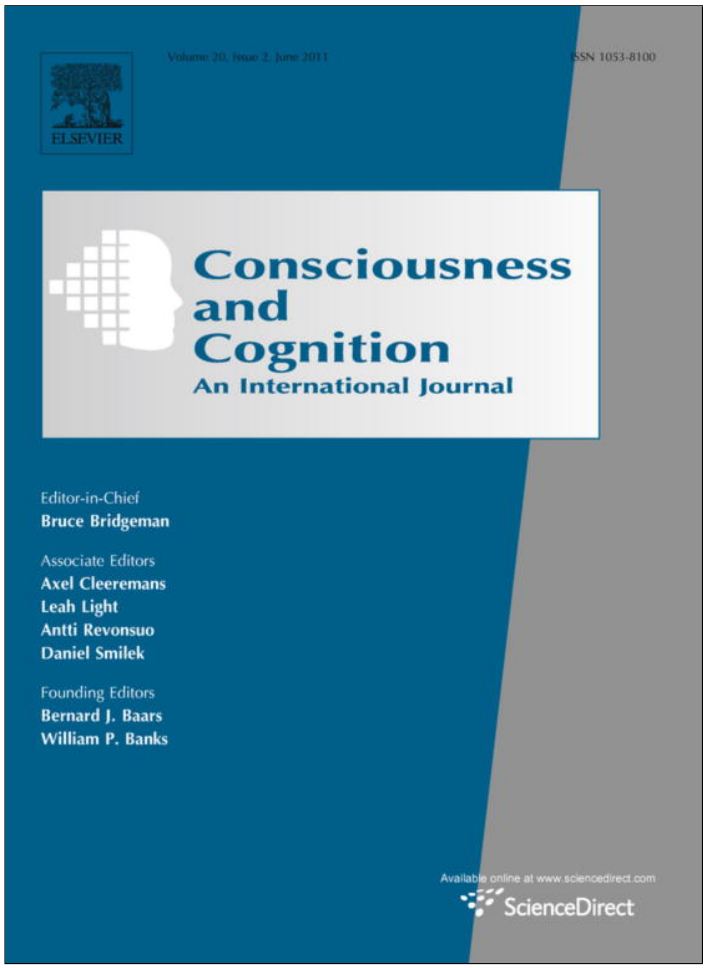

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Commentary

The influence of suggestibility on memory ☆

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ABSTRACT

We provide a translation of Binet and Henri's pioneering 1894 paper on the influence of suggestibility on memory. Alfred Binet (1857–1911) is famous as the author who created the IQ test that bears his name, but he is almost unknown as the psychological investigator who generated numerous original experiments and fascinating results in the study of memory. His experiments published in 1894 manipulated suggestibility in several ways to determine effects on remembering. Three particular modes of suggestion were employed to induce false recognitions: (1) indirect suggestion by a preconceived idea; (2) direct suggestion; and (3) collective suggestion. In the commentary we suggest that Binet and Henri's (1894) paper written over 115 years ago is still highly relevant even today. In particular, Binet's legacy lives on in modern research on misinformation effects in memory, in studies of conformity, and in experiments on the social contagion of memory.

Alfred Binet (1857–1911) is famous as the creator (with Theodore Simon) of the first successful intelligence test (Fancher, 1985). But the work of this French psychologist is remarkable in many other ways (see Wolf (1973) for a biography of Binet). In particular, he conducted research on many different aspects of remembering (cf., Nicolas, 1994a; Wolf, 1976) and was among the first investigators to study the influence of suggestibility on memory and the whole issue of false memory or memory illusions (Roediger, 1996). At the time he focused his studies on two major research topics: mnemonic techniques for memory improvement (cf., Binet, 1894) and with his collaborator Victor Henri (1872–1940; for a biography, see Nicolas, 1994b) the development of verbal and visual memory in children. It is in the course of the latter studies he showed that children could be highly suggestible and he devised several techniques to measure the effects of suggestive influence on their memory. This work culminated in his major book *La Suggestibilité* published in 1900 (and still untranslated today).

