Animated Pedagogical Agents in Multimedia Educational Environments: Effects of Agent Properties, Picture Features, and Redundancy

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Two experiments explored the integration of animated agents into multimedia environments in the context of R. E. Mayer’s (2001) cognitive theory of multimedia learning. Experiment 1 was a 3 (agent properties: agent only, agent with gesture, no agent) × 3 (picture features: static picture, sudden onset, animation) design. Agent properties produced no significant effects. Both sudden onset and animation conditions facilitated performance relative to the static-picture condition. In Experiment 2, we explored the effects of printed text, spoken narration, and spoken narration with the printed text, in a multimedia environment that included an agent, to investigate effects of redundancy. The spoken-narration-only condition outperformed the other 2, with no differences between printed text and printed text with spoken narration.

Interest in the use of animated pedagogical agents in instructional design involving multimedia learning environments has increased recently as new technologies have made them more accessible (Craig, Hu, Marks, Graesser, & Tutoring Research Group, 1999; Johnson, Rickel, & Lester, 2000; Moreno, Mayer, Spires, & Lester, 2001). An animated pedagogical agent is a computerized character (either humanlike or otherwise) designed to facilitate learning. Multimedia learning simply refers to any environment in which information is presented in two or more perceptual modalities (e.g., visual, auditory), but we will confine discussion to computer environments. We will begin with a brief discussion of animated agents and follow that with presentation of the cognitive theory of multimedia learning (Mayer, 1997, 2001; Moreno & Mayer, 1999, 2000) before considering the present research.

Because animated pedagogical agents are in an early stage of development, there has been relatively little empirical research into their uses, effectiveness, or limitations. Lester, Convers, Stone, Kahler, and Barlow (1997) reported one of the earliest investigations, using a bug named Herman in a design-a-plant environment. A fully expressive Herman exhibited animated segments with three types of communicative behaviors: (a) spoken principle-based advice, (b) high-level spoken advice, and (c) spoken task-specific suggestions. Lester et al. compared the fully expressive Herman with four other versions (see Johnson et al., 2000, p. 61): spoken principle-based advice only, high-level spoken advice only, spoken task-specific advice only, and a version that was mute with respect to plant components. Middle-school students who interacted with the versions of Herman that were fully expressive, offered principle-based advice, or gave high-level spoken advice outperformed children who interacted with the mute Herman and the version that provided only task-specific suggestions.

With respect to an agent–system assessment, the fully expressive Herman generally received higher ratings than the other versions on questions concerned with helpfulness. Lester et al. (1997) also obtained a persona effect. That is, the presence of a lifelike character, even one that was not very expressive, had a positive effect on learners’ interactive experiences. Students enjoy the learning experience more when an agent is included in the environment (see also Andre, Rist, & Muller, 1999).

Mayer (1997, 2001) has proposed a cognitive theory of multimedia learning, hereinafter referred to as Mayer’s theory. In a series of experiments, Mayer and his colleagues (Mayer, 1997; Mayer, Heiser, & Lonn, 2001; Moreno & Mayer, 1999) identified two effects that are central to multimedia theory. They are called the modality principle and the contiguity principle. The contiguity principle involves two effects: temporal contiguity and spatial contiguity. The modality principle is the idea that in multimedia educational environments involving words and images, words should be spoken to provide input to the auditory channel, rather than presented as written language that could potentially interfere with processing the pictorial information (Mayer, 2001; Moreno & Mayer, 1999). The temporal–contiguity effect refers to learning enhancements that are found when pictorial and spoken materials are presented concurrently, rather than sequentially (Mayer, 1997; Mayer & Sims, 1994). The spatial–contiguity effect refers to learning enhancements that are achieved when printed text and pictures are physically integrated (Mayer, 1997; Moreno & Mayer, 1999, 2000), rather than spatially separated.

In some respects, animated pedagogical agents would seem to provide a challenge to multimedia environments, given the tenets of Mayer’s theory (Mayer, 1997; Mayer et al., 2001; Moreno & Mayer, 1999). When on-screen agents are located on the monitor along with diagrams, pictures, or animations, their demands on the visual modality could lead to split-attention effects (Sweller &
Chandler, 1994). This effect might occur even when spoken text is integrated with pictures or animations in an attempt to avoid potential problems associated with a lack of temporal contiguity (Moreno & Mayer, 1999). The reason for this effect is that learners might focus their visual attention on the agent, rather than on the pictorial information that needs to be integrated with the spoken text. It might be useful, then, to direct the learner’s visual attention explicitly to the pictorial information (Alibali & DiRusso, 1999; Krauss, 1998) and away from the agent.

