Alfred Binet on eyewitness testimony

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Abstract

In his book “on suggestibility”, Alfred Binet (1900) conducted experiments on eyewitness behavior in the context of his research program of individual psychology. In chapter VI of this book, he dealt with the eyewitness testimony of children. After studying several objects pasted on a large poster for twelve seconds children were asked to report as many details as possible of what they had observed. Results showed that fewer but more accurate details were recalled by subjects who reported information freely and spontaneously, in comparison to those who responded to specific questioning. Moreover, question-wording strongly influenced recall leading to numerous memory errors. Thus, Binet was the first to establish the role of leading questions on acts of remembering. In the introduction we suggest that Binet’s legacy lives on in modern research on misinformation in memory. We provide an English translation of this paper that today exists only in his native French.
Recently Morton Hunt (2007) has written that “Alfred Binet… was not a great psychologist; he formulated no important theory, made no brilliant discoveries, and was not a charismatic teacher. But he had one original and simple idea…” (p. 251). Alfred Binet’s (1857-1911) idea was to measure intelligence as an age-related phenomenon, which led to the first mental tests that worked well and that have since been developed and used all over the world (see Fancher, 1985). Certainly this was his most important contribution to the field of psychology, but he made other telling contributions that are much less well known today (Nicolas & Ferrand, 2011; Siegler, 1992).

We believe that the work of this French psychologist is remarkable in many other domains, particularly applied psychology (see Hoffman & Deffenbacher, 1992). In particular, he conducted research on many different aspects of remembering and was among the first investigators to study the influence of suggestions on memory and the entire issue of what today would be called false memory or memory illusions (Roediger, 1996). In this article we focus on Binet’s pioneering contributions to memory research on eyewitness testimony.

It has now been a century since Binet’s death, and we take this opportunity to honor his contributions to the study of memory and to provide an English translation of an important chapter of his book on suggestibility (Binet, 1900) that today exists only in his native French. Because so little of Binet’s work on memory has been translated into English, it is perhaps for this reason that many English speaking psychologists do not recognize his importance to the field as captured in the quote by Hunt (above), despite some recent attention devoted to Binet’s work on psychology of memory (see Ceci & Bruck, 1995, pp. 52-55; Nicolas, 1994a; Wolf, 1976).

**Binet and Henri’s first Experiments on Memory and Suggestion (1894)**

Contrary to his work (for a synthesis see Binet, 1894) on memory of expert calculators and chess players, Binet is not well known for his experimental work on children’s memory (Binet, 1894a, 1894b, 1895a, 1895b). Binet and his collaborator Victor Henri (1872-1940; for a biography, see Nicolas, 1994b) first conducted studies on visual memory and the influence of suggestions and suggestibility on children’s performance during the school year 1892-1893.

In order to know how children’s memories might become subject to suggestions, Binet and Henri (1894a) first developed a new experimental situation. They studied how students aged 7 to 13 years remembered a line of a given length (16mm, 40mm, or 68mm) that had been drawn using a pencil on a white cardboard and was presented for 5 seconds. The authors
employed two different methods of testing. One was a recognition test in which the children had to identify the correct line among a range of lines arranged in ascending order (from 1mm to 72mm) after a retention interval of 5 seconds. The other test used the method of reproduction; children were required to reproduce (using a pencil and a sheet of paper) a line of the same length as the one they had viewed. The experiment revealed two main results: (a) the errors of visual memory decreased regularly with age; and (b) the errors were larger and more consistent with the recognition method than with the reproduction method. Children showed a tendency to shorten the longest lines and to lengthen the smaller ones in the recognition test and this tendency was greater for the younger children.

While studying visual memory, Binet and Henri (1894b) also tried to estimate the effect of natural suggestion as a function of children’s age (for a recent English translation of this paper, see Nicolas, Collins, Gounden & Roediger, 2011a). The authors’ primary aim was not to discern if children are prone to suggestions (they assumed they were), but rather to know how they become suggestible. 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 used.

1. **Indirect suggestion** from a preconceived idea induced by a prior test. In this case, a model line of (for example) 40 millimeters in length was presented to a child, who subsequently had to recognize it on a board that consisted of several lines including the model line. After this first test, the child was presented with a new board that did not contain the model line of 40 millimeters. Subjected to this new board, numerous children made false recognitions because they wrongly believed that the model line was also present (as it was the case on the first board). The results revealed that the youngest children were the most prone to suggestion in this manner whereas older children could more accurately report that the correct line did not appear on the second board.

