Online research with children

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Keywords: Online research, children as respondents, data quality, incomplete adults view, children and the Internet, kid's portal, Web experiments

Introduction

It has been noted that in recent years children have become increasingly important participants in research and marketing studies. Likely reasons for this trend are children's higher purchasing power and a heightened interest in opinions and rights of children. The trend goes along with a changed view in western societies: Children are seen as actors in their own right, not as incomplete adults (Scott, 1997).
This changed view has not been adopted yet by most researchers conducting studies that aim at generalizing results to populations of neighborhoods, cities, states, or countries. Many of them might be hesitating to include children into their studies because of a number of methodological particularities in conducting research involving children. Which characteristics have to be taken care of, and how online research with children can be conducted, is at the focus of this paper. It is explained, how so-called "kid's portals", online panels consisting of children and adolescents, and a distributed online/offline research technique can be used in conducting research with children. Two examples of online studies with children from the Web Experimental Psychology Lab (Reips, 1995) are reported.

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General issues in conducting research with children

Standard research methods are clearly inappropriate with pre-school children (Scott, 1997), and for a variety of reasons they need to be modified for older children. Let us look at some of the issues that need to be addressed when conducting research with children.

Context dependency

Children's behaviors and attidudinal expressions are highly context dependent. The social and cognitive meaning children attach to concepts, such as „work" or „honesty", might be different depending on where they are.

Cognitive capacity

Many forms of doing research require the participant's mastery of a number of basic cognitive skills, such as understanding of verbal material, a certain attention span, memory capacity, understanding of certain symbols, understanding of conversation rules. „Children think differently from adults and there are qualitative differences in the way children of different ages understand the world around them." (Greig & Taylor, 1999, p. 31).

Issues in conducting online research with children

Age statements

Age statements given online that suggest participation by a child can either be (1) correct; (2) incorrect due to an error or deliberate misinformation by an adult, or (3) incorrect due to missing knowledge/skills of a child. Therefore, one or more techniques should be used for control (e.g., a password technique or a subsampling technique, as explained in Reips, in press, or a distributed online/offline research technique, as explained in the „Control" section below).

Clarity and simplicity

Language used on Web sites for children has to be simple, messages have to be clear. Presenting verbal material as auditory files rather than written form is preferable, as younger children often have not fully mastered reading. A good example for an almost entirely auditory Web site is Alfy.com (1999), a so-called "kid's portal".
Navigation and functionality should be straightforward.

Control

To guarantee a minimum of experimental control in online research with children a distributed online/offline research technique can be used. The principal researcher initiates contact with one or more researchers or helpers who supervise children

locally during their use of the online materials (Figure 1). This technique was used in one of the Web experiments presented later.