Binet and Henri's 1894 paper, although written over 115 years ago, is still highly relevant today. The authors estimated the effect of natural suggestion on visual memory as a function of children's age. In the various experiments described in this paper, suggestion was manipulated in various ways under conditions of uncertainty for the children. Three particular modes of suggestion were employed to induce false recognitions: (1) indirect suggestion by a preconceived idea; (2) direct suggestion; and (3) collective suggestion. Binet's legacy lives on in modern research on misinformation effects in memory, in studies of conformity, and in experiments on the social contagion of memory.

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Just like later researchers, Binet sought to study suggestibility as a normal social and cognitive process rather than as an indication of psychological aberrance or weakness. Within this framework, he conducted other experiments (Binet, 1900) that established the role of prior attitudes (autosuggestion) and of comments or orders (suggestions of the experimenter) on acts of remembering in subjects studied both individually or in groups. The results of these experiments broadened and confirmed those published in Binet's earlier 1894 article. By studying the suggestibility of normal subjects, he helped to establish a scientific foundation for the psychology of testimony. Indeed, Binet's research on suggestibility in visual memory is similar to much later research. For example, the influential line of work begun by Elizabeth Loftus and her colleagues (e.g., Loftus & Palmer, 1974; Loftus, Miller, & Burns, 1978) on the effects of suggestion on visual memory are similar in spirit to Binet's. In the Loftus misinformation experiments, subjects study a scene and then later certain items are suggested as being in the scene that were not actually present. Relative to appropriate control conditions, subjects incorporate the misleading suggestions into memory and later recall or recognize them as part of their memory reports. Thus this method essentially uses the direct suggestion method that Binet used in 1894.

An even more direct influence of Binet's work can be seen in the famous series of experiments by Solomon Asch on conformity in social psychology (Asch, 1951, 1952, 1956). Asch used not only Binet's techniques but his actual experimental task from the 1894 paper. He showed a group of people a single line among comparison lines with one matching comparison line. Judgments were perceptual, with the stimuli still before the subject. Under conditions of no suggestibility (when subjects reported privately or were tested alone) few errors were made. However, when Asch had confederate subjects deliberately report a consistent error before the actual subject reported his or her response, that subject would often conform to the group judgment rather than report what he or she (presumably) accurately saw. The conformity research begun by Asch has been quite influential (see Gilovich, Keltner, & Nisbett, 2010, pp. 281–293 for a recent review). Asch's experiments use Binet's method of collective suggestion although, unlike Binet, he asked his confederate subjects to deliberately make errors. Despite what seems to be a direct adaptation of Binet's task and to some extent his method, Asch never cited Binet's work in his three major publications on this topic (1951, 1952, 1956). This is to take nothing away from Asch's clever adaptation of the task and the ensuing interest in his work, but when a researcher is studying social influence and suggestibility, one might be generous enough to reveal the sources of suggestion for one's own ideas and methods. Irony abounds in Asch's oversight.

Later research has combined the Loftus and Binet/Asch techniques to study conformity in memory reports. Roediger, Meade, and Bergman (2001) developed a task to explicitly blend the conformity situation (two subjects take turns recalling a scene so their memory reports can influence one another) with the misinformation paradigm (some of the information suggested by a confederate subject is wrong). Roediger et al. (2001; Meade & Roediger, 2002) had subjects witness scenes (e.g., a kitchen) that contained many objects. Later, subjects took turns recalling items from the scene. On some occasions, a confederate would recall two items that had not been in the scene, one that was quite typical for the scene (e.g., a toaster for the kitchen scene) or another object (oven mitts) that could occur there but with a lower probability. After the confederate and subjects had taken turns recalling the items, they were separated and then asked to recall the items separately after being instructed to be sure to recall only items from the original scenes. Nonetheless, the subjects often incorporated items suggested by the confederate into their recollections of the scenes. The confederate's erroneous memories seemed to infect the subject's memory, a process that Roediger et al. (2001) labeled the social contagion of memory. Others have studied similar phenomena (e.g., Wright, Mathews, & Skagerberg, 2005), and all these studies indirectly owe a debt to the pioneering work of Binet.

Because the issue of suggestibility has played such a large role in psychology in the English-speaking world (in research on social conformity, errors in memory, and hypnosis), it is unfortunate that Binet's pioneering work has been inaccessible to psychologists whose native language is English. The publication of the Binet and Henri (1894) translation helps to belatedly correct this oversight.