Experiment 1

Experiment 1 was designed to investigate issues related to attention by manipulating agent properties and features of the pictorial information. In all conditions, learners listened to a spoken narration describing lightning formation. The materials for the animation and narration used in Experiment 1 (and Experiment 2) were adapted from Mayer and Moreno (1998). For example, we used 16 identical text cycles taken from Moreno and Mayer (1999, p. 368) and replicated as closely as possible the frames from their animation (Mayer et al., 2001, p. 188; Moreno & Mayer, 1999, p. 361). In addition, we included the same series of retention, matching, and transfer questions (see Method below) reported by Mayer and Moreno (1998). To the extent possible, then, the only nontrivial differences between Mayer and his colleagues’ research, using the lightning formation scenario, and the research reported below involved manipulation of agent properties and picture features.

Method

Participants. Participants were students drawn from an undergraduate psychology research pool at the University of Memphis. The design was a 3 (agent properties) × 3 (picture features) factorial, yielding a total of nine groups. A total of 135 students, or 15 per group, were randomly assigned to conditions when they arrived at the laboratory. Because earlier work (Mayer, 1997; Moreno & Mayer, 1999) demonstrated that modality and contiguity effects are greater for learners with low domain knowledge (Mayer, 1997), only low-knowledge students were included in the study. Only students who scored 6 or less on a 12-item knowledge questionnaire adapted from Mayer and Moreno (1998, p. 314) were included in the study. This resulted in 4 participants being replaced.

Materials. Materials for the study were of two kinds: computerized materials and pencil and paper. The computerized materials consisted of the visual and narrative contents in the information delivery. The pencil and paper materials consisted of the questionnaire for domain knowledge, a test of spatial abilities, a persona scale, a retention test, a matching test, transfer problems involving creative solutions, and multiple-choice questions. All paper and pencil materials were printed on 8.5-in. × 11-in. pages. The test for spatial ability involved a paper-folding task described by Bennett, Seashore, and Wesman (1972). Each learner’s score was included as a covariate, because in previous research studies with high spatial ability have been better able to integrate visual and auditory information (Mayer, 1997; Mayer & Sims, 1994). For the retention test, we simply asked students to “Please write down how lightning works.” This test was collected after 5 min. The matching test consisted of one page. Students were asked to circle seven individual parts of the picture and place a particular alphabetic letter inside the circle (e.g., “Circle the downdraft and write D in it.”). The parts of the picture were as follows: warmer surface, updraft, freezing level, downdraft, gusts of cool wind, stepped leader, and return stroke. The matching test was collected after 3 min. The four transfer questions, presented one at a time on a separate page, were taken from Mayer and Moreno (1999, p. 314): “What could you do to decrease the intensity of lightning?” “Suppose you see clouds in the sky, but no lightning. Why not?” “What does air temperature have to do with lightning?” and “What causes lightning?” Each of the four pages was collected after 3 min.

In addition to the tests used by Mayer and his colleagues, participants were also presented with a persona evaluation and a series of six multiple-choice questions. These six questions were used to assess three categories of knowledge: explicit shallow, explicit deep, and implicit deep. The questions, their foils, and the knowledge categories that each was designed to assess are in the Appendix. A Likert-type scale, ranging from 1 to 6, was used for the persona evaluation: “Please rate how enjoyable the presentation was.” The scale is included in the Appendix. The computerized materials for the information presentation were created using three different computer application packages. The agent and voice were created using a Microsoft Agent (1998) software package. The multimedia animations were created using Macromedia Flash 3.0 (Macromedia, 1998). These packages were integrated using a program called Xtrain (Hu, 1996). The narration for the information presentation, which was taken directly from Moreo and Mayer (1999, p. 368), described a causal path beginning with how a storm front forms and concluding with the creation and display of lightning.