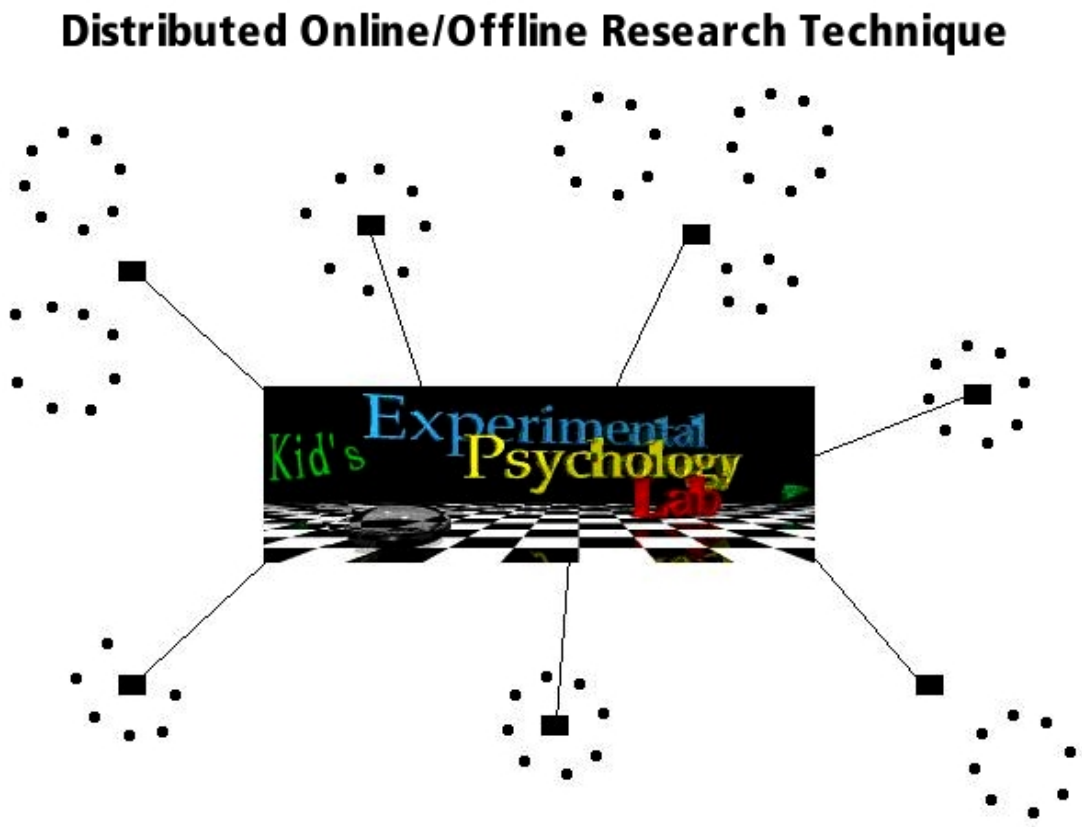

Figure 1. The distributed online/offline research technique. The principal researcher runs the study at a Web site (e.g., the Web Experimental Psychology Lab) that is accessible for a number of collaborators (denoted by small rectangles). Groups of children (circles of dots) participate under these collaborators' supervision.

Privacy

It is advisable (and soon will be the law for Web sites in the US) to ensure compliance with the Children's Online Privacy Protection Act (COPPA) of 1998 as layed out in the final rule by the Federal Trade Commission (1999). The rule requires a Web site operator aiming at children below the age of thirteen to do the following:

- Post your privacy policy;
- Get parental consent before collecting, using or disclosing personal information about a child;
- Get new consent when information practices change in a substantial way;
- Allow parents to review personal information collected from their children;
- Allow parents to revoke their consent, and delete information collected from their children at the parents' request.

Keep the collection of information to a minimum. Never collect more information than reasonably necessary. Explain the features that ask the children for information.

For example, in order to enable participation in sweepstakes, a Web site needs to collect contact information so that it is possible to contact the winners and send the prizes.

Examples: Two Web experiments with children

Two Web experiments are currently conducted with children in the Department of Experimental and Developmental Psychology at University of Zürich. Both experiments are linked in the Web Experimental Psychology Lab (Reips, 1995) that is currently visited by about 3000 persons a month (Reips, in press). Most of the visitors to the Web Experimental Psychology Lab are adults, so it is planned to ask these people to ask their children to participate in versions of the experiments that are specially designed for children. This is a way of assuring informed consent of parents for their children's participation in our online studies.

