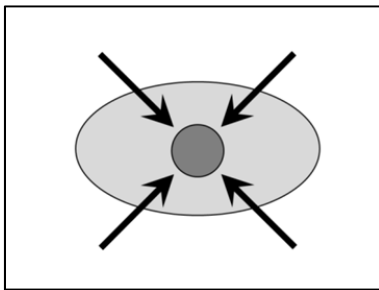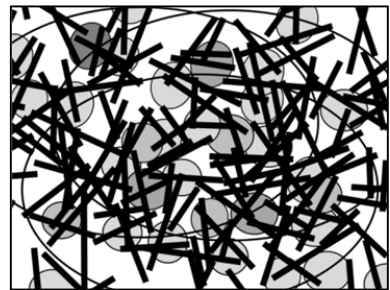# Experiment 1 Materials

Implicit Hint Movie

The hint stimulus was presented as part of a 56-second long MPEG-2 movie (NTSC, frame size: 720 × 480 pixels, frame rate: 29.97 fps). The movie was composed from one hint image, two mask images, three filler images, and one fixation image. The mask images were constructed using similar fragments of the hint image, whereas the filler images were neutral in this regard. The movie consisted of a single sequence of frames looped three times to construct a movie of a sufficient running time interpolating a one-second interval (black screen) between each loop. Each loop consisted of 540 frames (18 sec) including 20 separate hint frames (a total of 60 separate hint images in a 56-sec movie). The loop started with a fixation mark at the center of the screen followed by a mask and filler images, and 20 cycles of a set of hint, mask, and filler images as detailed in Figure 1. The movie was projected on a screen at the front of the room by a liquid crystal display projector.
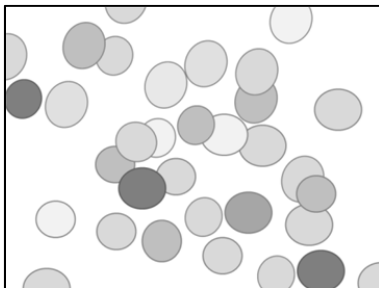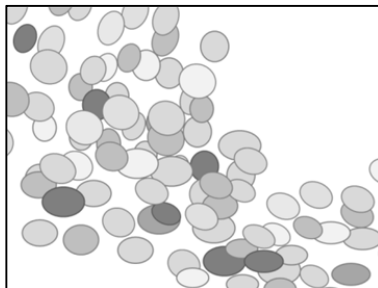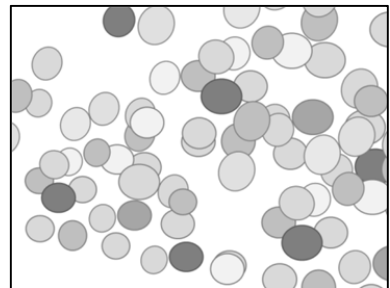

Hint

Mask 1

Mask 2

Filler 1

Filler 2

Filler 3

Timeline of the Implicit Hint Movie

Start (m:s)	End (m:s)	# frm	Image
00:000.000	00:001.001	30	Eyefix
00:001.001	00:001.134	4	Mask 2
00:001.134	00:001.902	23	Filler 1
00:001.902	00:001.935	1	Hint
00:001.935	00:002.069	4	Mask 1
00:002.069	00:003.136	32	Filler 2
00:003.136	00:003.170	1	Hint
00:003.170	00:003.303	4	Mask 2
00:003.303	00:004.071	23	Filler 3
00:004.071	00:004.104	1	Hint
00:004.104	00:004.238	4	Mask 1
00:004.238	00:005.105	26	Filler 1
00:005.105	00:005.138	1	Hint
00:005.138	00:005.272	4	Mask 2
00:005.272	00:006.139	26	Filler 2
00:006.139	00:006.173	1	Hint
00:006.173	00:006.306	4	Mask 1
00:006.306	00:007.274	29	Filler 3
00:007.274	00:007.307	1	Hint
00:007.307	00:007.441	4	Mask 2
00:007.441	00:008.175	22	Filler 1
00:008.175	00:008.208	1	Hint
00:008.208	00:008.342	4	Mask 1
00:008.342	00:008.775	13	Filler 2
00:008.775	00:008.809	1	Hint
00:008.809	00:008.942	4	Mask 2
00:008.942	00:009.009	2	Filler 3
00:009.009	00:009.042	1	Hint
00:009.042	00:009.176	4	Mask 1
00:009.176	00:009.643	14	Filler 1