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Natural suggestibility in children ☆

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In numerous studies carried out on suggestion these past years, most researchers have disposed the conditions of their experiments so as to maximize the effect of suggestion. For this purpose, subjects whose temperament rendered them particularly sensitive to suggestion were deliberately chosen. In order to increase their authority and power, experimenters used to apply the technique of suggesting things to a subject while he was asleep; this allows the mental influence that one can have on another person to produce effects that would not otherwise have been observed. It is in this way that researchers have been able to provoke in various persons, hallucinations, delirious conceptions and other phenomena that are only observable with persons whose sense of judgment is paralyzed.

One must admit, however, that suggestions of these kinds are quite removed from what takes place in real life. Except for some rare cases of contagion and epidemics, the moral actions and reactions that ordinarily occur in the relationships of normal individuals hardly resemble, in terms of intensity, what happens in hypnotism.

Our present research on educational psychology aimed to study the effect of suggestion in normal situations. It is known that in a well-disciplined class, the teacher, by means of his words, encouragements, criticisms, disapprovals, by a system of rewards and punishments and also [page 338] by his attitudes and gestures, continually exerts suggestion on his pupils. However, in order to characterize their moral action which is not only harmless but also wholesome and necessary for any profitable education, teachers generally avoid employing the term suggestion, a term which evokes the domain of pathology. Indeed, there is an abyss between suggestion from experimenters and doctors, and that from teachers; the latter neither deprives the pupil of his freedom of action nor hinders his judgment. Therefore in order to avoid any confusion, it seems useful to us to employ the term *natural suggestion* to describe the form of influence that people exercise on others in normal situations.

We must immediately explain how we designed our experiments and how we tried to simulate, as much as possible, an ordinary life situation. We did not imagine an experiment specifically about suggestion, but during another study on a different question, we examined what would happen to the results if we used a suggestion so slight that neither the pupils nor the teachers noticed its existence. We therefore carried out our research on children's visual memory, which we will describe briefly. Various lines of different lengths were presented to children, who were to memorize them and, after a while, to recognize them on a board containing lines of different lengths. The experiment on suggestion itself consisted simply in emitting doubt as the pupil, based on his memory, pointed to a line on the board. At this moment, the experimenter always uttered the same sentence: "Are you sure it is the correct line?"

This kind of suggestion is similar to that constantly exercised by a teacher on his pupils, when he emits doubt with regard to the exactness of their answers in order to verify the confidence they have in their responses. This form of *educational suggestion* is so well included in the customs of teaching that our different experiments never provoked the slightest surprise on behalf of pupils or teachers.

Our experiments were devised to study the various [page 339] conditions which determine the effects of suggestion, for example pupils' age and the type of mental operations on which suggestion operates. We thought that it would not

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be of interest to show once again that children are suggestible; we wanted to investigate the mechanism underlying natural suggestion. The effect of suggestion was studied in three different circumstances: first, when suggestion resulted from a preconceived idea which was generated by the lay-out of the experiment; second, direct suggestion using spoken words as outlined above; and third, by proposing an experiment in which pupils acted collectively and simultaneously in order to induce suggestion by imitation. These three different experimental manipulations are described separately below.

Suggestion by a preconceived idea

In a first series of tests, three model lines of different lengths were successively presented to children. They then had to find these three lines one after the other among other lines of different lengths displayed on a board. It is the scale experiment described previously; it uses a board containing 21 parallel lines where the length of the lines varies regularly from 4 to 80 mm. The difference between two neighboring lines was 4 mm and the three model lines presented to the children corresponded to the 5th, 11th and 18th lines.

Once this test complete, we repeated it with a second board which was arranged similarly to the first one, the only difference being that the third model line was excluded; this second board, instead of containing 21 lines, contained only 16. As a result, the 18th line, which corresponded to the third model line with the longest length, was not represented on board II. The child was not informed of this modification which he had to discover alone by the efficiency of his eye glance. Two distinct response types were observed: either the child, believing that the model line with the longest length was presented on the truncated board, indicated a line; or the child noticed that the model line was not on the new board. This test was conducted under two forms, first by memory and then by direct comparison. In the memory condition, once the child had looked at the model line for a certain time, it was hidden and, after about 10 s [page 340], the board in which the child had to find the model was presented. In the direct comparison condition, the model line and the board were presented simultaneously, and the child was able to move his eyes several times from one line to the other one in order to compare the model line with the various lines on the board.