Design. The design was a 3 (agent properties: agent only, agent with gestures, no agent) × 3 (picture features: static picture, sudden onset, animation) factorial. With respect to agent properties, the agent-only condition consisted of a spoken narration describing lightning formation that was synchronized with pictorial information. It included a visible agent located on the monitor exhibiting only gaze, eye blinks, and mouth movements while speaking. The agent-with-gestures condition added deictic gestures, with the agent looking toward and pointing to parts of the pictorial display as they were described in the narrative. A screen shot of the gesturing agent is presented in Figure 1. The no-agent condition consisted of the same spoken narration in synchrony with the visual display, but no agent was on the monitor at any time. With respect to picture features, the static picture was a nonmoving display that contained all of the elements needed to create lightning, from the beginning of the process when cool, moist air moves over warmer surface air to the final return stroke that produces the bright flash of lightning (see Figure 1). The sudden-onset condition consisted of the same static picture, with each element in it illuminated by a color change (i.e., flashed bright red) when the element was specified in the spoken narrative. The animation condition consisted of the movements of a storm front, formation of ice crystals, building of electrical charges, and so forth, leading to the formation and display of lightning (Moreno & Mayer, 1999).

Procedure. When the participants first entered the laboratory, they were issued a packet of materials. This packet contained their informed-consent form, the test of domain knowledge, and the test of spatial abilities. Eligible students then received instructions for the information delivery followed by the actual information delivery, which ran for approximately 180 s. Buttons visible on the monitor (see Figure 1) were disabled in both Experiments 1 and 2. The experimenter started the information delivery, and the monitor was returned to the desktop at the end of the presentation. Afterward, the participants were first given the persona evaluation, then the retention question, the matching test, the transfer test, and the multiple-choice questions.

Scoring. Matching scores were computed by counting the number of correctly labeled elements (out of seven) on the matching test. Retention scores were computed by counting the number of major idea units (out of eight; see Mayer & Moreno, 1998, p. 315) each participant wrote on the retention test. Following Moreno and Mayer (1999, p. 362), 1 point was given for stating each idea unit, regardless of wording. The transfer score was computed by counting the number of acceptable answers across the four transfer problems. Again, we followed Moreno and Mayer (1999, p.
362) in determining what were acceptable and unacceptable answers to each of the four problems. On the multiple-choice questions 1 point was given for each of the six questions that was answered correctly.

Results and Discussion

Each participant’s score on the test of spatial abilities was first computed: There were 12 paper-folding tasks, with a total of 5 points on each for a maximum score of 60. The minimum and maximum scores obtained by participants were 2.50 and 60, respectively \((M = 25.94 \text{ and } SD = 14.11)\). These scores were then used as covariates for statistical control in all analyses for Experiment 1. A 3 (agent properties: agent only, agent with gestures, no agent) \(\times 3\) (picture features: static picture, sudden onset, animation) analysis of covariance (ANCOVA) was performed on data from each dependent measure (persona, retention, matching, transfer, multiple choice). Tukey’s honestly significant difference test contrasts were used to evaluate all simple effects in both Experiments 1 and 2.

Analysis of the persona data yielded no significant effects (agent only \(M = 3.42\), agent with gestures \(M = 3.07\), no agent \(M = 3.44\)). These scores were in the range between 3 (somewhat enjoyable) and 4 (somewhat not enjoyable). Because the difference between the no-agent and agent-with-gestures condition approached significance, \(F(2, 132) = 2.28, p < .11\) (and at the suggestion of an anonymous reviewer), the effect sizes were computed using Cohen’s \(f\) statistic. These analyses yielded an effect size of .42 in the agent-with-gestures versus the no-agent comparison and an effect size of .02 in the agent-only versus the no-agent comparison. The failure to obtain a significant persona effect may have been due to the brevity of the information delivery, which was just 180 s. In previous research that obtained the effect (Andre et al., 1999; Lester et al., 1997), learners were exposed to on-screen agents for much longer periods of time. There are some conflicting data, however, from recent experiments reported by Moreno et al. (2001), in which students explored the design-a-plant environment (Johnson et al., 2000) for 24 to 28 min. They found that when learners were presented with spoken narration in conditions with and without an on-screen agent, there were neither differences in interest in the task nor differences on measures of learning.

