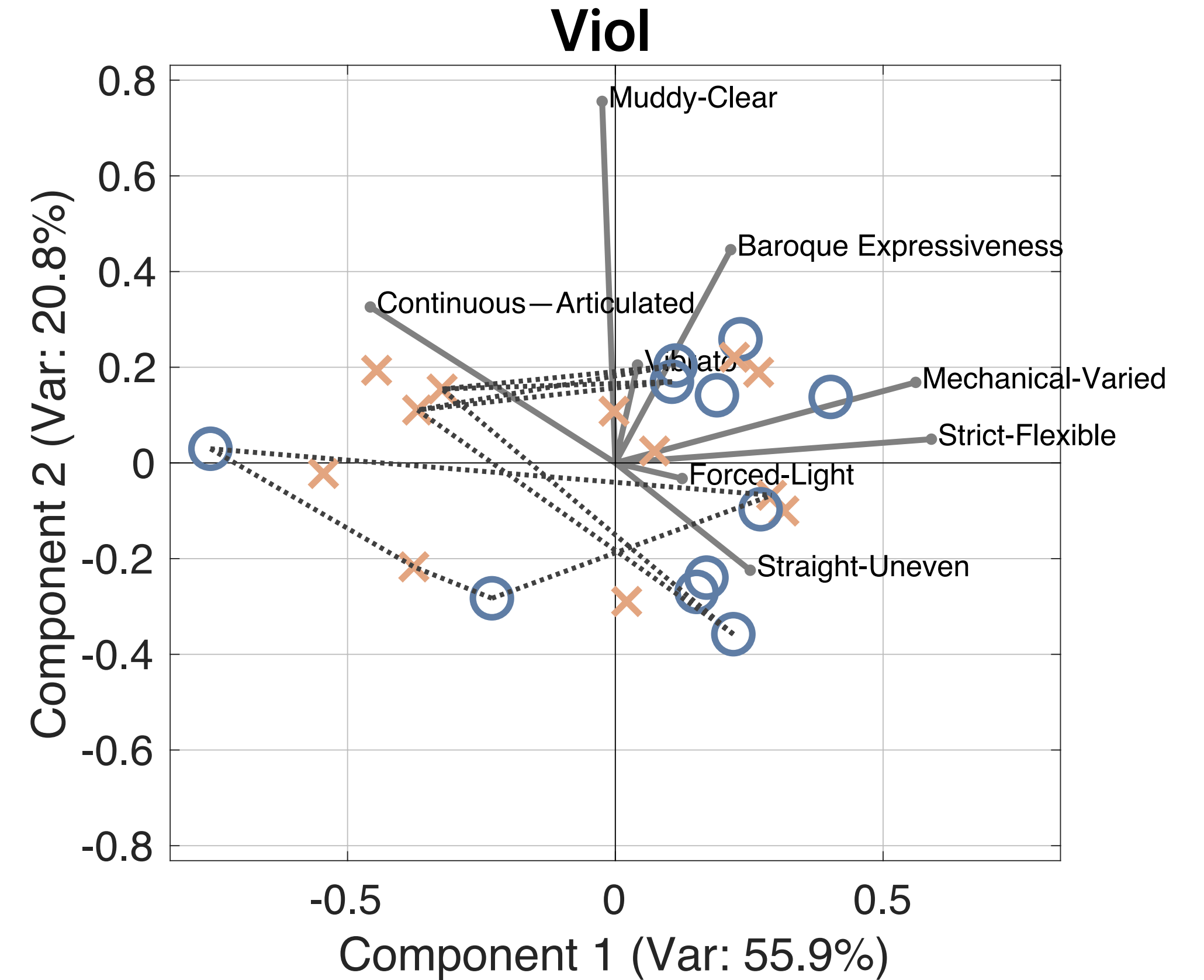
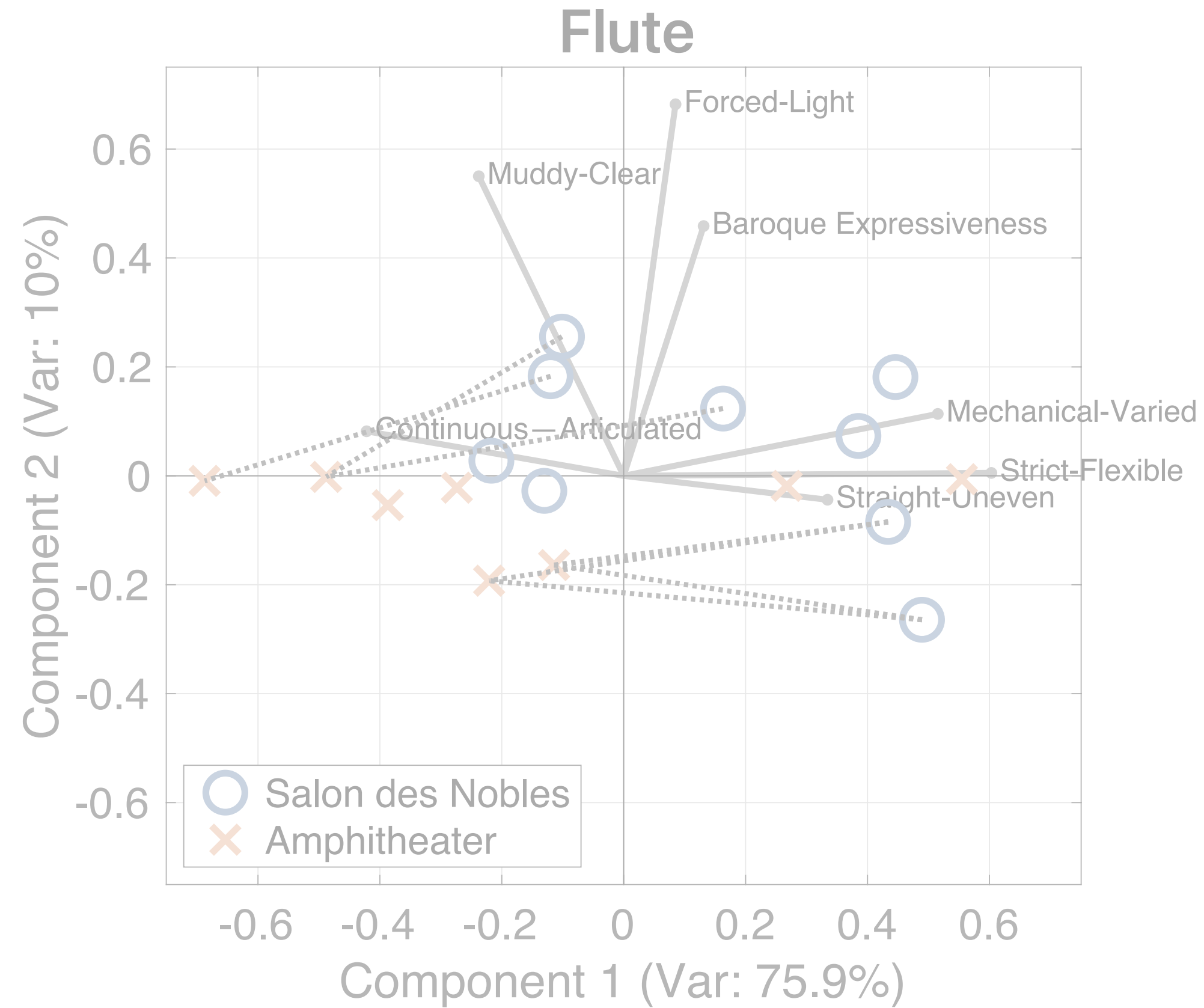
Results - PCA and correlations