2. **Direct suggestion** by the experimenter. In this case, suggestion was provided verbally by the experimenter. Just after the child designated a line as equal to the model line, the experimenter then said: “Are you sure? Is it not the neighboring line?” The results revealed that under the influence of this direct suggestion made in a soft tone of voice, the majority of children abandoned the line they first indicated and chose the suggested one. The results also showed that younger children were more influenced by suggestion than were older ones. Moreover, it appeared that the influence of suggestion was greater when certainty and confidence were low. Indeed, when a direct comparison of lines was performed (the children could simultaneously view the model line while searching for the same line on the board), the
number of cases where the children changed their answer was smaller relative to the condition in which the children had to rely on memory for the sample line in order to perform the task.

3. Collective suggestion. In this condition, several children were placed in front of the board containing the lines during the test and were asked to respond collectively. The results revealed that children generally (a) gave more exact answers in a group situation; (b) the youngest often had uniform and unanimous answers (the first answer given by one of the children was usually accepted and followed by the other members of the group), but (c) the oldest children were more likely to express themselves in an independent manner (the first answer given by one of the children was not always followed by the other members of the group). In this latter case, the suggestion of other children probably served to minimize errors, although control groups that would test children individually were not used.

Binet and Henri’s research on suggestibility in visual memory was adapted by Solomon Asch (1907-1996) who not only used Binet and Henri’s techniques but also his actual experimental task from the 1894 papers. However Asch (1951, 1952, 1956) never cited Binet and Henri’s work (see Nicolas, Collins, Gounden & Roediger, 2011b). By studying the suggestibility of normal subjects, the French authors helped to establish a scientific foundation for a psychology of testimony. Binet (1900) later conducted a number of new experiments on eyewitness behavior in the context of his program of individual psychology.

**Binet’s later Experiments on Memory and Suggestion (1900)**

The development of experimental research on memory and suggestibility in normal subjects continued with Binet’s program on individual psychology that started in 1896 (Binet, 1897; Binet and Henri, 1896). Binet did not want to limit his new psychology to the study of simple elements of the mind (the prevailing Wundtian doctrine) but felt inclined to include the study of complex operations. Indeed, in his program on individual psychology, Binet argued that normal individuals are characterized and differ from one another by their higher mental processes (in particular by their way of remembering, imagining, judging and reasoning) rather than by their sensory capacities. Like researchers who came much later, Binet sought to study suggestibility as normal social and cognitive processes rather than as an indication of psychological aberrations or weakness. Within this framework, he conducted new experiments published in the never translated into English book “On suggestibility” (Binet, 1900) that established the role of comments or orders (suggestions) of the experimenter on the acts of remembering in subjects studied both individually or in groups. The results of these experiments extended and confirmed those published in Binet’s earlier articles from 1894.
Binet’s (1900) new experiments on memory, of which some important excerpts are translated here, are complementary to the Binet and Henri’s (1894b) experiment described above. Binet explicitly took the role of an investigating judge and estimated the truthfulness of the memories of his witnesses: he was, arguably, the first to establish a scientific foundation for the psychology of testimony (Binet, 1900, p. 285).

Indeed, in chapter VI of his book on “l’interrogatoire”, Binet (1900) dealt with the psychology of the testimony. In the text, he moreover called for the creation of this new science. According to Binet, a judge can influence witnesses by his/her questions as follows: 1° He/she may allow the witness to exercise complete free rein and spontaneity (in recalling information); 2° He/she may force questions without biasing (impose questions without biasing the recall); 3° He/she may make leading suggestions to the witness by the questions; 4° And finally he/she may force extreme suggestions by his/her questions. Here Binet reduced these cases to experimental conditions for groups of male elementary schoolchildren aged 7 through 14 years.

Several objects (a coin, a button, a stamp, a store label, a photograph, and a small magazine picture of a crowd) were pasted on a large poster. The experimenter showed the poster for twelve seconds and then asked the children to report as many details as possible of what they had seen. The first case of an investigating judge was imitated here by asking children to write their answers as fully as they could without asking them any specific question. Results showed that their reports were incomplete with numerous errors added; but this was in fact the best condition for testimony (to obtain testimonials from young witnesses). Binet underlined that if you desire faithful testimony from a child you must not ask him any questions, nor allow him to make oral report, but require him to write down spontaneously what he knows. This is especially true about children because they are less capable than adults in distinguishing between facts and fiction.