Start (m:s)	End (m:s)	# frm	Image
00:009.643	00:009.676	1	Hint
00:009.676	00:009.810	4	Mask 2
00:009.810	00:010.544	22	Filler 2
00:010.544	00:010.577	1	Hint
00:010.577	00:010.711	4	Mask 1
00:010.711	00:011.812	33	Filler 3
00:011.812	00:011.845	1	Hint
00:011.845	00:011.979	4	Mask 2
00:011.979	00:012.779	24	Filler 1
00:012.779	00:012.813	1	Hint
00:012.813	00:012.946	4	Mask 1
00:012.946	00:013.046	3	Filler 2
00:013.046	00:013.080	1	Hint
00:013.080	00:013.213	4	Mask 2
00:013.213	00:013.814	18	Filler 3
00:013.814	00:013.847	1	Hint
00:013.847	00:013.981	4	Mask 1
00:013.981	00:014.581	18	Filler 1
00:014.581	00:014.615	1	Hint
00:014.615	00:014.748	4	Mask 2
00:014.748	00:014.982	7	Filler 2
00:014.982	00:015.015	1	Hint
00:015.015	00:015.148	4	Mask 1
00:015.148	00:015.883	22	Filler 3
00:015.883	00:015.916	1	Hint
00:015.916	00:016.049	4	Mask 2
00:016.049	00:016.650	18	Filler 1
00:016.650	00:016.683	1	Hint
00:016.683	00:016.817	4	Mask 1
00:016.817	00:016.917	3	Filler 2