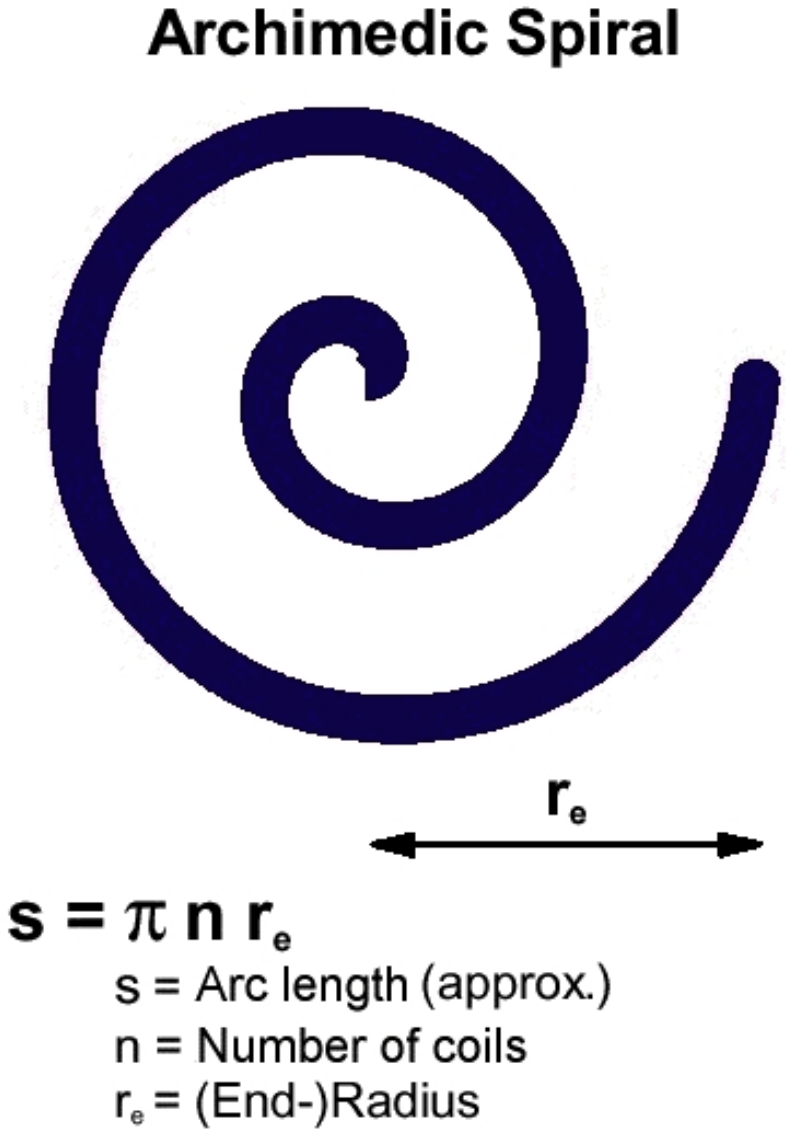

Figure 2. The normative mathematical relations within an Archimedic spiral.

Web experiment I: Length estimation in the Archimedic Spiral

Perception-based judgments often require the integration of relevant information from different dimensions of a stimulus. Contrary to other geometric figures (e.g., rectangles, see Wilkening, 1979), the normative mathematical relations within an Archimedic spiral shown in Figure 2 are not well-known among adults. This geometric shape can therefore be used to control for potentially confounding influences of explicit knowledge when comparing adults' and children's performance in perception information integration tasks.

Material

Nine spirals were constructed by combining all possible combinations of the two relevant factors *number of coils* and *end radius*, with three levels each. Figure 3 shows the resulting arc lengths.

