



# An Experimental Approach to Multimodality

Investigating the Interactions between Musical  
and Architectural Styles in Aesthetic Perception

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# Overview

1. Results of a study series on intermodal interactions between styles
2. Relevance for multimodality research
3. Style in multimodal artefacts

# Cross-modal interactions

- IUAV Venice (arts and design university)
- Cognitive psychology group
- Experimental aesthetics
- Part of a larger project on the Experimental aesthetics of style

# Experimental approach to style

## *Assumptions*

- Style: exists in various areas of culture and society
- Style as binding link between modes in multimodal texts

## *Operationalization*

- Style perception can be measured via ratings on semantic scales
- Perceptual dimensions of style can be experimentally manipulated

## *Current limitations*

- Not multimodal texts, but combinations of stimuli in different modes
- BUT: Connection between modes was given via stylistic properties

# Study I: Online study

- Subjects were shown a short video (25 sec.) and asked for ratings on semantic scales.
- On the next page, they were asked if they heard the music. Those who answered „No“ were excluded
- 4 conditions / videos
- n = 626 (501 valid answers)

# Study I

- Four videos:
  - Baroque architecture with baroque music
  - Baroque architecture with modern music
  - Modern architecture with baroque music
  - Modern architecture with modern music

# Study I

- Four videos:
  - Baroque architecture with baroque music
  - Baroque architecture with modern music
  - Modern architecture with baroque music
  - Modern architecture with modern music



= intermodally coherent



= intermodally incoherent

# Study I: Online study

Ratings of the architecture were elicited; music was not mentioned.






“Do you like the style of the buildings in the video?”

*not at all* — *very much*

“Please judge the style of the buildings on the following dimensions:”

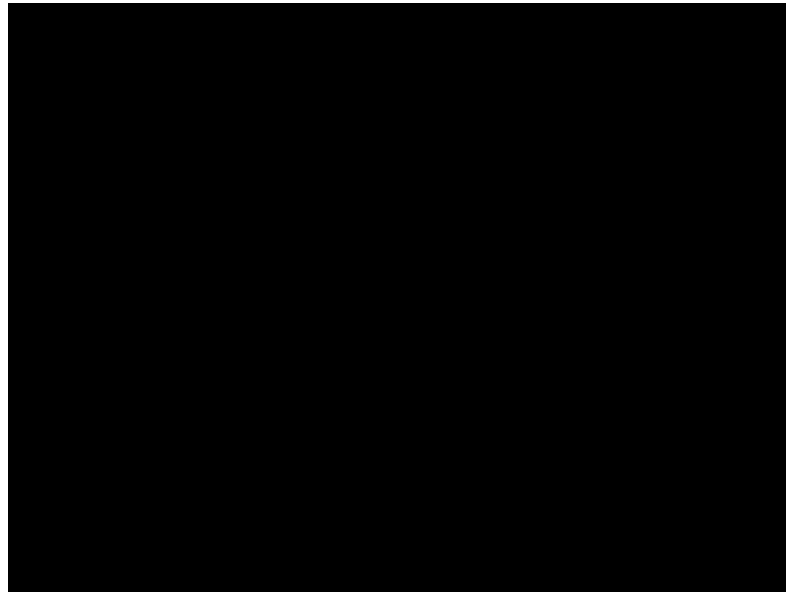
<i>introverted</i>	—	<i>extraverted</i>
<i>unbalanced</i>	—	<i>balanced</i>
<i>bright</i>	—	<i>dark</i>
<i>incoherent</i>	—	<i>coherent</i>
<i>grave</i>	—	<i>agitated</i>
<i>modest</i>	—	<i>bold</i>
<i>reason</i>	—	<i>feeling</i>
<i>complete</i>	—	<i>incomplete</i>



STYLE	STIMULUS	BUILDING, ARCHITECT	IMAGE URL, COPYRIGHT HOLDER, LICENSE, LICENSE URL
BAROQUE	A1	 <p>San Carlo alle Quattro Fontane, Rome, Italy <i>Francesco Borromini</i></p>	<p><a href="http://commons.wikimedia.org/wiki/File:SCarloQuattroFontaneRome2.jpg">http://commons.wikimedia.org/wiki/File:SCarloQuattroFontaneRome2.jpg</a> © Welleschik Creative Commons CC BY-SA 3.0 <a href="http://creativecommons.org/licenses/by-sa/3.0/">http://creativecommons.org/licenses/by-sa/3.0/</a></p>
	A2	 <p>Einsiedeln Abbey, Einsiedeln, Switzerland <i>Caspar Moosbrugger</i></p>	<p><a href="http://commons.wikimedia.org/wiki/File:Kloster_Einsiedeln_Frontansicht.jpg">http://commons.wikimedia.org/wiki/File:Kloster_Einsiedeln_Frontansicht.jpg</a> © Hofec Creative Commons CC BY-SA 3.0 <a href="http://creativecommons.org/licenses/by-sa/3.0/">http://creativecommons.org/licenses/by-sa/3.0/</a></p>
	A3	 <p>Palais du Luxembourg, Paris, France <i>Salomon de Brosse, Alphonse de Gisors, et al.</i></p>	<p><a href="http://commons.wikimedia.org/wiki/File:Palais_Luxembourg_Sunset_Edit.JPG">http://commons.wikimedia.org/wiki/File:Palais_Luxembourg_Sunset_Edit.JPG</a> © Benh Lieu Song, modified by Sanchezn Creative Commons CC BY-SA 3.0 <a href="http://creativecommons.org/licenses/by-sa/3.0/">http://creativecommons.org/licenses/by-sa/3.0/</a></p>
	A4	 <p>Theatinerkirche, Munich, Germany <i>Agostino Barelli, Enrico Zuccalli</i></p>	<p><a href="http://commons.wikimedia.org/wiki/File:München_Theatinerkirche_a.jpg">http://commons.wikimedia.org/wiki/File:München_Theatinerkirche_a.jpg</a> © Uwe Barghaan Creative Commons CC BY-SA 2.5 <a href="http://creativecommons.org/licenses/by/3.0/">http://creativecommons.org/licenses/by/3.0/</a></p>
	A5	 <p>Stift Melk, Melk, Austria <i>Jakob Prandtauer</i></p>	<p><a href="http://de.wikipedia.org/wiki/Datei:Stift_Melk_001.jpg">http://de.wikipedia.org/wiki/Datei:Stift_Melk_001.jpg</a> © User:Fb78 (commons.wikimedia.org) Creative Commons CC BY-SA 2.0 DE <a href="http://creativecommons.org/licenses/by-nc-nd/2.0">http://creativecommons.org/licenses/by-nc-nd/2.0</a></p>
	M1	<p><i>Georg Philipp Telemann, Concerto grosso in D major, TWV 54:D3 (1716)</i></p>	<p>1. Intrada – Grave <i>Trevor Pinnock / The English Concert</i> (0:00 to 1:12)</p> <p><a href="http://www.youtube.com/watch?v=uZ80V-YWEnc">http://www.youtube.com/watch?v=uZ80V-YWEnc</a> © Deutsche Grammophon. All rights reserved</p>