The ANCOVA performed on the retention data yielded a significant effect only for picture features, \(F(2, 133) = 25.73, p < .001\). There was a significant difference between both the sudden-onset and animation conditions when compared with the static-picture condition \((p < .01)\). The difference between the sudden-onset and animation groups was not significant. There were no effects of agent properties. Table 1 includes the means and standard deviations obtained in each condition for retention, matching, transfer, and multiple-choice questions. The presence of an on-screen agent did not produce a split-attention effect (Sweller, 1988). This finding is consistent with results reported by Moreno et al. (2001) that were noted previously.

The ANCOVA performed on the matching data yielded only a significant effect of picture features, \(F(2, 133) = 12.43, p < .001\). Students in both the sudden-onset and animation conditions significantly outperformed those in the static-picture condition \((p < .01)\), but the sudden-onset and animation conditions did not differ from each other. There was no effect of agent properties (see Table 1). The manipulation of picture features, in an attempt to draw attention to them as they were being described in the narrative, whether through full animation or sudden onset, enhanced perfor-
There was a difference between the sudden-onset and static-picture conditions. Sweller (1991) have called the redundancy effect of picture features, results of Moreno et al. (2001). The latter is consistent with recent findings that information from disparate sources is unintelligible until mentally or physically integrated—the redundancy effect refers to decrements in performance that sometimes result from providing redundant information that is not necessary for comprehension. Kalyuga, Chandler, and Sweller (1999) explored the presentation of identical printed and spoken texts combined with diagrams, as students learned about solders composed of different ratios of tin to lead. The sessions lasted about 1 hr and no on-screen agent was used. Kalyuga et al. combined three different text conditions with the diagrams: printed text only, spoken text only, or printed and spoken text. Kalyuga et al. reported that students in the spoken-text-only condition outperformed those in both the printed-text-only and the printed-and-spoken-text conditions.

Experiment 2

Experiment 2 was designed to explore what Chandler and Sweller (1991) have called the redundancy effect. The original finding was that the elimination of textual material that described the contents of a diagram actually enhanced learning. Unlike the split-attention effect—that information from disparate sources is unintelligible until mentally or physically integrated—the redundancy effect refers to decrements in performance that sometimes result from providing redundant information that is not necessary for comprehension.

The materials and procedure. The pencil and paper materials were those routinely used by Mayer and his colleagues (e.g., Mayer, 1997, 2001; Moreno & Mayer, 1999); the test of domain knowledge along with the matching, retention, and transfer problems. The computerized materials included those obtained by Mayer et al. (2001) recently reported experiments, using the lightning scenario, in which they compared the presentation of spoken text alone with conditions in which spoken text was combined with printed text. No on-screen agent was used, and they did not include a condition that presented only printed text. Students who received printed text alone outperformed those who received printed text along with spoken text on both retention and transfer tasks.

Method

Participants. The participants were 71 students drawn from the same pool as in Experiment 1. The design was a simple one way with three groups. Twenty-four students were assigned to a condition in which the agent provided only spoken text synchronized with the animation (agent spoken only), 23 were assigned to a condition in which the agent provided only printed text (agent printed only) synchronized with the animation, and 24 were assigned to a condition in which the agent provided both spoken and printed text (agent spoken plus printed) synchronized with the animation. All participants scored 6 or less on the 12-item knowledge questionnaire.

Materials and procedure. The pencil and paper materials were those used by Mayer and his colleagues (e.g., Mayer, 1997, 2001; Moreno & Mayer, 1999): the test of domain knowledge along with the matching, retention, and transfer problems. The computerized materials included the following tasks.

Table 1

Means and Standard Deviations for Each Agent-Properties and Picture-Features Condition for Retention, Matching, Transfer, and Multiple-Choice Questions in Experiment 1