The second manner of the judge (that is, the case of forced memory) was tested on other children. The experimenter first showed the poster and then, as the child reported what he had seen, asked forty-one questions about actual details of the fixed objects. The results show that more but less accurate details were given (cf. Stern, 1939), e. g., when a child sketched the canceling letters R I S on a stamp that has not been cancelled at all. Thus subjective certainty and completeness of details are not correlated with the ability to recall. The errors are of two types: namely, logical errors, e. g., having stated that the button is sewed on (it is pasted on), the logical error of assigning a color to the thread followed; and, errors of invention, e. g., when some fancied or imaginary object is described instead of the real one.
Three other tests were conducted using written questionnaires. The same objects were shown as before. The children were divided into three groups and each group received a different set of questions. The first was intended to force memory, e.g., "How is the button fastened?" The second gave moderate suggestion about each object, e.g., "Is the button fastened with a thread?" The third gave a strong suggestion, e.g., "What is the color of the thread which passes through the holes of the button and fixes it to the card?" Thus, each of the last three cases of the judge mentioned above was experimentally reproduced. Each set of questions brought out characteristic results. The majority accepted the suggestions and wrote as if the memory images had been true and spontaneous. This feeling of spontaneity is an exceedingly important factor which was well brought out in the introspective reports. The tests were repeated on older students. These young adults made the same kind of errors as the children had committed, though not to the same extent. These students were undoubtedly more reliable observers than people on whom judges ordinarily depend in courts. The strong effect of question forms (cf. Loftus, 1975) was thus primarily studied by Binet in his original investigations.

We have chosen to translate this chapter by Binet (1900) because it anticipated later development in the psychology of memory and suggestibility. By studying the suggestibility of normal subjects, Binet established a scientific foundation for a psychology of testimony. As Ceci and Bruck (1995, p. 52) who have a nice discussion of Binet and his contributions at the time have also noted, Binet’s “data continue to stand up well in the modern forum.”

**Binet’s Contribution in Light of Later Research**

As noted by Cunningham (1988), Binet’s book on suggestibility was largely ignored in France despite the important implications it held for the study of eyewitness testimony (Binet, 1905). However, his work was later developed by a former student of Hermann Ebbinghaus (1850-1909), the German William Stern (1871-1938) who was able to generate interests in the academic and legal communities (Stern, 1903-1904) by adapting some of his research methods.

More recently, Binet’s research on suggestibility in visual memory can also be found in later work in the field. Various authors have shown that how a question about the past is formulated can influence what a person claims to remember. In the misleading post-event information (MPI) paradigm participants are exposed to a complex event; they are later misinformed about some details of that event, and finally are given a forced recognition test requiring them to choose between the original and the suggested details. 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 is similar in spirit to Binet’s. For example, participants first watched a series of slides depicting a traffic accident that happened after a car failed to stop at a stop sign. The experimenter then asked one group of subjects what the car did after “passing the yield sign” (instead of “stop sign”). The control group was asked what the car did after passing the stop sign. When they were later asked about the information seen in the slides, the subjects who heard the misleading question were much more likely to report having seen a yield sign than the subjects who had been asked questions containing correct or neutral information. In the Loftus (1979, 2003, 2005) misinformation experiments, relative to appropriate control conditions, participants incorporate the misleading suggestions into memory and later recall or recognize them as part of their memory reports. Thus this method is essentially the same as the direct suggestion method that Binet had employed in his studies in 1900.

Binet’s friend, the Swiss psychologist Larguier des Bancels (1912), was correct in crediting Binet’s contribution to the scientific psychology of memory, and considered this field of research to be among Binet’s most influential work. Binet indeed realized early that Ebbinghaus’ (1885/1913) attempts to exert careful control over the meaning of the material in his memory experiments, while laudable for his purposes, deprived the study of other qualitatively interesting phenomena (as Bartlett [1932] also pointed out long after Binet).

The paper
What follows (after the References) is a translation of some significant excerpts of Binet’s (1900) long chapter VI (pp. 244-329) important contribution to help bring it to the attention of the English-speaking world.
References


On questioning\(^1\) (1900)

Alfred BINET

[245] While conducting this work, I almost constantly adopted the point of view of an investigating judge and I explored how the process of judicial interrogation could induce possibilities of suggestions and errors\(^2\).