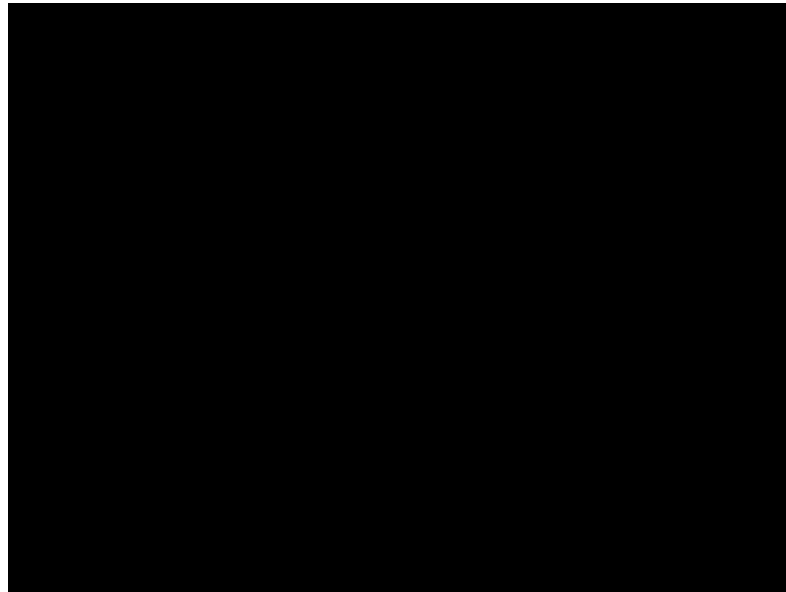
MODERN	A6		SAS Royal Hotel, Copenhagen, Denmark <i>Arne Jacobsen</i>	<a href="http://commons.wikimedia.org/wiki/File:SAS_Royal_Hotel,_Copenhagen,_1955-1960.jpg">http://commons.wikimedia.org/wiki/File:SAS_Royal_Hotel,_Copenhagen,_1955-1960.jpg</a> © seier+seier Creative Commons CC BY 2.0 <a href="http://creativecommons.org/licenses/by/2.0/">http://creativecommons.org/licenses/by/2.0/</a>
	A7		Aalto-Hochhaus, Bremen, Germany <i>Alvar Aalto</i>	<a href="http://commons.wikimedia.org/wiki/File:AaltoVahr-01.jpg">http://commons.wikimedia.org/wiki/File:AaltoVahr-01.jpg</a> © Jürgen Howaldt Creative Commons CC BY-SA 2.0 DE <a href="http://creativecommons.org/licenses/by-sa/2.0/de/">http://creativecommons.org/licenses/by-sa/2.0/de/</a>
	A8		Wohnstadt Carl Legien, Berlin, Germany <i>Bruno Taut</i>	<a href="http://commons.wikimedia.org/wiki/File:Berlin_C_Legien_Trachtenbrodtstr_26.jpg">http://commons.wikimedia.org/wiki/File:Berlin_C_Legien_Trachtenbrodtstr_26.jpg</a> © Doris Antony Creative Commons CC BY-SA 3.0 <a href="http://creativecommons.org/licenses/by-sa/3.0/">http://creativecommons.org/licenses/by-sa/3.0/</a>
	A9		Georgia Pacific Building, Atlanta, Georgia, USA <i>Skidmore, Owings &amp; Merrill</i>	<a href="http://commons.wikimedia.org/wiki/File:Georgia_pacific_building_atlanta_01.jpg">http://commons.wikimedia.org/wiki/File:Georgia_pacific_building_atlanta_01.jpg</a> © Ashley Moore Creative Commons CC BY-SA 3.0 <a href="http://creativecommons.org/licenses/by-sa/3.0/">http://creativecommons.org/licenses/by-sa/3.0/</a>
	A10		Neue Nationalgalerie, Berlin, Germany <i>Ludwig Mies van der Rohe</i>	<a href="http://commons.wikimedia.org/wiki/File:Neue_Nationalgalerie_Berlin.jpg">http://commons.wikimedia.org/wiki/File:Neue_Nationalgalerie_Berlin.jpg</a> © Manfred Brückels Creative Commons CC BY-SA 3.0 <a href="http://creativecommons.org/licenses/by-sa/3.0/">http://creativecommons.org/licenses/by-sa/3.0/</a>
	M2	Soundtrack to the film <i>Koyaanisqatsi</i>	03. Cloudscape <i>Philip Glass</i> (0:00 to 1:12)	<a href="http://www.youtube.com/watch?v=5SUpWrSValg">http://www.youtube.com/watch?v=5SUpWrSValg</a> © Philip Glass. All rights reserved