<table>
<thead>
<tr>
<th>Condition</th>
<th>Retention question M</th>
<th>SD</th>
<th>Matching test M</th>
<th>SD</th>
<th>Transfer questions M</th>
<th>SD</th>
<th>Multiple choice (total) M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent properties</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No agent</td>
<td>3.91</td>
<td>2.88</td>
<td>4.04</td>
<td>1.57</td>
<td>1.69</td>
<td>1.16</td>
<td>3.40</td>
<td>1.23</td>
</tr>
<tr>
<td>Agent only</td>
<td>3.80</td>
<td>2.61</td>
<td>4.04</td>
<td>1.73</td>
<td>1.76</td>
<td>1.15</td>
<td>2.96</td>
<td>1.22</td>
</tr>
<tr>
<td>Agent with gestures</td>
<td>3.49</td>
<td>2.62</td>
<td>4.02</td>
<td>1.78</td>
<td>2.02</td>
<td>1.37</td>
<td>3.02</td>
<td>1.22</td>
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<tr>
<td>Picture features</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Static picture</td>
<td>1.93</td>
<td>1.99</td>
<td>3.13</td>
<td>1.56</td>
<td>1.44</td>
<td>1.10</td>
<td>2.60</td>
<td>1.23</td>
</tr>
<tr>
<td>Sudden onset</td>
<td>4.20</td>
<td>2.35</td>
<td>4.42</td>
<td>1.54</td>
<td>2.13</td>
<td>1.46</td>
<td>3.47</td>
<td>1.20</td>
</tr>
<tr>
<td>Animation</td>
<td>5.07</td>
<td>2.68</td>
<td>4.56</td>
<td>1.59</td>
<td>1.89</td>
<td>1.03</td>
<td>3.31</td>
<td>1.10</td>
</tr>
</tbody>
</table>

Note. Total possible scores are as follows: retention question, 8; matching test, 7; transfer questions, 4; multiple choice, 6.
were created using Microsoft Agent (1998), Macromedia Flash 3.0 (Macromedia, 1998), and Xtrain (Hu, 1998). The agent spoken-only condition was identical to the agent-only animation condition in Experiment 1. The agent spoken-plus-printed condition was identical to the agent spoken-only condition, except that the printed text, synchronized with the spoken, appeared in a cartoon-like bubble located directly above the agent. A screen shot of the agent with the bubble is presented in Figure 2. The printed text appeared in the bubble as it was spoken, one sentence at a time. The agent printed-only condition was identical to the agent spoken-plus-printed condition but without sound.

The procedure was similar to Experiment 1. After informed consent was obtained, the knowledge questionnaire was administered. This was followed by instructions for the 180-s information delivery, which followed immediately. The retention test, the matching test, and the four transfer problems were then presented in that order.

Results and Discussion

There was a significant effect in the retention data, $F(2, 68) = 5.68, p < .01$. The means and standard deviations for all dependent measures are in Table 2. Students in the agent spoken-only condition significantly outperformed those in the agent printed-only condition ($p < .01$). Those in the agent spoken-plus-printed condition had intermediate performance and did not differ significantly from either of the other two groups. The difference, when the agent spoken-plus-printed condition was contrasted with the agent spoken-only condition, was in the direction predicted by the redundancy effect, so Cohen’s $f$ statistic was computed. It yielded an effect size of .48.

There was a significant effect in the matching data, $F(2, 68) = 4.81, p < .05$. Students in the agent spoken-only condition significantly outperformed those in the agent spoken-plus-printed condition ($p < .05$) and marginally outperformed those in the agent printed-only condition ($p = .05$). The matching data, then, were clearly in line with predictions from the redundancy effect: The presence of printed text along with spoken text significantly interfered with performance.

There was a significant effect in the transfer data, $F(2, 68) = 5.13, p < .01$. Students in the agent spoken-only condition significantly outperformed those in both the agent printed-only and agent spoken-plus-printed condition ($p < .05$). It seems clear, then, in line with the claim made by Mayer et al. (2001, p. 187)—that in multimedia learning environments “presenting words as text and speech is worse than presenting words solely as speech”—that this conclusion holds when a pedagogical agent is part of the environment as well.

Summary and Conclusions

The findings of Experiment 1 appear to have several implications for the design of multimedia learning environments containing animated agents. First, the presence of an on-screen agent did not produce split-attention effects (Sweller, 1988; Sweller & Chandler, 1994) on any of the four measures that were evaluated (retention, matching, transfer, multiple choice). This finding is in line with recent results by Moreno et al. (2001) who reported that when learners were presented with spoken narration, the presence of an on-screen agent had no effects relative to the spoken narration alone. In fact, Atkinson (2002) has recently presented evidence that there may be conditions under which the presence of an on-screen agent might actually improve performance.