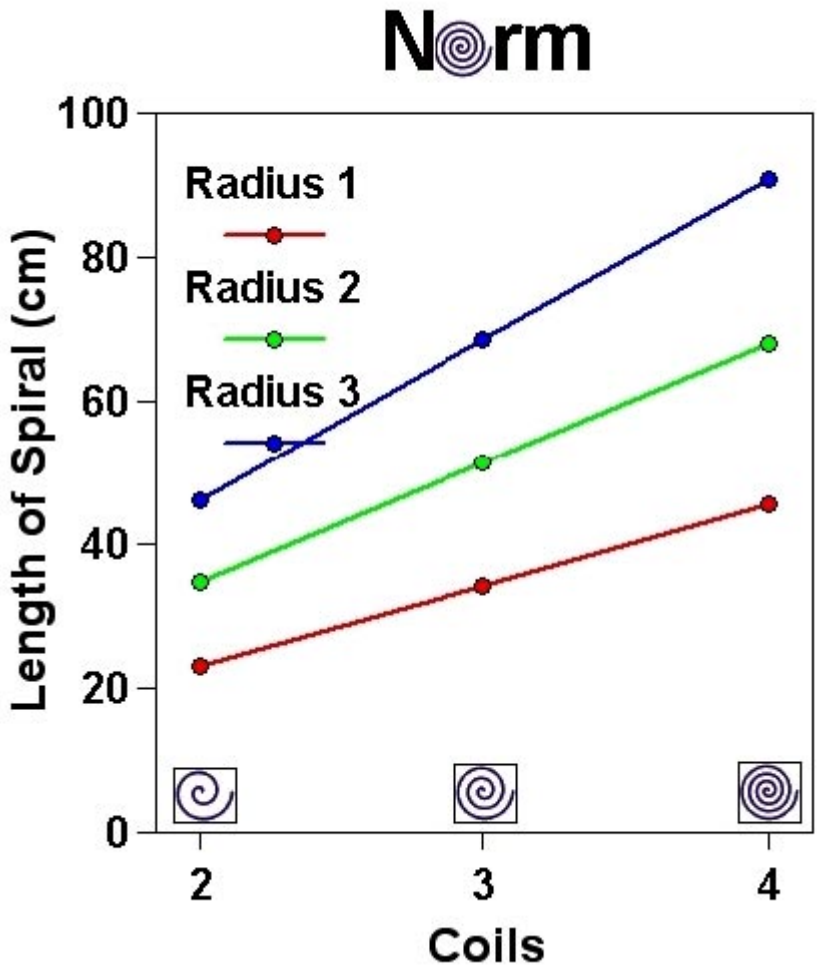

Figure 3. Normative lengths, radia, and number of coils in the nine Archimedic spirals used in the first Web experiment reported.

Procedure

Participants are asked to look at two blocks of all nine spirals, one spiral at a time. After each spiral, the participant's task was to estimate the spiral's length. In the version for children the spirals were presented as snakes (Figure 4, left side) that later crawled into a tunnel with only a tiny piece of tail hanging out (Figure 4, right side). The child has to click on the tunnel at that point where it thinks the snake's head is hidden. The tunnel is made up of dozens of numbered pieces, each of which sends its number to the Web server for logging if clicked.

At the end of the experiment the child comes to a Web page filled with downloadable animal pictures and animations.

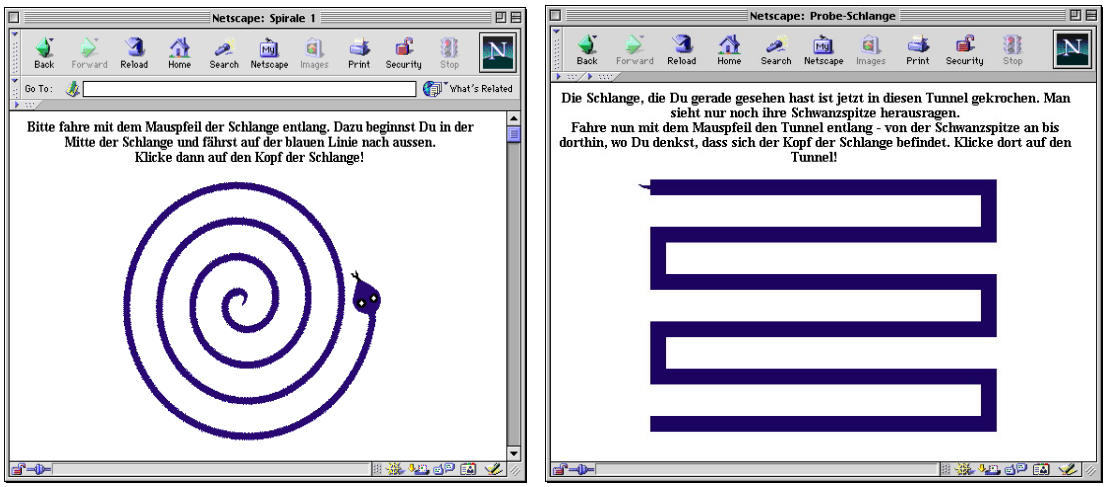

Figure 4. Spirals were presented as snakes (left side). The participant's task was then to guess the place of the snake's head by clicking on a tunnel the snake had crawled into (right side), thereby producing an estimation of the spiral's length.

Results

So far, the Web experiment reveals a tendency for children and adults to ignore the normative relationships between length, radius and number of coils in Archimedic spirals (Krist & Reips, 1999).