Baroque architecture, baroque music



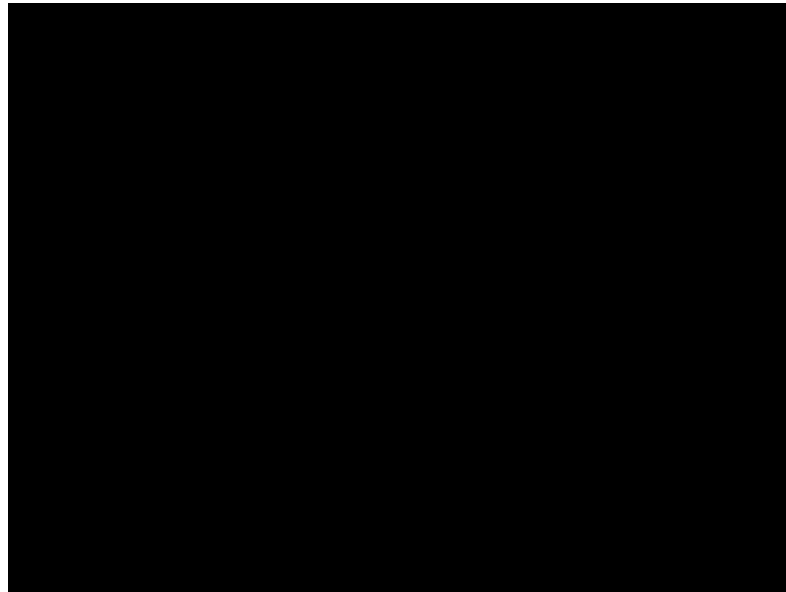
Intermodally coherent

Modern architecture, baroque music



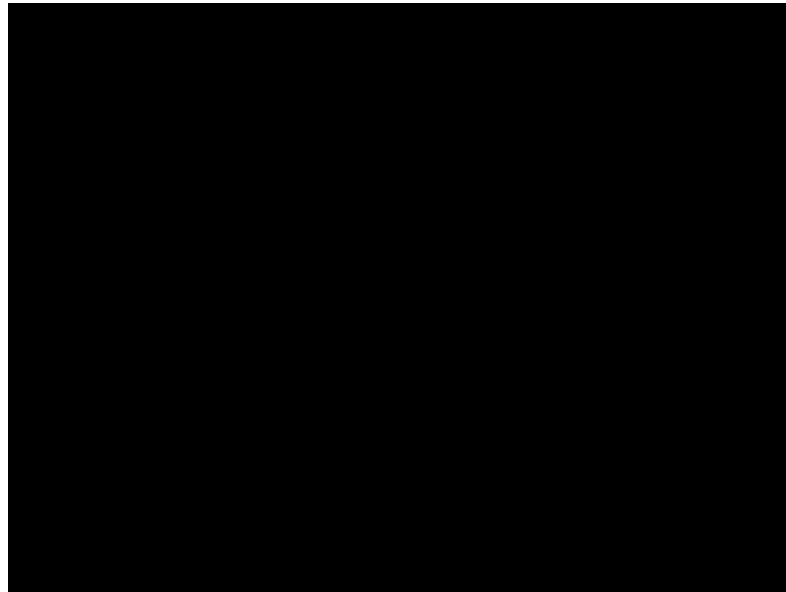
Intermodally incoherent

Baroque architecture, modern music



Intermodally incoherent

Modern architecture, modern music



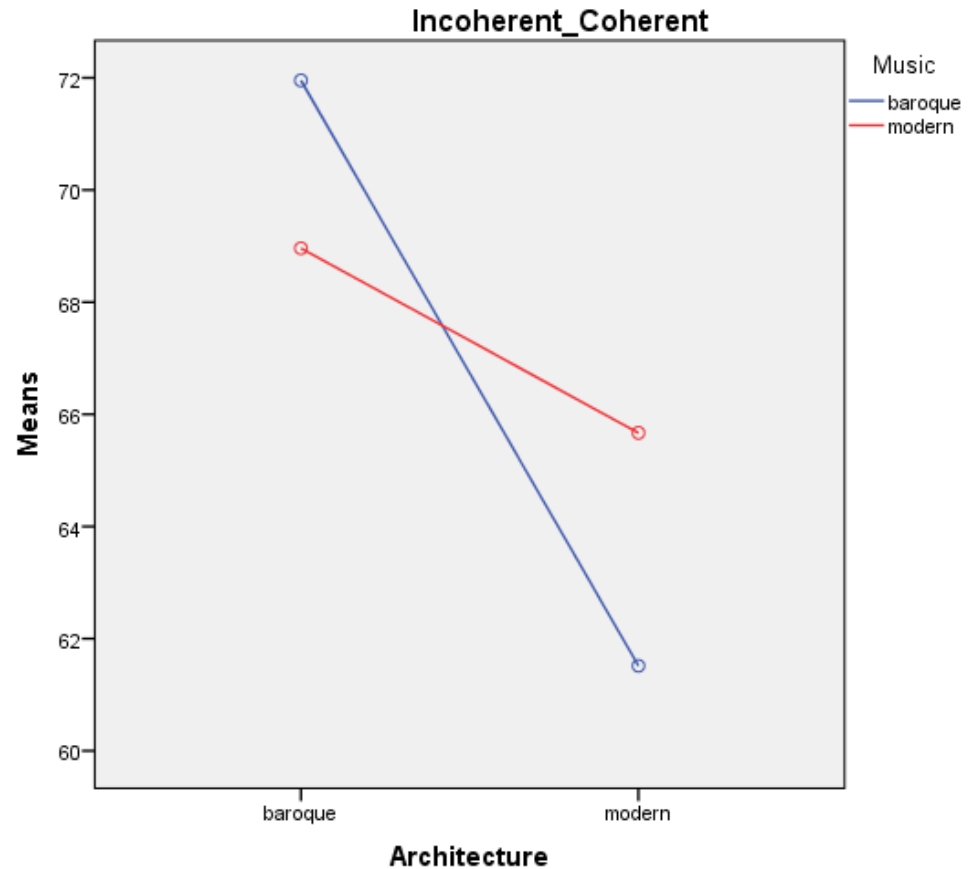
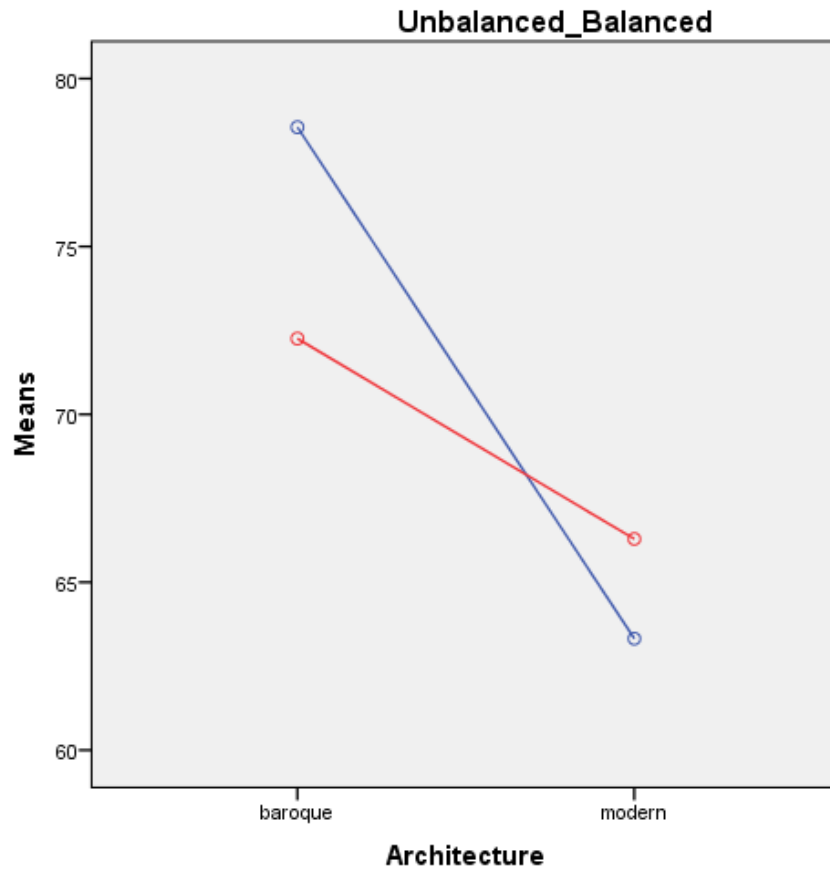
Intermodally coherent

# Stylistic interactions

- Sliders movable by mouse (values from 0 to 101; preset to 50)
- For 8 from 9 scales: effect for “architecture”
  - > the arch. styles were differently evaluated on all scales (except “grave – agitated”)
- No main effect for “music”
  - > music did not influence the ratings (which were, after all, given for the architecture)
- BUT: two of the nine scales showed interaction effects

# Study I: 2×2 ANOVA (architecture × music)

*baroque music: blue, modern music: red*





# Study II

“Do you like the style of the buildings in the video?”

*not at all* — *very much*

“Please judge the style on the following dimensions:”