Second, with respect to picture features, our sudden-onset and animation conditions were consistently superior to the static-picture condition. This held even though the static picture con-
tained all of the same visual elements that were included in the other two picture conditions (see Figures 1). Presumably, both the sudden-onset and animation conditions improved performance by directing the learner’s attention to specific elements of the visual display as they were discussed in the narrative. Further, with respect to agent properties, it seems reasonable to conclude that deictic gestures were ineffective in providing the kind of attentional cues that were needed. In fact, it is possible that in the absence of other attentional cues, the agent’s head movements and pointing activities may have sometimes distracted the learners by directing attention to the agent and away from critical elements of the pictorial display (e.g., Jonides, 1981; Lambert, Spencer, & Mohindra, 1987; Muller & Rabbit, 1989).

Third, in a computerized environment designed according to the tenets of Mayer’s cognitive theory of multimedia learning (Mayer, 1997; Mayer & Moreno, 1998; Moreno & Mayer, 1999, 2000), a sudden-onset condition produced learning enhancements roughly equivalent to those produced by a fully animated presentation. Thus, the procedure of simply flashing appropriate parts of the pictorial information, when they were described in the spoken narrative, was as effective as a full animation. This finding may have practical implications, because creating flashing elements in a static picture can be less taxing with modern technology than creating full animations.

Finally, students in the agent printed-only condition of Experiment 2 learned relatively little compared with those in the agent spoken-only condition. This finding was expected, because the text in the agent printed-only condition was not integrated with the pictorial information. What was unexpected was that adding spoken text to the printed text, in the agent spoken-plus-printed condition, failed to improve performance beyond that observed in the agent printed-only condition on any measure. Thus, combining spoken text with printed text not only produced the redundancy effect but it also failed to produce any learning gains relative to simply providing printed text alone presented in a location that violated Mayer’s (1997, 2001) spatial contiguity principle.

In conclusion, we need to highlight some limitations of our findings. First, the information delivery was brief (180 s) and involved a system of cause–effect relations. It is not clear whether similar findings would be obtained in longer term learning sessions or in other knowledge domains that do not involve causal systems. Second, the participants were selected because they lacked domain knowledge. Whether similar results would be obtained with more knowledgeable learners attempting to master more advanced concepts remains to be addressed. Finally, although there were no differences between our agent-only and no-agent conditions in Experiment 1, further research involving a variety of agents in different learning environments and knowledge domains (cf. Atkinson, 2002) is clearly needed before any firm conclusions can be drawn concerning the uses and limitations of on-screen agents.

References


Mayer, R. E., & Sims, V. K. (1994). For whom is a picture worth a...


Appendix

Multiple-Choice Questions

Explicit—deep

1. What causes a flash of lightning?
   a. The return stroke*  
   b. Negatively charged leader  
   c. Positively charged leader  
   d. Negative charges rushing from the cloud

2. When do downdrafts occur?
   a. When air is dragged down by rain  
   b. When air currents cool and fall back to earth  
   c. When cold air hits the ground  
   d. When there are unbalanced electrical charges between the ground and the clouds

Explicit—shallow

3. The upper portion of the cloud is made up of what?
   a. Water droplets  
   b. Cold air  
   c. Ice crystals  
   d. Water vapor

4. What part of the cloud are the positively charged particles located in?
   a. Bottom part  
   b. Center of the cloud  
   c. Outside edge  
   d. Top part*

Implicit—deep

5. Why does lightning strike buildings and trees?
   a. They are higher than the ground  
   b. A build-up of positive charges  
   c. It is the point where the negative leader ends  
   d. Positive leader starts at these points*

6. Why does it get colder right before it rains?
   a. Positive charges are absorbed into the clouds  
   b. Warm moist air rushes upward into the clouds  
   c. Cold downdrafts of air fall from the clouds*  
   d. Warm surface air rapidly cools

* Correct answer.

Persona Evaluation

Please rate how enjoyable the presentation was.

<table>
<thead>
<tr>
<th>Extremely enjoyable</th>
<th>Enjoyable</th>
<th>Somewhat enjoyable</th>
<th>Somewhat nonenjoyable</th>
<th>Nonenjoyable</th>
<th>Extremely nonenjoyable</th>
</tr>
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<tr>
<td>1</td>
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