Web experiment II: Causal attributions in the moment of surprise

The attribution of a cause for a highly surprising event might be dependent on age. Huang (1930) studied children's explanations of strange physical phenomena[2]. By a strange phenomenon he meant „a simple demonstration in which the outcome was unexpected and surprising, - different from or even contrary to what the child had expected from the events leading up to it" (p. 63). Huang's findings cast doubt on earlier accounts by Piaget (1927) that children up to the age of 12 show a general tendency to be *mystical*, that is, to believe in non-physical or „magic" explanations of phenomena. The present Web experiment was designed to compare choices among more or less mystical causal attributions in a moment of surprise for different age

[2] I thank Horst Krist for pointing me to Huang's early studies in this realm.

groups. Also, it was intended to test whether causal attributions can be induced by unrelated actions to be performed before the surprising event happens.

Material

To induce surprise in the participants of the Web experiment, a „magic card trick“ Web site by Bob Fay was used[3]. The Web pages were modified to suit experimental purposes, and more Web pages as well as CGI procedures for randomized distribution to experimental conditions were added. Figure 5 shows the first page of the Web experiment, where the virtual character "Simeon" is introduced.

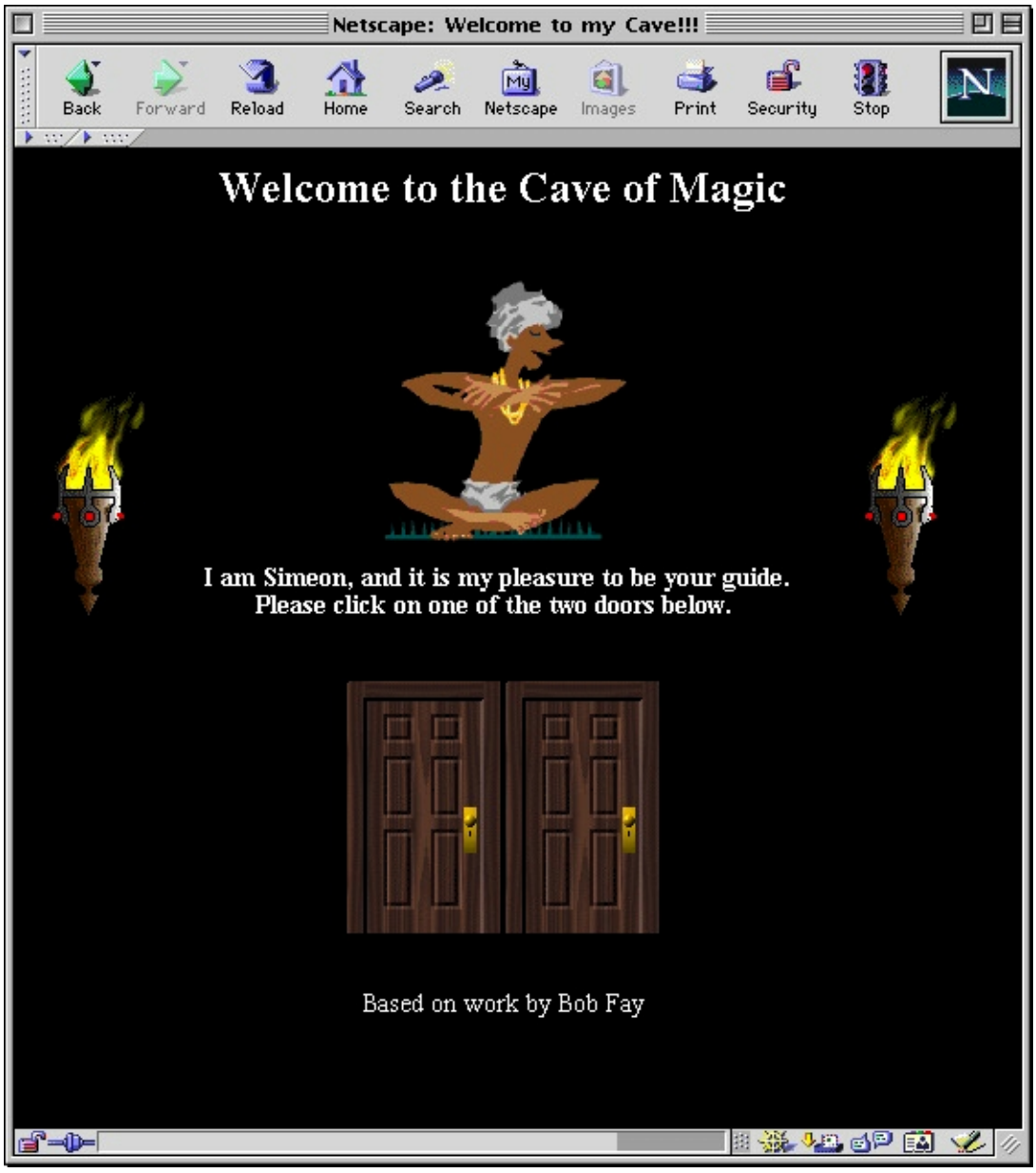

Figure 5. First page of Web experiment II.

[3] Bob Fay deserves credit for giving me permission to use and change his materials.

Figure 6. Presentation of the task and preparation of the surprising event in Web experiment II.