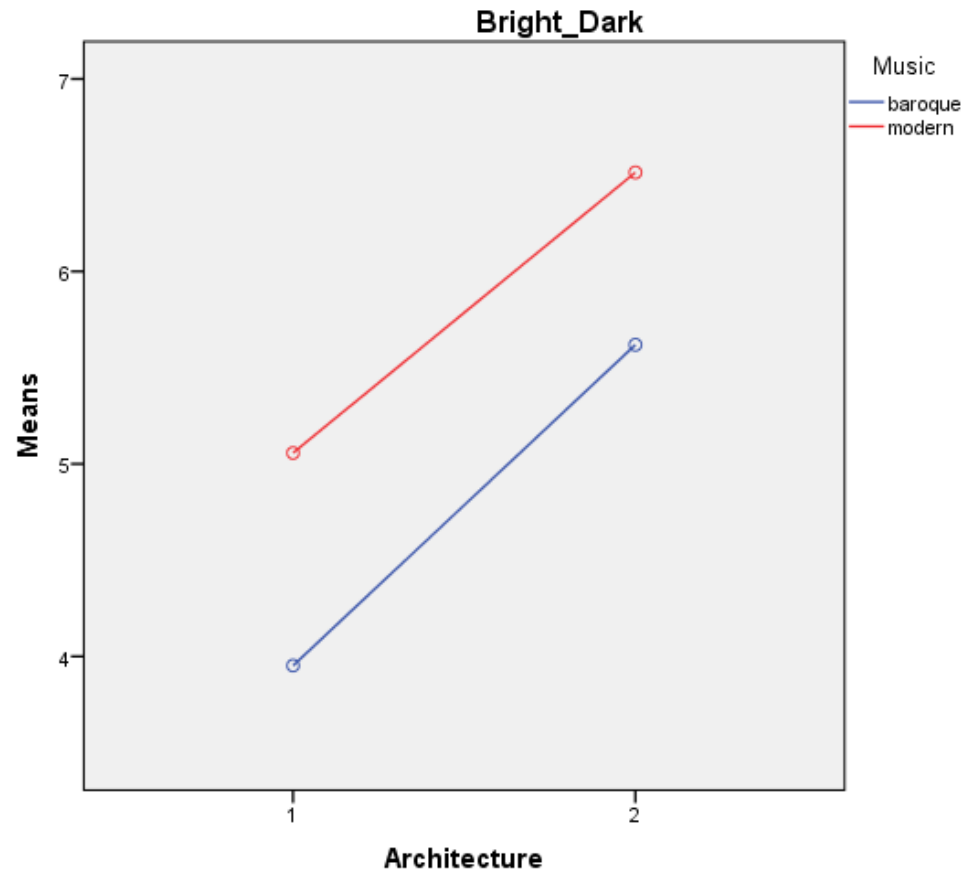
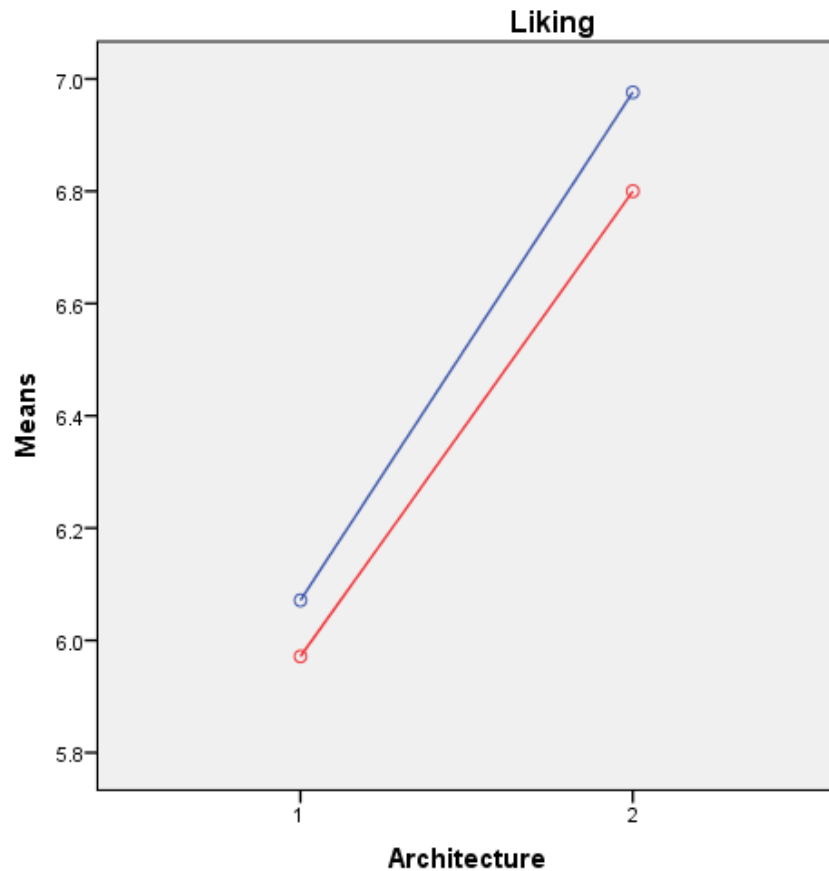
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<i>modest</i>	—	<i>bold</i>
<i>reason</i>	—	<i>feeling</i>
<i>complete</i>	—	<i>incomplete</i>

# Study II:

- Participants: 75 students from a design and arts faculty in Italy
- Same stimuli
- Same scales (with added Italian translations)