Answer Booklet

The radiation problem was then presented in a booklet with instructions identical to those of Gick and Holyoak (1980) along with diagrams as follows. For the no-hint group, the booklet also included 40 filler addition problems (e.g., 23 + 18 =＿＿＿) and, for the hint group, a recognition task followed by a familiarity inquiry, as well as general procedural instructions. In the recognition task, participants were presented four figures (Figure 2 in the text) and their task was to choose the one that they thought had been shown. They also answered a confidence rating—"sure," "half-sure," and "guess"—for the one they chose. The familiarity inquiry asked whether they have seen the radiation problem before. They chose an answer among the options "yes," "no," and "I am not sure, but I might have seen it before."
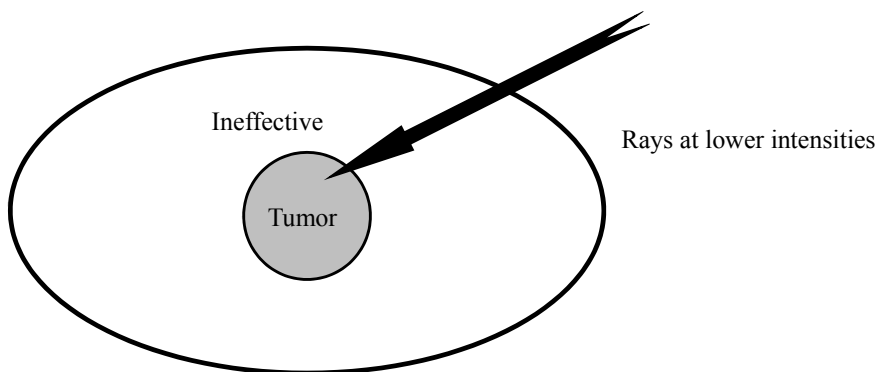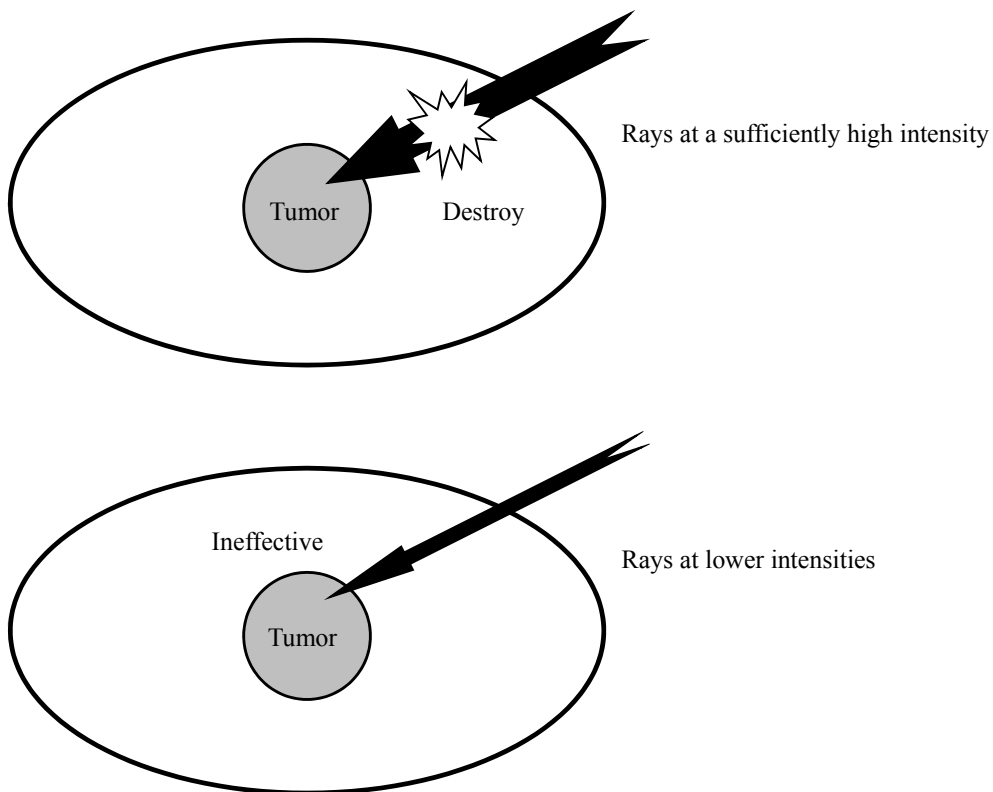
INSTRUCTIONS

Please do not open this booklet until you are given a signal to begin. You should flip every page as instructed. Do not go back to previous pages. Read the following instructions carefully, and if you have any questions, please do not hesitate to ask.

This is an experiment on human thinking. The purpose of this experiment is to examine the effect of diversion on thinking. It is often said that good ideas come after we have a break. You are asked to solve a simple problem described later. One minute after you start to solve the problem, you are to engage in an irrelevant task for one minute. There actually are two conditions: The Winding-Up Condition and Relax Condition. In the Winding-Up Condition, you are supposed to accurately solve as many as possible calculation problems for one minute. In the Relax Condition, you are asked to watch an irrelevant short movie on the screen three times over the course of one minute. Note that people in the Winding-Up Condition are asked to concentrate on the task and should not glance at the screen. Similarly, people in the Relax Condition should keep the screen in sight for the full minute. After this period of time, you will return to the initial problem. If you solve the problem before the time period elapses, please wait quietly.

