





# INTRODUCTION

- Memory for a tonal structure is limited to 11-20 seconds after modulation<sup>1, 2</sup>
- However, previous research used homophonic musical stimuli, which are rarely experienced in the real world
- **Question:** Do surface features—like melody or rhythm—influence memory for nonadjacent keys?
- Nonadjacent key relationships:



Figure 1. Configuration of stimulus with examples.

# EXPERIMENT 1

- **Figuration**: presence of melodic/rhythmic figuration
- Activity: number of notes present
- **Sequence**: cycle of fifths or non-C5
- Surface-feature consistency: same vs. different





Figure 2. Sample stimuli illustrating difference between factors.

Task: rate (sliding 1-7 scale) the goodness of completion of the target (probe cadence)

# Musical surface features and memory for nonadjacent keys

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# EXPERIMENT 2

Duration: Intervening section lasted 6, 12, 18, 24, 30, or 36 sec Nonadjacent key relationship: same vs different



Figure 3. Nonadjacent key relationships same vs different.



### RESULTS: Exp 1

**Figuration** ( $F_{1, 43} = 11.84$ , p < 0.005,  $\omega^2 = 0.003$ ) Activity ( $F_{1, 43} = 19.81$ , p < 0.005,  $\omega^2 = 0.004$ ) **Sequence** ( $F_{1,43} = 2.76$ , p = 0.096)



Figure 5. Average rating of conditions manipulating surface features and their consistency.

### NAKR: Different

D Maior

### **SF Consistency** ( $F_{1,43} = 133.98$ , p < 0.005, $\omega^2 = 0.029$ )





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### DISCUSSION

The addition of surface features and consistency significantly increased stimulus memorability

However, memorability decreases over time

Limitation: the exact time limit for memory of a key in the presence of surface features is yet unknown; replication with higher *n* is necessary.

# REFERENCES

Farbood, M. (2016). Memory of a tonal center after modulation. *Music Perception*,

Woolhouse, M., Cross, I., & Horton, T. (2016). Perception of nonadjacent tonic-key relationships. *Psychology of Music, 44*(4), 802-815.

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# What is a nonadjacent key relationship?



### Nonadjacent (to target)

C Major "I went to the shop..."

### Intervening

E Major "...which was downtown..."

### Probe (target)

C Major "...to buy some sugar."



# Experiment 1

- •Figuration: presence of melodic/rhythmic figuration
- •Activity: number of notes present
- •Sequence: cycle of fifths or non-C5
- •Surface-feature consistency: same vs. different



C:V















# NAKR: Same

# C Major

- G Major



# NAKR: Different

# **D** Major

# G Major **C** Major

		Comparisor	) (
Average Rating	4.8		
	4.6		
	4.4		
	4.2		
	4		
	3.8		
	3.6		
	3.4		
	//		
	0		
		FOAO-FOA	D

**No Features** 



# Experiment 1: Results

Same Diff -Linear (Same) -Linear (Diff)

0.8 Ratings 0.6 ompletion 0.4 0.2 ess O Boodne Normalized Goodne -0.4

-0.6

# Experiment 2: Results





# **Intervening Key Duration**

Intervening Key Length (sec)









# Experiment 2: Stimuli

# Intervening key duration: 36 sec