- Each participant judged both architectural styles (in randomized order)
  - “architecture” within-subjects factor
  - statistical advantages (individual differences factored out) but: carry-over effects (from first to second video) possible

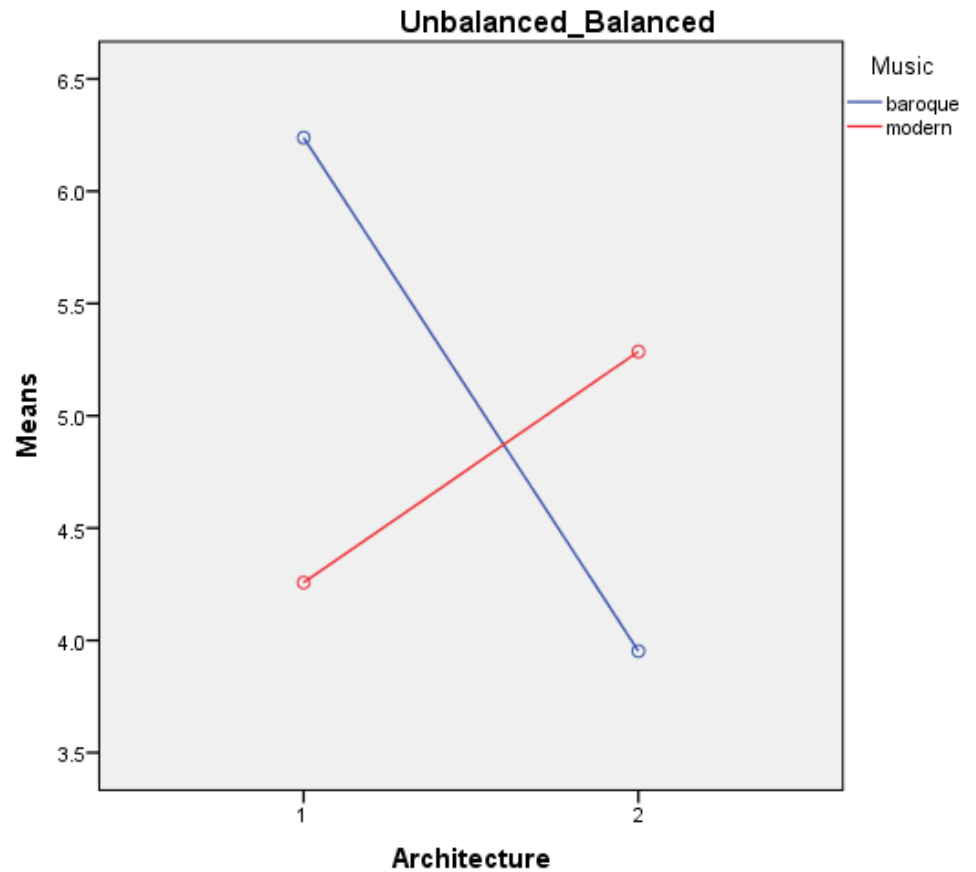
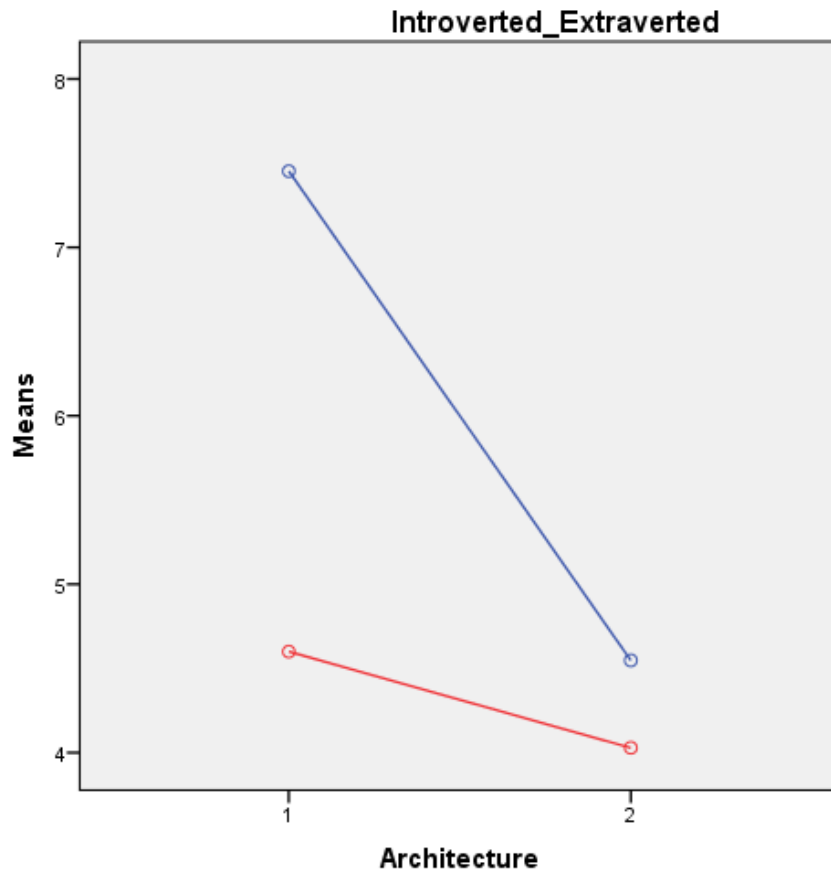
# Study II: 2×2 ANOVA (architecture × music)