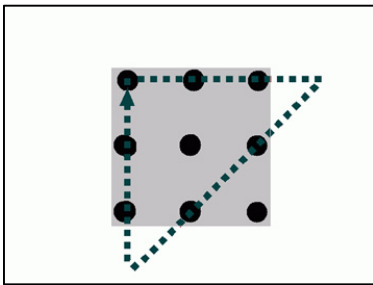*Your condition is WINDING-UP / RELAX.*

Suppose you are a doctor faced with a patient who has a malignant tumor in his stomach. It is impossible to operate on the patient, but unless the tumor is destroyed the patient will die. There is a kind of ray that can be used to destroy the tumor. If the rays reach the tumor all at once at a sufficiently high intensity, the tumor will be destroyed. Unfortunately, at this intensity the healthy tissue that the rays pass through on the way to the tumor will also be destroyed. At lower intensities the rays are harmless to healthy tissue, but they will not affect the tumor either. What type of procedure might be used to destroy the tumor with the rays, and at the same time avoid destroying the healthy tissue?

Tumor Destroy

Rays at a sufficiently high intensity

Ineffective

Tumor

Rays at lower intensities

Experiment 2 Materials

Implicit Hint Movie

The hint movie was also similar to that used in Experiment 1 except the content images (shown below). The mask and filler images were constructed using similar pieces of figures. The only difference between the mask and filler images used in this experiment was that small pieces of figures were densely placed in the mask image around the place where the diagonal line of the hint image was located.

Hint

Mask 1

Mask 2

Filler 1

Filler 2

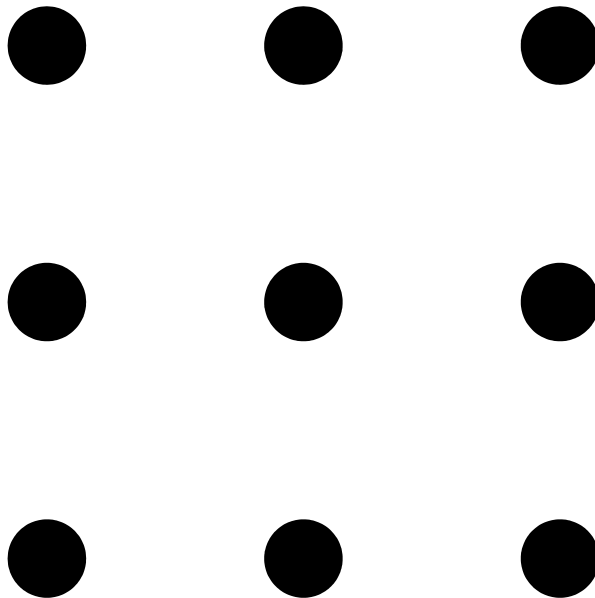Filler 3

Timeline of the Implicit Hint Movie

Start (m:s)	End (m:s)	# frm	Image
00:000.000	00:001.001	30	Eyefix
00:001.001	00:001.702	21	Filler 1
00:001.702	00:001.902	6	Mask 2
00:001.902	00:001.935	1	Hint
00:001.935	00:002.336	12	Mask 1
00:002.336	00:003.103	23	Filler 3
00:003.103	00:003.136	1	Hint
00:003.136	00:003.370	7	Mask 2
00:003.370	00:004.071	21	Filler 2
00:004.071	00:004.104	1	Hint
00:004.104	00:004.338	7	Mask 1
00:004.338	00:005.105	23	Filler 1
00:005.105	00:005.138	1	Hint
00:005.138	00:005.372	7	Mask 2
00:005.372	00:006.139	23	Filler 3
00:006.139	00:006.173	1	Hint
00:006.173	00:006.373	6	Mask 1
00:006.373	00:006.640	8	Filler 2
00:006.640	00:007.274	19	Filler 1
00:007.274	00:007.307	1	Hint
00:007.307	00:007.741	13	Mask 2
00:007.741	00:008.141	12	Filler 3
00:008.141	00:008.175	1	Filler 2
00:008.175	00:008.208	1	Hint
00:008.208	00:008.442	7	Mask 1
00:008.442	00:008.775	10	Filler 1
00:008.775	00:008.809	1	Hint
00:008.809	00:009.009	6	Mask 2
00:009.009	00:009.042	1	Hint
00:009.042	00:009.643	18	Filler 3