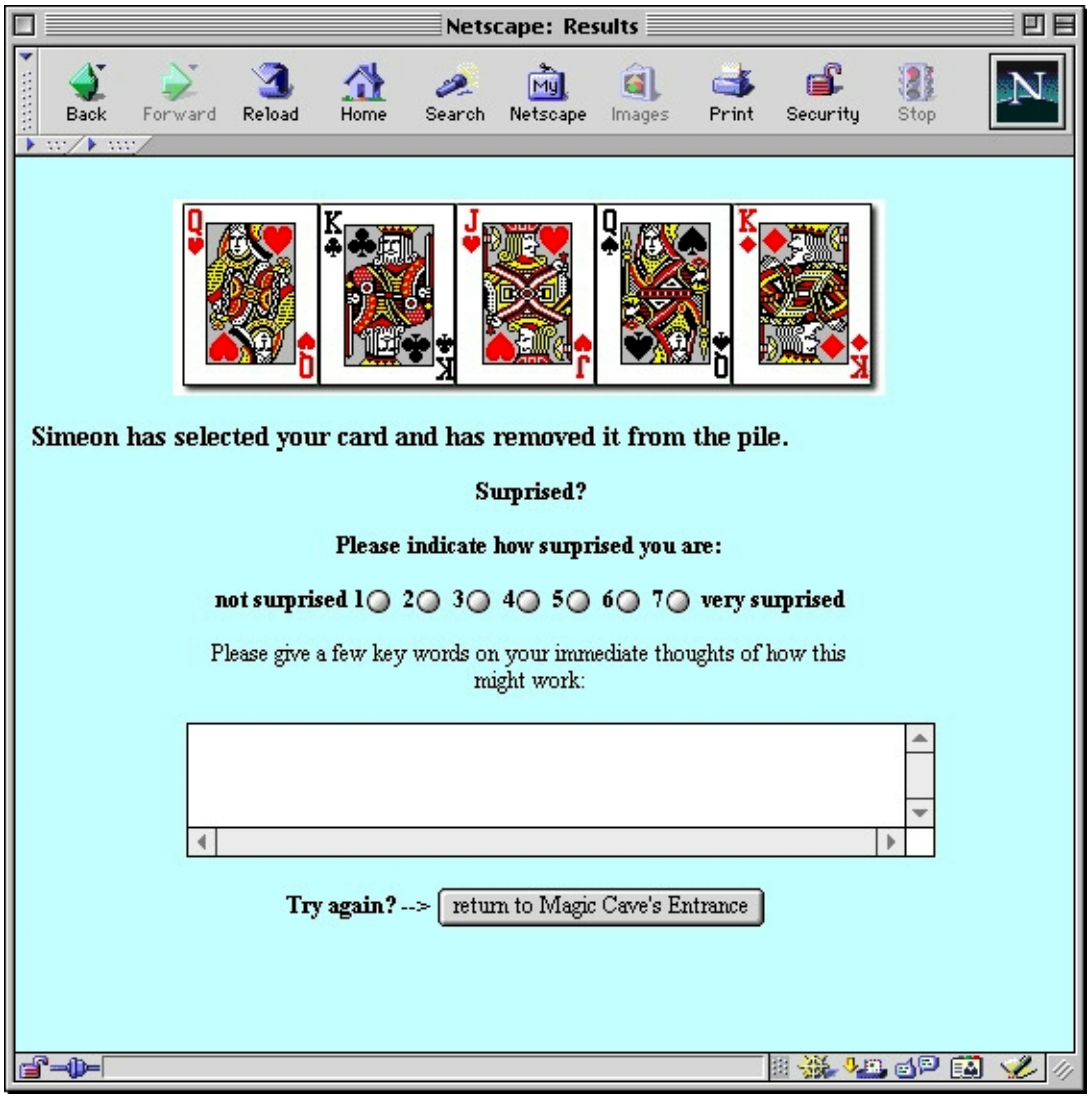

Figure 7. The surprising event and the manipulation check in Web experiment II.

Procedure

Participants are asked to click on one of two virtual doors and then on one of two virtual eyes. These required actions may suggest to some participants that later events are somehow based on one's own choices. Figure 6 shows the third Web page, where Simeon presents the task and prepares the participant that something unusual will happen via "mind control". The fourth Web page contains the experimental manipulation: Participants are required to either write the name of their chosen card with the mouse arrow (mouse cause condition), whisper the card's name (sound cause condition), use the mouse to click three radio buttons (mouse cause control condition), whisper their own name (sound cause control condition), or just click on the word "here" to proceed (general control condition). On the next Web page participants are shown another deck of cards, which indeed doesn't contain the card the participant had concentrated on (Figure 7). Participants are immediately asked to indicate their level of surprise on a seven point scale. The participant is also asked for causal mechanisms that might explain the fact that Simeon correctly removed the chosen card (see Figure 8).

In order to achieve a high level of experimental control the distributed online/offline research technique described earlier in this article was used. A teacher[4] from a high school in Phoenix, Arizona (USA) recruited nine students aged 12 to 14 (three students were 12, two were 13, and four were 14) who agreed to participate in the study. After receiving informed consent the local collaborator asked his students to visit the Web experiment's URL and participate. The school's IP (computer address) was known to the experimenter. As a consequence, it was possible to tell whether a participant came from that student group or from somewhere else on the WWW.

[4] I would like to thank Way Yuhl for his help with this research.