*baroque music: blue, modern music: red*



# Study II: 2×2 ANOVA (architecture × music)

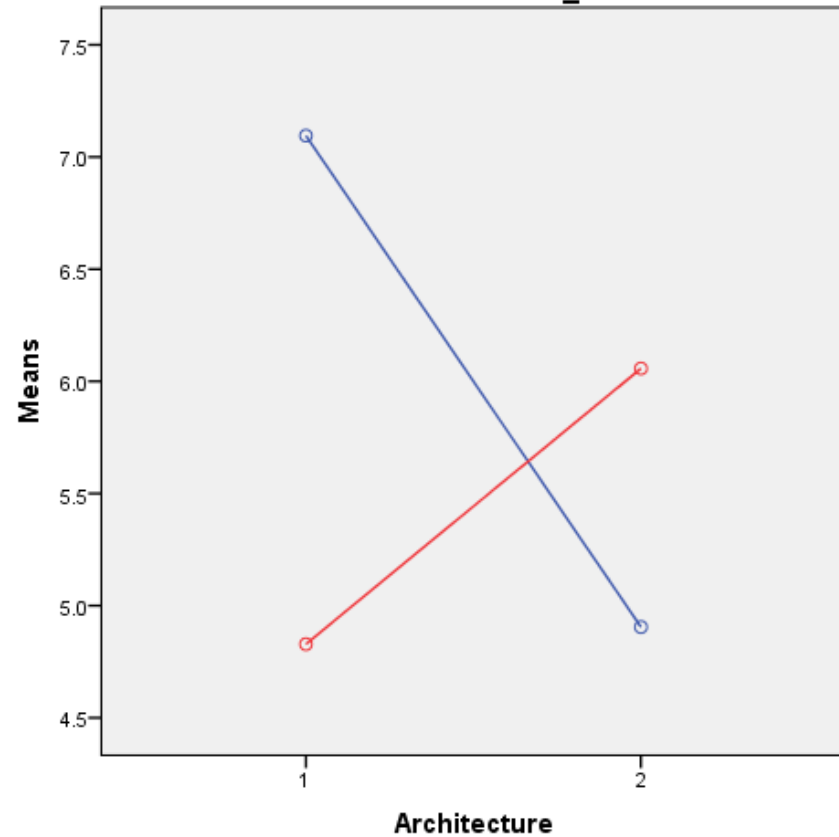
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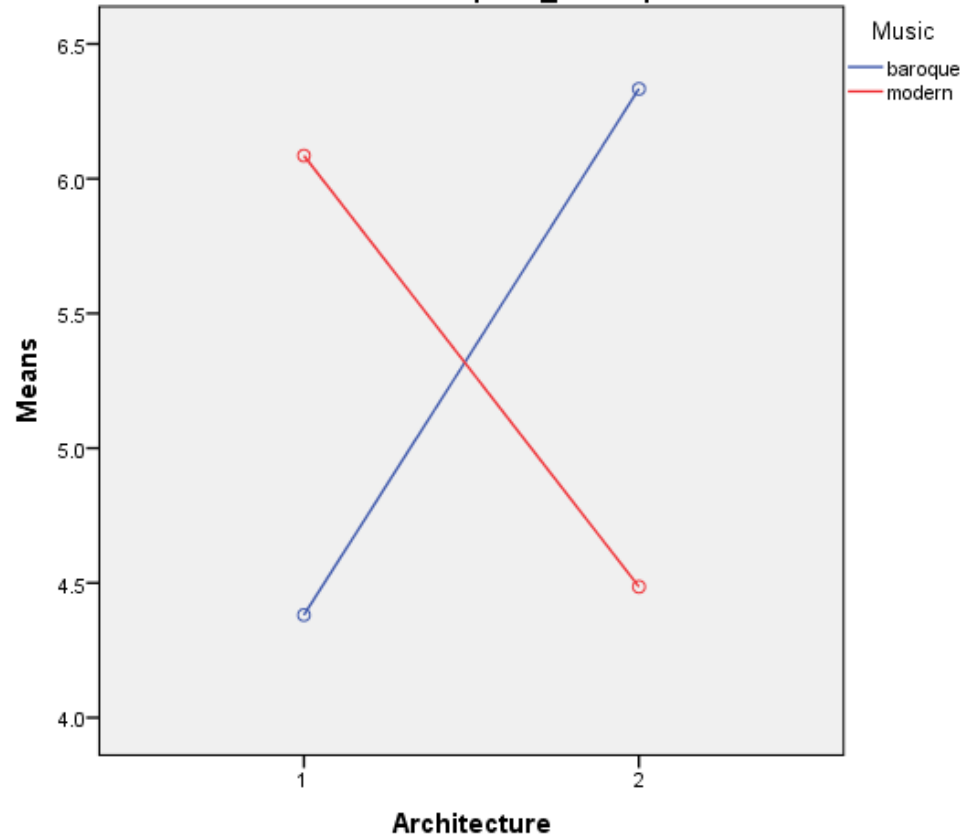
# Study II: 2×2 ANOVA (architecture × music)