	Phrasing	Tone	B.E.	PC 1	PC 2
Phrasing	0.60	0.05	-0.04	0.55	-0.27
Tone	-0.02	0.78**	0.06	0.28	0.56

	Phrasing	Tone	B.E.	PC 1	PC 2
Phrasing	0.18	0.42	0.23	0.28	0.19
Tone	0.54*	0.34	0.21	0.43	0.09

Results - PCA and correlations



	Phrasing	Tone	B.E.	PC 1	PC 2
Phrasing	0.60	0.05	-0.04	0.55	-0.27
Tone	-0.02	0.78**	0.06	0.28	0.56

	Phrasing	Tone	B.E.	PC 1	PC 2
Phrasing	0.18	0.42	0.23	0.28	0.19
Tone	0.54*	0.34	0.21	0.43	0.09

Conclusion

Conclusion

- Differences in playing as function of room

Conclusion

- Differences in playing as function of room
 - Reported by musicians

Conclusion

- Differences in playing as function of room
 - Reported by musicians
 - Measured in objective data

Conclusion

- Differences in playing as function of room
 - Reported by musicians
 - Measured in objective data
 - Audible to listeners

Conclusion

- Differences in playing as function of room
 - Reported by musicians
 - Measured in objective data
 - Audible to listeners
- However, these differences are not always in agreement

Conclusion

- Differences in playing as function of room
 - Reported by musicians
 - Measured in objective data
 - Audible to listeners
- However, these differences are not always in agreement
- Furthermore, findings were not consistent across instruments