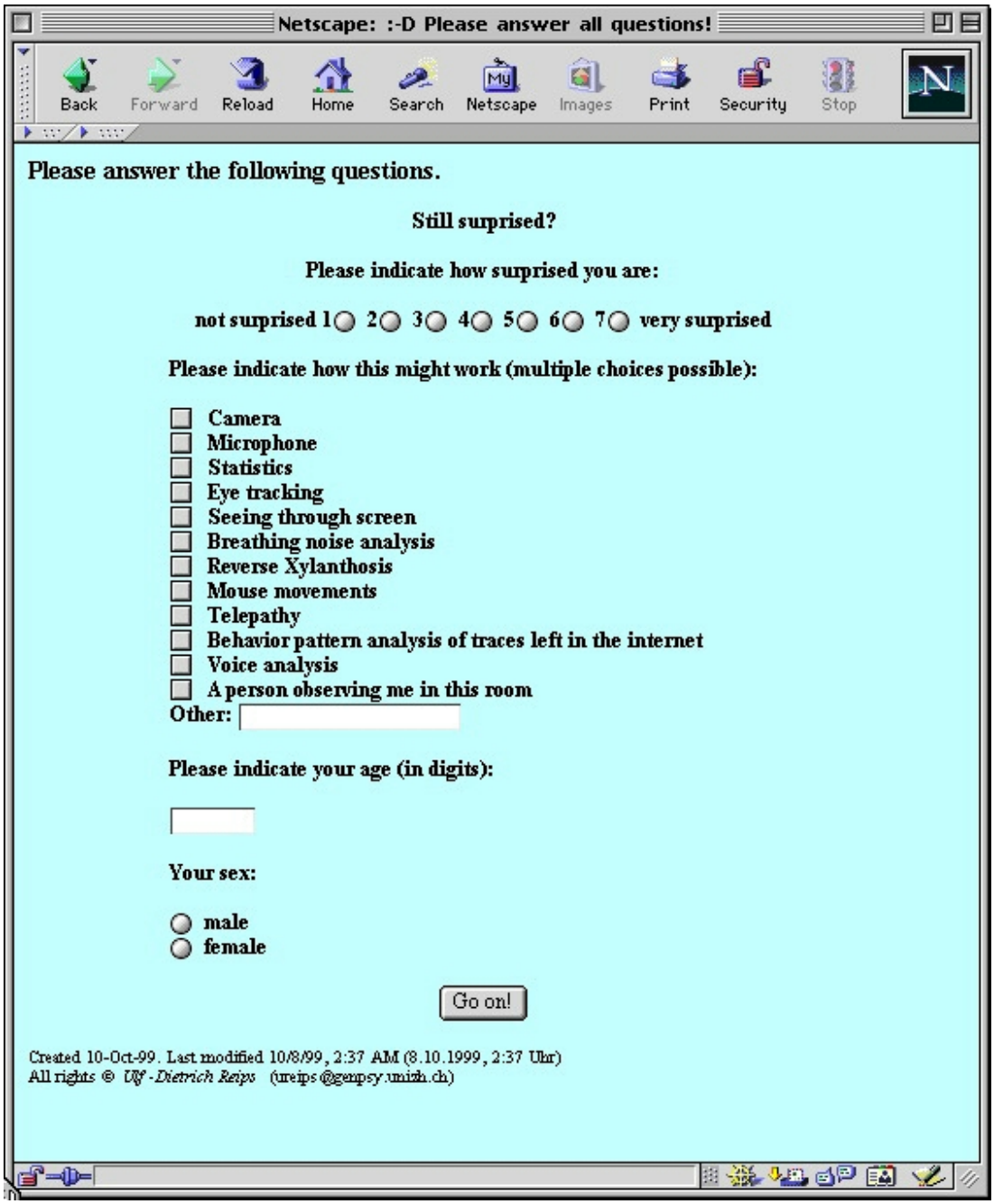

Figure 8. The questionnaire containing the list of causal mechanisms offered to participants in Web experiment II.

Preliminary Results

Analyses of pilot data reveal an effect of age on choice of causal mechanism. Children up to the age of 13 show a high probability of choosing the "mystical" cause "Seeing through screen" among other causes, while other age groups rarely pick this cause. Among the highly controlled school group there were three causes picked more than once: mouse movements (twice), eye tracking (twice), and "Seeing through screen" (three times). Two of the twelve year olds and one thirteen year old chose "Seeing through screen" exclusively as their sole attributed cause. Over a period of almost three months "Seeing through screen" was chosen only eight times by those people logging in from the WWW (for a comparison: "Mouse movements" was chosen 202

times). Half of those people gave six or more causes. Of the remaining four one person didn't give her age. A twenty-one year old picked "Seeing through screen" as one of her four causes, a 48 year old and an eight year old (the only one during the three months) made this their sole cause. Overall, one out of five WWW-recruited children aged eight to thirteen who did not find out about the card trick and named a single cause chose "Seeing through screen".

Due to a coding error, the effect of the mouse and sound manipulation could not be measured yet. It remains at large whether participants in the mouse cause condition and in the sound cause condition will show a noticeable increase in the attribution of respective causes (Mouse movements, Microphone) when compared with the control conditions.

Several participants commented on this Web experiment by sending e-mails. "Belinda" writes: "please tell me how it is done, i have no idea. i chose the cards before i even entered the door and clicked on either eye so how is it possible? i done it approx five times and every time it worked." (11/7/99). And "Lukas" sent the following comment: "It's cool!!! I thought it's a telepathy or something like that because it's about psychology. And I think you know that because you're the guy. That was insane!" (10/29/99).

Epilogue

Until final results for the Web experiments described here can the conclusion can be drawn that online research with children is possible, if precautions are taken. One solution to some of the potential problems in this type of research is the use of a combined online/offline research technique.

Judged on the basis of e-mailed comments, young participants seem to like our Web experiments just as older participants. Let us finish with a statement sent on November 3, 1999, by one potential participant demanding his participation in online research: "Hi i am a 10 year old collage genus and i herd about this science slub thing e-mail me back at …"

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