*baroque music: blue, modern music: red*

Incoherent\_Coherent



Complete\_Incomplete



# Study I

	Architecture	Music	Architecture × Music
aesthetic preference / liking	baroque: preferred		
introverted – extraverted	baroque: extraverted		
unbalanced – balanced	baroque: balanced		intermodal similarity: balanced
bright – dark	modern: dark		
incoherent – coherent	baroque: coherent		intermodal similarity: coherent
grave – agitated			
modest – bold	baroque: bold		
reason – feeling	baroque: feeling		
complete – incomplete	modern: incomplete		

# Study II

	Architecture	Music	Architecture × Music
aesthetic preference / liking	modern: preferred		
introverted – extraverted	baroque: extraverted	baroque: extraverted	intermodal similarity: extraverted
unbalanced – balanced			intermodal similarity: balanced
bright – dark	modern: dark	modern: dark	
incoherent – coherent			intermodal similarity: coherent
grave – agitated			intermodal similarity: agitated
modest – bold	baroque: bold		intermodal similarity: bold
reason – feeling	baroque: feeling		
complete – incomplete			intermodal similarity: complete

# Study I + II

	Architecture	Music	Architecture × Music
aesthetic preference / liking			
introverted – extraverted	baroque: extraverted		
unbalanced – balanced			intermodal similarity: balanced
bright – dark	modern: dark		
incoherent – coherent			intermodal similarity: coherent
grave – agitated			
modest – bold	baroque: bold		
reason – feeling	baroque: feeling		
complete – incomplete			(?)



# Results for style research

- Some scales are reliably connected with styles
- Proves the existence of relations between styles similarly categorized across modalities
- Intermodal categorization terms such as “baroque” and “modern” seem not to be arbitrary

# Results for Multimodality Research

- Stylistic influences across perceptual and semiotic modalities proven
- Cognitive aspects: perception and judgment of style does not function separately in mode combinations
- We expected an influence of the music for scales which are easily applied to music
  - > Results are ambiguous
- However, some scales are unconsciously used to evaluate the relation between modalities (contrary to the task setting)
- In conventional experiment setting, as well as in (uncontrolled) online study
  - > Probably automatic and unconscious task

# Limitations

- Results only for a carry-over task
- Interactions between other layers  
(form, content, discourse)

# Location in multimodality research

(tentative)

Sign processes combining modes



Multimodal  
text

Non-textual  
combinations

# Textual layer model

(simplified ...)

## Textual layers



```
graph TD; TL[Textual layers] --- F[Form]; TL --- C[Content]; TL --- D[Discourse]; TL --- S[Style];
```