Start (m:s)	End (m:s)	# frm	Image
00:009.643	00:009.676	1	Hint
00:009.676	00:010.110	13	Mask 1
00:010.110	00:010.544	13	Filler 2
00:010.544	00:010.577	1	Hint
00:010.577	00:011.078	15	Mask 2
00:011.078	00:011.812	22	Filler 2
00:011.812	00:011.845	1	Hint
00:011.845	00:012.112	8	Mask 1
00:012.112	00:012.779	20	Filler 3
00:012.779	00:012.813	1	Hint
00:012.813	00:013.046	7	Mask 2
00:013.046	00:013.080	1	Hint
00:013.080	00:013.380	9	Mask 1
00:013.380	00:013.814	13	Filler 3
00:013.814	00:013.847	1	Hint
00:013.847	00:014.214	11	Mask 2
00:014.214	00:014.581	11	Filler 1
00:014.581	00:014.615	1	Hint
00:014.615	00:014.982	11	Mask 1
00:014.982	00:015.015	1	Hint
00:015.015	00:015.282	8	Mask 2
00:015.282	00:015.883	18	Filler 1
00:015.883	00:015.916	1	Hint
00:015.916	00:016.116	6	Mask 1
00:016.116	00:016.650	16	Filler 2
00:016.650	00:016.683	1	Hint
00:016.683	00:016.917	7	Mask 2
00:016.917	00:016.950	1	Hint
00:016.950	00:017.684	22	Mask 1
00:017.684	00:018.018	10	Filler 1

Answer Booklet

The nine-dot problem was presented in the answer booklet with an array of 3 × 3 dots as shown below. A recognition inquiry (only for the hint condition) was introduced before the recognition task to test awareness of the hint directly. In this task, participants were asked whether they saw the hint and they chose an answer from "yes," "no," and "I thought I saw something, but I didn't recognize it clearly." They were also given a forced choice among four figures—the true hint image and its 90, 180, and 270 degree rotated ones as shown below.

Your task is to draw four lines which, between them, go through all nine dots below. However, you must abide by the following constraints: the lines must be straight; the lines must be connected (i.e., once you have started drawing you must not lift your pen off the page); you must not retrace over a line you have already drawn.
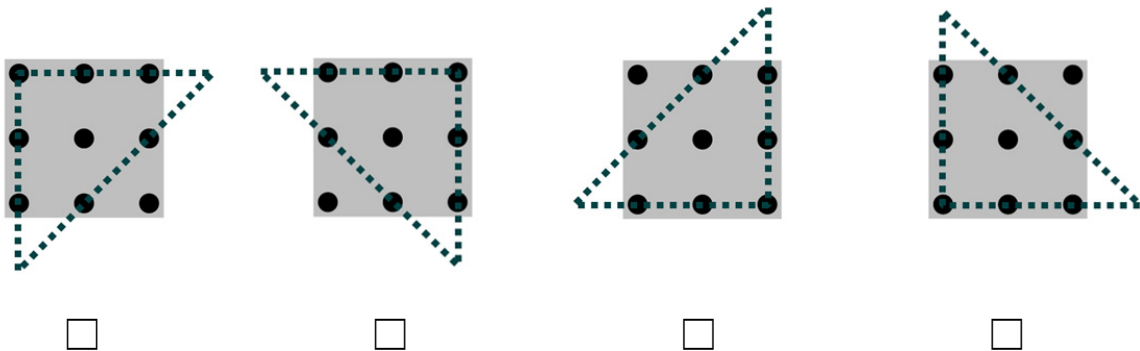
RECOGNITION INQUIRY AND RECOGNITION TASK

You actually saw one of the four figures below on the screen. Did you recognize the figure when it was shown?

☐ *Yes, I did.*

☐ *I thought I saw something, but I didn't recognize it clearly.*

☐ *No, I did not.*

Which one of the images below do you think you saw? Choose and check only one of them. Please guess even if you don't remember seeing anything.

☐   ☐   ☐   ☐

How confident are you in your answer above?

☐ *Sure*

☐ *Half-sure*

☐ *Guess*

Experiment 3 Materials

RECOGNITION TASK