Let us try to precisely determine children's intellectual state at the time of this experiment and the various motives which acted on their judgment. The child, having previously seen the three model lines on the first board, would tend to believe that it would be possible to come upon three such similar lines on the second board as well; moreover, since the second board was presented just after the 3rd model line, the child could interpret this as a deliberate invitation from the experimenter to search for the third line on the second board; there were thus a certain number of influences which could have incited him to search for the 68 mm-long line on a board where the last line was only 60 mm long. Despite all these influences which acted on a given child even more if he did not pay attention, he can still resist these influences by the efficiency of his eye glance and by the exactness of his memory. Furthermore, in order to triumph over the obstacles placed in his way, the child must have the courage to tell the experimenter that the model line is not on the second board; a child of an exaggerated shyness, although possessing an excellent eye glance, may not pass this test. Overall, in order to succeed in this experiment which in reality is not as simple as it seems, the child must have sufficient intellectual qualities, an awakened attention, an excellent eye glance or memory, the certainty tied to well-executed mental operations and also moral qualities such as a firm, assured and confident character.

Subjected to this test, a certain number of pupils failed it, and believed that on a board whose longest line was 60 mm, the line with a length of 68 mm was to be found. Can we say that all of the pupils who made this error did so because of suggestion, as we have just described? It is obviously not so, because for some of them, the error simply resulted from a lack of memory or a poor eye glance. This is easy to explain. In a preliminary experiment, designed to measure the pupils' visual memory, they were presented with a 68 mm-long line and then asked [page 341] to find this line on a board containing other lines among which the longest one was 80 mm long. Memory errors of considerable importance were observed. Indeed, some pupils indicated a line of 60 mm and even shorter as equal to the model 68-mm line. When these same pupils performed the experiment on suggestion, their errors cannot be attributed solely to suggestion, because without suggestion they made a similar error.

We thus excluded these pupils from the total number of subjects and kept only those who in the preliminary testing had sufficient memory or eye glance to indicate only the lines measuring more than 60 mm as equal to the model line of 68 mm long. It was only these pupils who could notice that board II did not contain the model line of 68 mm long.

The answers given by these pupils must be studied according to two factors: their age and the condition in which they correctly identified that the model line was not on the second board. We will outline only a few points.

The 240 children who took part in our experiments belonged to three different primary school classes: elementary class, middle class and upper class. The average age of the elementary class was 7–9 years old; 9–11 years old for the middle class and 11–13 years old for the upper class. The youngest children were the most sensitive to suggestion by a preconceived idea. Indeed suggestion by a preconceived idea concerned 88% of the children in the elementary class, 60% of the middle class children and 47% of the children belonging to the upper class. Because much effort was made so that the experiments for all the pupils were conducted in absolutely equivalent conditions, the differences indicated above can be directly attributed to the children's age and degree of intellectual development. The influence of suggestion therefore seems to vary considerably between 8 and 11 years of age.

In these same experiments, we were able to compare the influence of age on memory capacity, and it appeared that the influence of age on memory was much less pronounced; two children of 8 and 12 years old [page 342] differ less by the exactness of their memory than by their susceptibility to suggestion. Considering memory performance for a 68 mm line, 8-year-old children made on average 89% errors while 12-year-old children made on average 70% errors.

Having dealt with the influence of age on suggestibility, we shall now consider the effect of the mental operations executed by the child on suggestibility.

As mentioned above, the experiment on lines was conducted in two conditions, a memory condition and a direct comparison condition. The number of errors made by the children when they were left on their own without any suggestion varied according to condition. Indeed, when considering data from experiments performed by 300 children on a 68 mm line, we observed 67% errors in the direct comparison condition and 79% errors in the memory condition.

When the experiment was modified by introducing a source of error, namely the absence of the 68 mm line on board II, the number of errors was still greater in the memory condition than in the direct comparison condition. Indeed, 65% of the children were influenced by suggestion in the memory condition while in the direct comparison condition, 38% of the children were influenced by suggestion.

