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## Creating Images for Perception Research

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**Abstract.** Partially deleted line drawings are often used in object recognition studies. In this tutorial, software is demonstrated that allows researchers to manually delete pixels of a line drawing (percent deletion is calculated as the image is fragmented) or to select a random deletion process based on percent deletion. An online database is also described that allows researchers to catalog images for use in other studies.

### Creating Images

Line drawings of objects are commonly used in perception research. For instance, the Snodgrass and Vanderwart's (1980) picture set has been used to create fragmented pictures for object recognition research (e.g., Snodgrass & Corwin, 1988; Snodgrass & Poster, 1992). Similarly, Biederman (1987) used line drawings with vertices and midsegments removed to investigate recognition-by-components theory. Line drawings have also been used in memory research with Alzheimer's patients (Hodges, Salmon & Butters, 1992), visual recognition with visual agnostic patients (Farah, McMullen & Meyer, 1991), and speech production (Hirsh, 1998).

Snodgrass set was created using an algorithm that randomly deleted contour from the line drawings to create fragmented line drawings (e.g., Snodgrass and Corwin, 1988). Biederman (1987), on the other hand, deleted either complete geons, vertices,

or midsegments. Regardless of the approach, it is important to monitor the amount of contour deleted from the line drawing. Contour can be measured manually using a stadiometer. However, contour can also be measured digitally. Specifically, using a black and white line drawing, the number of black pixels can be counted. As contour is deleted, the number of black pixels will decrease and the percent of contour deletion can be calculated.

IRP was developed to create fragmented line drawings for use in perception research. Line drawings can be modified using a random deletion process or by hand. When using the random deletion process, this "eraser size" and amount of contour deleted can be preset to make numerous versions of a line drawing varying in amount of fragmentation. A counter indicating percent of contour deletion aids in modifying line images when removing pixels by hand.

### Cataloging Images

Once line drawings are modified for research purposes, providing access to the set or sets of line drawings can facilitate the research process. In order to facilitate the use of the line drawings in perception research, an online database<sup>1</sup> was developed as a repository for line drawings or pictures for use by perception researchers. In addition to the image files, the database contains important information associated with

each image. This information includes the name of the line drawing or picture, recognition rate, recognition time (e.g., Snodgrass & Yuditsky, 1996), the conceptual category to which the image belongs, and indexes for familiarity (Berman, Friedman, Hamberger, & Snodgrass, 1989) and typicality (Table 1). The journal reference for the line drawings or pictures and associated statistics is also included in the database. Furthermore, the database is searchable by picture name, category, and reference.

There are several other important features of the database. First, picture files can be added by other researchers. Thus, the database provides a source of picture files and related information for use in perception research from a variety of sources. In addition, the database is structured so that similar databases of modified picture files can be accessed. For example, original line drawings can be accessed in the database. From those original pictures, modified versions such as those created by Snodgrass and Corwin (1988) with a certain percentage of contour removed or those used by Biederman (1987) with vertices or midsegments of geons removed, can be accessed as well. A third feature is a table for developmental trends that can be appended with additional information for different age groups. The table includes the age range of the sample, recognition rate, recognition time, method used for identifying the object (e.g., naming or free viewing, recognition, implicit memory task; Koch, Abbey, & Schmidt, 1995), and the journal reference for the developmental results. Finally, the database also includes word frequency information for the picture names (Alario, Costa, &

Carmazza, 2002; Barry, Morrison, & Ellis, 1997).

In summary, the online database contains information concerning recognizability, categorization, familiarity, typicality, and developmental trends. This information provides researchers the ability to select line drawings or pictures for perception research using picture files with known recognition rates, recognition times, and conceptual category that can be used in priming studies. Given the ability to add picture files to the database, this database provides a repository of line drawings and pictures for perception and memory research. It is anticipated that the database will aid researchers in developing object recognition studies and in replicating results across samples and experimental conditions.

Table 1. Information contained within the online database for each image.

Picture Associated Characteristics	Picture Related Characteristics
Picture file	Word frequency of picture name • Source of frequency information
Picture name	
Recognition rate	
Recognition time	
Category	
Familiarity	
Typicality	
Additional Information	Search Database By
Journal reference for the line drawings	Picture name Category Reference
Table for developmental statistics	
Comments concerning picture use	

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<sup>1</sup> <http://dhansen.cs.georgefox.edu/opdb/>

Screen shots of IRP, additional copies of the poster, and a link to the online picture database can be found at <http://cognition.georgefox.edu>