The question can be divided into several parts as a function of how we understand an interrogation. I do not doubt that, in practice, [246] judges employ in good faith such and such method of interrogation, without realizing the differences that they present with regard to the guarantees of sincerity and of accuracy. I thus distinguish 4 main varieties of methods:

1\(^o\) The judges allow the person being interrogated – let us suppose that he is a witness – his complete spontaneity; the witness does not respond to questions, and is in complete liberty.

2 \(^o\) The judges ask questions, they formulate precise questions, they show insistence, they force the witness to answer, without influencing the witness in one direction or another. It is a forcing of memory.

3 \(^o\) The judges exert influence on the witness. By the nature of the questions that they employ, they induce a light suggestion.

4 \(^o\) The judges make excessive suggestions.

The logical order would want that we begin with the first type of interrogation; but in fact, I began my experiments with the second, for the very simple reason that we do not make such classification at the beginning of a research. I shall thus begin by presenting the results that I obtained via the memory forcing method.

Exercise of forced memory

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\(^2\) We proposed a translation that conforms as far as possible to Binet’s original text. We have kept the writing styles and the tenses used by the author in his writing that might be somewhat unusual to today’s norms of scientific writing. [Translator’s note]
Let us suppose that an investigating judge, alone with a child, questions the latter; this child was the witness of a grave event for which a testimony without error is of capital importance for justice. The judge questions the child with gentleness, with patience, knowing how much the slightest suggestion can influence the docile mind of a child. He weighs each word before pronouncing it, and he even takes precaution to hide from the child his own personal conviction, in order to avoid dictating, despite himself, the answer that seems more appropriate; but, in spite of this precaution, he is obliged to insist several times, to obtain from the child, answers that do not come immediately; he cannot contend himself with the silence of his small witness; he needs to make the child speak, one way or another; he is impartial, and very impartially he puts alternatives to the child: "Did you see this or that, specify how things occurred, this way or that way?" I believe to be right in supposing that the interrogation of children, who are obligated to appear as witnesses in justice, occurs mostly according to this method. The Investigating judge does not consider this method to be incorrect, because he believes to have suggested nothing precise to the child in leaving him free to choose among the various proposed alternatives. Although nothing precise was suggested to the child, as I am going to demonstrate we nonetheless exercised on the child an influence that is no less dangerous. We “forced” his memory, by instructing the child to specify memories that are vague and uncertain; the judge forced the child to commit, without the judge’s knowledge - and thus in complete good faith - memory errors that may have serious consequences.

These reflections are inspired by the results of the experiment that I have designed to study memory errors in children. The results of this experiment exceeded by far all my expectations and have astonished the Headmaster who assisted me and who collaborated on my research. I have no fear that the children might have tried to mislead us, they have too much respect for their director, and besides, they were all sincerely surprised when at the end of the experiment we pointed out their errors.

The test was run individually on each child in the office of the director.

I began by giving the child the following explanation: "My friend, we will perform together an experiment to see if you have a good memory, a memory better than your classmates, and I'll show you a board, which is there, hidden behind the screen. A number of objects are fixed on this board. I'll put the board before your eyes, and you'll study the items

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1 Binet made parallel between his work and the functioning of the French legal system of his era. Some legal terms used might not exist in other legal systems or might have changed considerably over time. Moreover the court employees at that time were mostly men. [Translator’s note]

2 All the children who participated in the various experiments were boys. [Translator’s note]
carefully for twelve seconds, twelve seconds, observe well, it's a very short time, this is not a minute and a minute contains sixty seconds, twelve seconds are very short; so you must not waste this precious time, and use it to observe very carefully and intensely the objects on the board, for as soon as twelve seconds elapsed, I’ll remove the board, and then I’ll ask you a host of questions about what you have seen. I will ask more than 30 questions on many small details, and you will have to answer me with accuracy, is this OK? This explanation has almost always had the effect of arousing the curiosity and zeal of the child. I repeat once or twice: "pay attention", then I take the board with my hand and placed it on the table in front of the child. At this moment, I have in the other hand a watch with seconds and I remain in this situation for twelve seconds. The child looks at the board, devouring it with his eyes, his gaze wanders from one object to another, without saying anything. None of the children pronounces aloud a word or touches the object with his hands. Twelve seconds being over, I hide the board behind the screen. I take a pen and then ask the child questions about the things that he has seen and remembers. [249]

In all that follows, it is always I who hold the pen. I address questions to the child, he replies orally, and I write their answers. The interview is quite long. Because of the need to write the answers, I speak slowly, most often I write while talking. The interview lasts for ten or twenty minutes for each child. Because there are lots of questions and, in addition, some children are very slow to give their answers, each question must be repeated many times before they decide to break their silence and some details are given in monosyllables. Inversely, others give details spontaneously and thus questioning is much faster.