These results are significant; they put forward the very complicated meaning which must be given to the term suggestibility. We proposed above a kind of theoretical analysis of the state of suggestibility and said that suggestibility is partially linked to the shyness of the child and also partially to memory or eye glance uncertainties, as a result of which the child would not dare to assert that a particular model line was absent on the second board. The two testing conditions, the memory test and the direct comparison test, reveal the importance of the feeling of uncertainty. On one hand, in the direct comparison test, the fact that the child could see both the model and test lines gave him more confidence in his judgment, and on the other hand the error in the second board (i.e. the absence of the 68 mm line) was more striking in the direct comparison test than when making a judgment based on memory. It was thus precisely when feeling of uncertainty was reduced that the number of errors due to suggestion was also smaller.

Verbal suggestion by the experimenter

By its design, our experiment to a certain extent resembled classic experiments on suggestibility in which an experimenter influences the subject [page 343] by his words. However unlike these classic experiments, our experiment has more to do with suggestion in an educational context. The following is a description of the procedure applied in our study.

A model line 40 mm long was presented to a child. In a memory or a direct comparison test, the child then had to identify the same line on a board which consisted of series of lines, one of which was 40 mm long. Once the child had indicated a line which appeared to him as equal to the model line, we pronounced, regularly and always on the same tone, the following sentences: "Are you really sure? Is it not the next line?" In order to evaluate the exact consequence of this discreet warning, we should have taken into consideration the tone, the accent and many other imperceptible nuances which can influence a person's authority and the value of his words. Regrettably, such notation is still nowadays completely impossible. Let us simply specify that the experimenter made the remark in a soft and quiet tone, without raising his voice, without making gestures, and without insisting. Only 150 children were subjected to this experiment. The results are illustrated in the table below (see Table 1).

The youngest children, from the elementary class, usually did not present a strong stability in their first judgment; indeed only 19% of them maintained their spontaneous judgment while the others, under the influence of the warning, changed their opinion and chose a different line. The same variation was more or less observed with pupils from the middle class. It was those from the upper class who showed most firmness in their response; 49% of the pupils – almost half – remained insensitive to the warning and continued to indicate as the exact answer the line which they chose at first.

The distinction between performance in the memory and the direct comparison tests presented above is also applicable here. Overall, the children remained more faithful to their first judgment in the direct comparison test relative to the memory test. Indeed, in the memory test, [page 344] 74 children complied with the suggestion which was given to them (and changed their response); while in the direct comparison test, this number dropped to 65 children.

However, overall the difference between both testing conditions was not that important.

Even clearer was the difference in attitude between children according to whether or not they succeeded in finding the appropriate line in the test board. In all cases without exception, the experimenters gave the same warning to the child in order to perturb the stability of his judgment. However it is noteworthy that children who first gave the right answer were also more reluctant to abandon this answer compared to those who first made an error. Hence, in the case of a right answer, 56% of the children abandoned their initial judgment, whereas in the case of an inaccurate answer, 88% of the children

Table 1
Numbers of cases in percentage in which the children changed their answers.

	Memory (%)	Direct comparison (%)	Average (%)
Elementary class	89	74	81.5
Middle class	80	73	76.5
Upper class	54	48	51

changed their answer following the warning. This result in our point of view can be partially explained in the following way: when a child does not find the line exactly equal to the model, it is possible that his failure may be due to a lack of attention. Being often conscious of his inattention, the child is more inclined to change his opinion than another child who is aware and satisfied by the attentional effort which he has deployed to find the exact line. However this explanation remains too simple to be the whole story.

Let us now turn to the children who gave an erroneous initial answer and changed their answer following the warning. The same warning was given to all the children and the direction of the error which they made was never indicated (i.e. that they had selected a larger or smaller line). However, once warned, most of the children spontaneously changed their answer; 81% of the children gave second answers closer to the correct answer, whereas a minority of children (19%) gave a second answer which was farther away from the correct answer. The very vague warning thus had the effect of helping them to correct their error; it is a peculiar fact which we were far from expecting. We could have thought that the child would be disturbed or misled by experimenter's words and as such aggravate in half of the cases his initial error; no such thing happened and instead the warning had a beneficial effect inciting the child to pay more attention. This favorable effect can be easily explained by considering the direct comparison test; the child, aware that we questioned the efficiency of his eye glance, would be inclined to compare both lines again with more attention and more control and thus generate better performance. It is even more surprising that this awakening of attention rendered more exact a comparison based on memory that the child cannot check by looking at [page 345] the lines again. In the memory test, the model line was not presented a second time and the child must rely only on memory, nevertheless when warned of his error, he can still correct an incorrect initial answer. This can still be explained by an awakening of attention, but in this situation the reinforcement of attention focused on an image in memory instead of focusing on physically present items.

