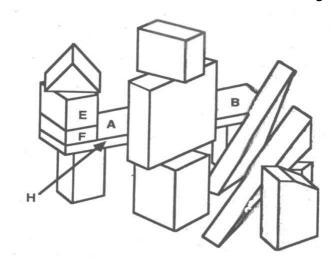
Auditory Scene Analysis

Otherwise known as

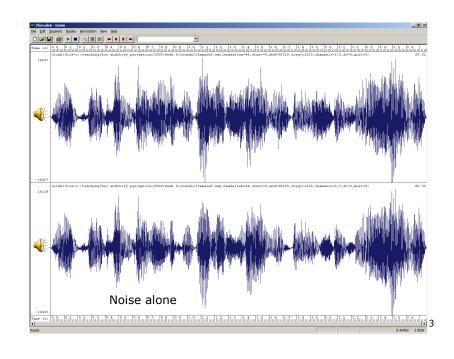
Auditory Grouping
Auditory Streaming
Sound source segregation

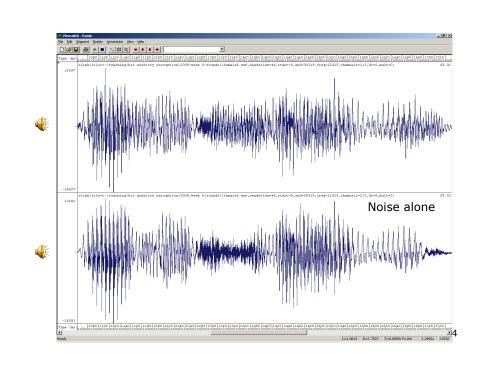
Assigning acoustic/auditory features to distinct objects or sources of sound

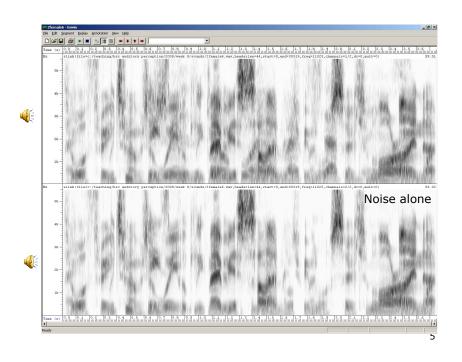
The visual analogue: Assigning visual features to distinct objects

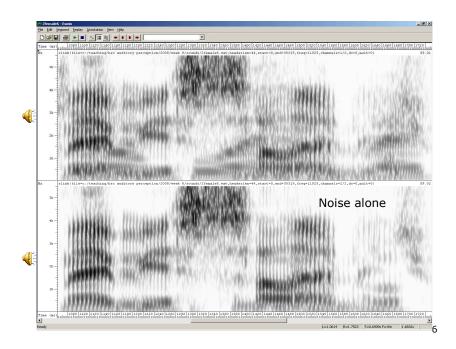


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Visual examples of Gestalt principles



Law of Pragnanz:

Reality is organized or reduced to the simplest form possible.

For example, we see the image above as a series of circles rather than as many much more complicated shapes.

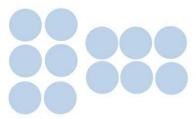


Law of Similarity:

Items that are similar tend to be grouped together.

In the image above, most people see vertical columns of circles and squares.

Visual examples of Gestalt principles



Law of Proximity:

Objects near each other tend to be grouped together.

The circles on the left appear to be grouped in vertical columns, while those on the right appear to be grouped in horizontal rows.





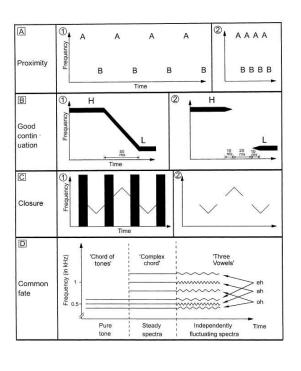
Law of Closure:

Objects grouped together are seen as a whole.

We tend to ignore gaps and complete contour lines. In the image above, there are no triangles or circles, but our minds fill in the missing information to create familiar shapes and images.

http://psychology.about.com/od/sensationandperception/ss/gestaltlaws.htm,

http://psychology.about.com/od/sensationandperception/ss/gestaltlaws.htm_o



Auditory analogues

Purwins et al. (2000)

Sequential segregation

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Auditory streaming

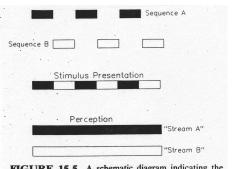
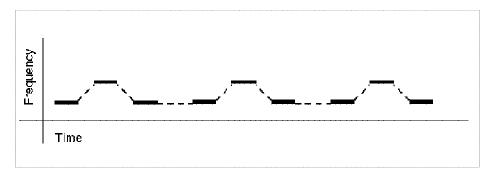


FIGURE 15.5 A schematic diagram indicating the type of procedure used in many streaming experiments. Two alternating sounds (e.g. two different frequencies alternating in time) are presented. Under the appropriate conditions, the listeners do not report hearing a single sound that alternates in pitch, but rather they report hearing two sounds (two streams) each with its own pulsating pitch.

Under some conditions, a single sound source is perceived



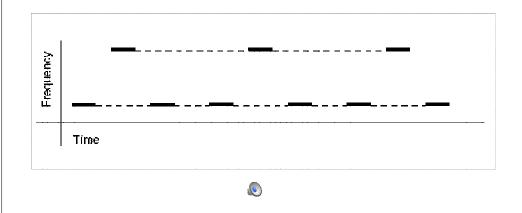


From Yost (1994)

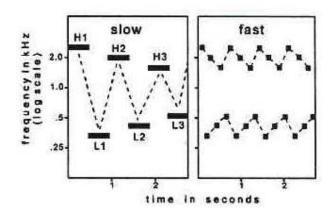
11

12

But sometimes, two sound sources are perceived



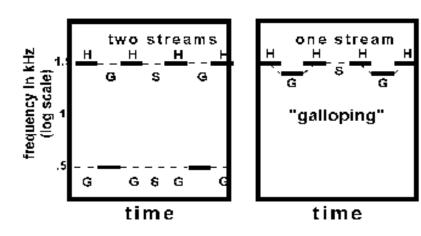
Demo 1:Stream segregation in a cycle of six tones



Is it clear what a stream is?

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Demo 3: Accelerating galloping patterns, with large and small frequency differences



Old-plus-new heuristic

- A method for decomposing mixtures of sounds
- When a spectrum becomes more complex, interpret this as ...
 - a continuing old sound
 - joined by a new one supplying the additional components
- So the interpretation of a particular sound (in terms of assigning sources) will be affected by its temporal context (things that just happened)

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