Signification in Auditory Display: When are two perceptualizations equivalent, and who cares?

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## Emerson’s language grid

<table>
<thead>
<tr>
<th></th>
<th>I: Aural discourse dominant</th>
<th>II: Combination of aural and mimetic discourse</th>
<th>III: Mimetic discourse dominant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract syntax</td>
<td>1</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Combination of abstract and abstracted syntax</td>
<td>2</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Abstracted syntax</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>


Mimetic sonifications

Abstract syntax

Combination of abstract and abstracted syntax

Abstracted syntax

Earcons, melodic sonifications

Musical + 'Direct'

'Direct' sound mappings

Mimetic sonifications. Indexicality is least in the abstract syntax work and highest in the abstracted syntaxes

Sonification as representational discourse

Abstract syntax

Combination of abstract and abstracted syntax

Abstracted syntax

Earcons, melodic sonifications, arbitrary sonic mappings

Musical + 'Direct' or hybrid approaches (e.g., auditory icons)

'Direct' sound mappings

Representational discourse. Indexicality is least in the abstract syntax work and highest in the abstracted syntaxes

Les quatre écoutes: the acousmatic reductions

<table>
<thead>
<tr>
<th>Objective</th>
<th>Abstract</th>
<th>Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective</td>
<td>4. Comprendre</td>
<td>1. Écouter</td>
</tr>
<tr>
<td></td>
<td>3. Entendre</td>
<td>2. Oïïr</td>
</tr>
</tbody>
</table>

Schaeffer's quatre écoutes, or four ways of listening.

Direct listening modes?

<table>
<thead>
<tr>
<th></th>
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<th>Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct</strong></td>
<td></td>
<td>8. ?</td>
</tr>
<tr>
<td><strong>Acousmatic</strong></td>
<td>4. Comprendre</td>
<td>1. Écouter</td>
</tr>
<tr>
<td></td>
<td>3. Entendre</td>
<td>2. Ouiir</td>
</tr>
</tbody>
</table>

- **Objective**
- **Subjective**

Musical=\{2,3\}, Everyday= \{1,4,5,8\}
Causal=\{1,5\}, Semantic=\{4,8\}
Direct=\{5,8\}, Acousmatic=\{1,2,3,4\}
Objective=\{1,4,5,8\}, Subjective=\{2,3\}

Modes of listening: Schaeffer, Chion, and Gaver. The direct listening space opens up the possibility of further listening modes mirroring those in the acousmatic space. This table shows the positions of the new modes 5 and 8.

Eight atomic modes of listening.

<table>
<thead>
<tr>
<th>Direct</th>
<th>Abstract</th>
<th>Concrete</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7. DAS</td>
<td>6. DCS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. DAO</td>
<td>5. DCO</td>
<td></td>
</tr>
<tr>
<td>Acousmatic</td>
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<td></td>
<td>Subjective</td>
<td></td>
</tr>
</tbody>
</table>

Les huit écoutes

Perceptualization as a process

Real World

Data collection (purposeful)

Data

EXTERNAL REPRESENTATIONS
Used for meaning making & inference drawing

EVOCATION

Peircean semiotic triangle

Semiotic triad as a commuting triangle

\[ O \xrightarrow{f} R \xrightarrow{g} I \]

\[ O \xrightarrow{g \circ f} R \]

Data \xrightarrow{\text{render}} Representation

\[ \text{understanding} \]

Evocation \xrightarrow{\text{read}}

Visualization as a mathematical category

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Perceptualization: answering questions

Evocation = read \circ render

Questions = answers \circ rules
Who cares?

<table>
<thead>
<tr>
<th>Name</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adams</td>
<td>57%</td>
</tr>
<tr>
<td>Jones</td>
<td>80%</td>
</tr>
<tr>
<td>Smith</td>
<td>63%</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
References