Suggestion in collective experiments

These experiments also consisted of direct comparison and memory tests. However unlike the previous experiments which were run individually, here groups of four pupils participated collectively. The pupils of a group were arranged side by side such that they could all clearly see the model line and the board containing comparison lines. They were then asked to answer at the same time and to indicate the line on the board which seemed to them as equal to the model line. Generally, they did not manage to answer at the same time, some were slower and others quicker; those who answered last could be influenced by the answers given by those who were faster. The experiment thus reproduced in miniature what takes place in a crowd, where every individual is subjected to the contagious effect of the example given by others.

In our study the contagious effect of others was very obvious with small children. Almost all groups of young children on whom we conducted our observations gave uniform responses. Often when one of the children, usually the quickest, indicated a line on the board, the three other children would as a result indicate the same. As they advance in age, children acquire more independence; the oldest children of our study could thus indicate a line different from the one which was chosen by one of their companions before them; however when they acted in a group, they still tended to indicate the same line and as such the number of identical answers were more important in collective experiments than in experiments carried out individually.

By observing the children in these conditions, it was possible to dispatch them into three categories: the children who answered first and served as an example for the others; then the slower children, who were influenced by this example and thus answered like the faster children; and finally, children who disagreed with their peers and answered in their own way. We examined whether the average collective answer was closer to the truth than the averages of individual answers. It appeared that collective answers were a little better than individual ones. Indeed, in one of the classes which we tested, 23 correct answers were given individually while 34 correct answers were given collectively [page 346].

Summary

The experiments which we have summarized consisted in provoking judgments of line length either by relying on memory or by direct comparison. In any study on people's judgments, and studies of sensation are nothing other than studies of judgment, there are two things to be distinguished: first the judgments themselves, like in the experiments which we have just described: the number of exact answers and the number of errors, the value of these errors and their nature. The second thing consists in studying the mental state which accompanies the judgment; this implies measuring for example the time necessary for the judgment to occur or to ponder the intellectual conviction which accompanies it. Our research focused on this last point.

Judgments present diverse degrees of stability. By stability we mean the resistance that a state of consciousness offers against the influences that tend to modify it. This stability varies with the circumstances. Two people arriving at the same judgment by means of the same process and on two identical objects may not have the same stability. Indeed it is possible that the first person remains faithful to his opinion whatever happens, whereas the second person may abandon it, under an intellectual or emotional influence.

We have described above the procedures used to estimate the stability of judgment in children. Although this estimation led to numerical conclusions, it cannot be considered equivalent to a real measure. Indeed in all the experiments that we

carried out with children, by our words and our attitude, we exerted an influence at different levels depending on our personality; hence without doubt if another experimenter were forced to redo exactly the same experiments, he would not exercise a moral action strictly equivalent to ours. The person who acts as experimenter here is of vital importance, whereas this influence is much weaker in common experiments in psychology.

Nevertheless, we always tried hard to exercise minimal influence on the pupils, by trying not to intimidate them. Furthermore, since we used the same procedure [page 347] in all classes and schools, the numerical results that we have presented can at least be used relatively to compare pupils to each other and to determine the influence of age on suggestibility.

This last point appears to us to be the most important fact that our research has revealed. Our experiments were also able to determine the influence of age on the development of memory for length and also on the stability of judgments about length. In many ways the outcome of these experiments concerns specific and restricted phenomena and as such it would be dangerous to draw general conclusions about children's psychological organization. Nevertheless, within the limits of these experiments, the important point can be summarized as follows: the degree of suggestibility varies more with age than does the development of memory for lines, studied in the same conditions. This appears in all the numerical results which we have given. As a conclusion to this study, these numerical data can be summarized below as a unique average:

Average number of memory errors and direct comparison errors: elementary class, 89%; upper class, 70%.

Average number of errors as a result of suggestion: elementary class, 88%; upper class, 47%.

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