### Form

- Segmentability
- Spatial relations
- Time relations
- Combination rules

### Content

- Discourse referents
- Propositions
- Inferences

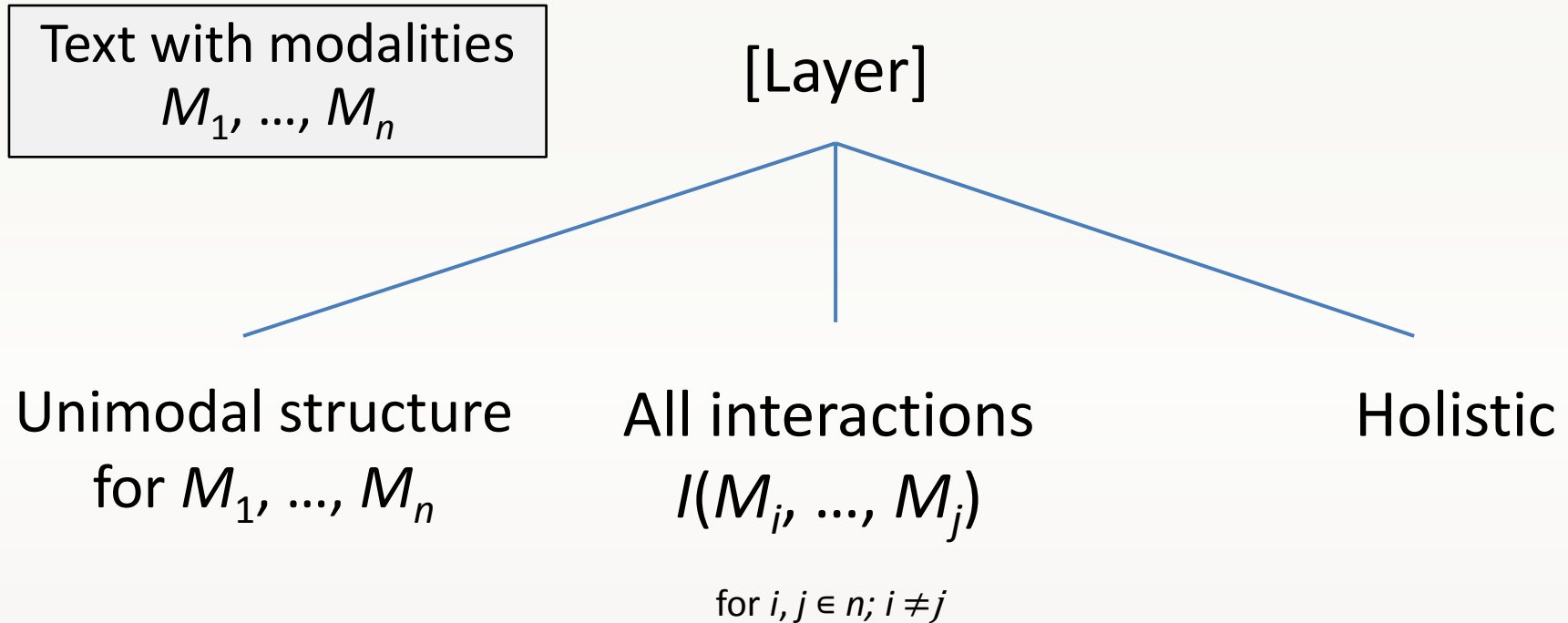
### Discourse

- Rhetorical structure
- Narrativity
- Intertextuality
- Context and function

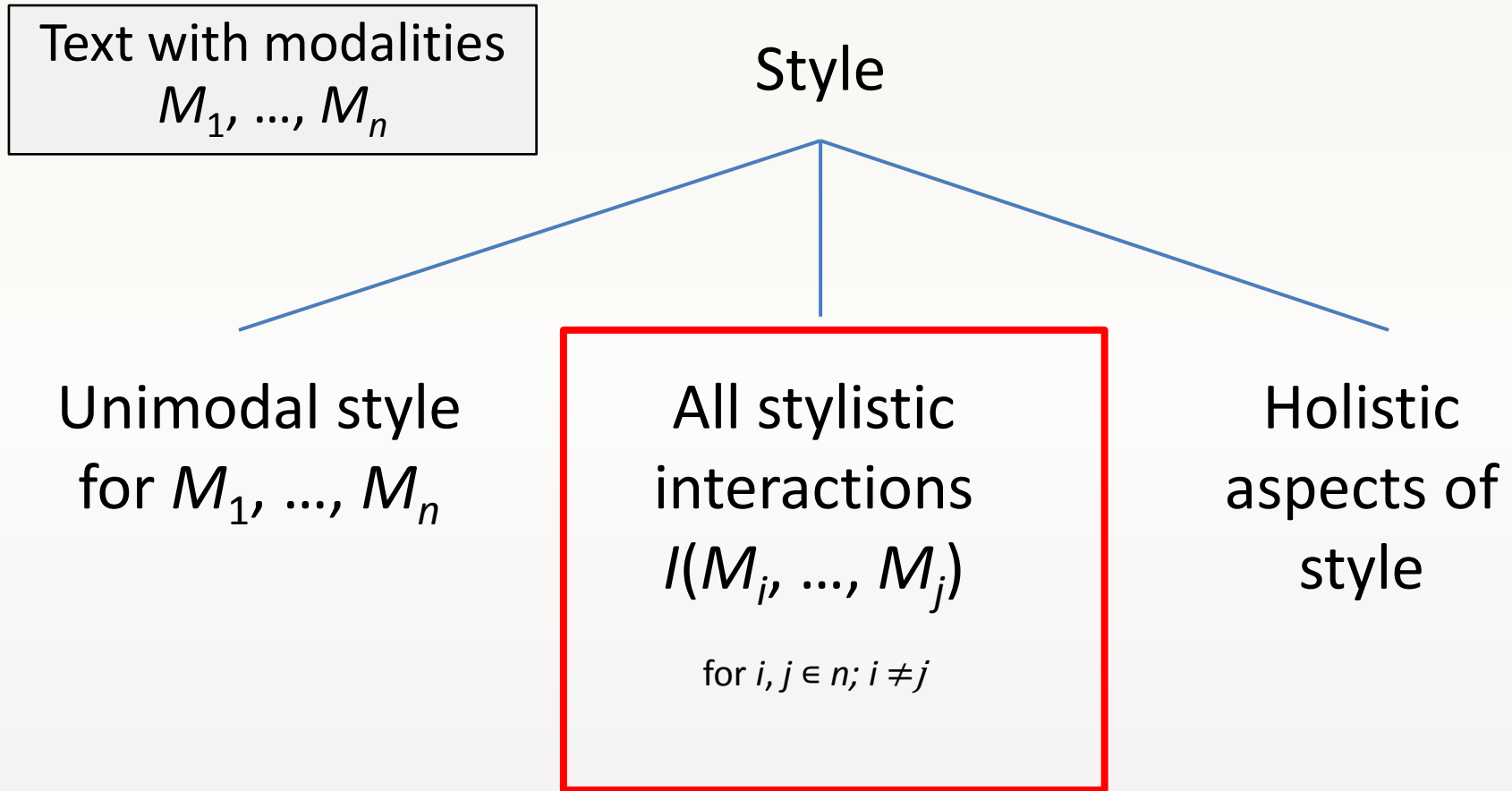
### Style

- Choice-related aspects
- Connect artefacts with different function / content

# Layers in multimodal texts



# Style in multimodal texts



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