When the experiment is completed and all answers are written, I present again the board to the child, so that he can recognize the mistakes he has made; all the children are very curious to see the board again. By allowing them to learn from their mistakes, I deprive myself of a similar experiment again on these same children, but I prefer to satisfy their curiosity and also I put myself in agreement with them on the mistakes they made. Indeed, it could happen that a child has not made an error of memory on an object, but has poorly explained his thoughts, thus by showing the object in dispute, it is easier to agree.

Once the errors recognized, the experience is over, the child leaves the office and the director always specifically recommends to the child not to talk about the objects he saw on the board to his classmates. This recommendation is made in the most serious tone, and the director ensures by a covert investigation, that the recommendations are followed. The experiments are conducted in three successive afternoons, in the first afternoon, we tested the children of the [250] first class, the second afternoon the children of the second class and
during the third afternoon, the children in the third and fourth classes are tested. To prevent cheating, we have taken all the precautions we could take, and we believe that children, fearing the punishment of the director, have not told their friends anything about the experiments.

The board on which the objects are set is dark yellow and square in shape. It is 22 centimeters long and 15.5 centimeters tall. The fixed objects are six in number: a penny, a store label, a button, [251] the portrait of a man, a picture representing individuals crowded in front of a partly open gate, and a new two cents French stamp. We present in figure 1 a picture of the whole board with the items fixed on it. It is a reduced version of the reality as seen by the size of the penny. We also give individual photograph and the size of each of the 6 objects. It is perhaps necessary that we describe in detail each of the 6 objects but we would confine ourselves to essential information and you can refer to the figures for further details. If we had to *completely* describe one of these objects, we would need several pages and we would still not complete the descriptions.

Figure 1. – Objects used for the exercise of forced memory.

Figure 2. – The penny.
The penny. - It is glued on to the board; we can see a face, more precisely the portrait of Napoleon III, without crown. The penny is old and dirty. It shows deterioration at the bottom, and slightly to the right in its outline there is an area of several millimeters which is smooth, free of drawings, as if it had been struck with a hammer.

The store label. - It is a label of the stores called Bon Marché. The label is glued to the board and is traversed by a pin in a bottom to top direction. It is green and is twofold. Other details, form and inscriptions, are seen in the figure. [352]

![Image of the store label](image3.jpg)

Figure 3. – The store label.

The button. - Glued to the board, it is circular with a raised edge and is pierced with four holes through which no thread is seen. It is made of corozo nut and the color is dark brown, mottled with light brown.

![Image of the button](image4.jpg)

Figure 4. – The button.

The portrait. - This picture is taken from a chronophotographic series of Mr. Demeny.
The picture. - This picture, which I cut from an illustrated newspaper, depicts a scene of the postmen’s strike which has taken place some days before the experiment. It is not necessary to describe further the picture [253] and the portrait, since we give a picture of these items printed in black.

The stamp. - It is a 2 cents French stamp, colored red-brown and is glued to the board.
All children know these objects, they know that the penny is French, they know and distinguish the effigy of Napoleon III on the penny and they are aware of the Bon Marché stores that are located less than 1 kilometre away from the school; the button is of common shape and color that cannot surprise the children; the stamp is known by all the children, except for a few. The portrait bears nothing special except the grimace of a man. Finally, the picture which represents postal workers on a strike, illustrates an event that several children have heard, because it dominated all Paris a few days ago. Many children have remembered the strike and the postal workers and have mentioned this event when describing the picture from memory [254]. One of them even related to us that he has seen the picture in an illustrated newspaper.

In summary, the 6 items were not difficult to interpret by the children, and some items were even familiar. (…)

[255] We do not want to investigate the state of mind of an individual when placed in the presence of an object; we seek to incite the individual to commit memory errors, in order to appreciate the power of his imagination in creating such errors. For this reason, instead of abandoning the individual by leaving him alone with the object, we ask him a series of specific questions. (…)

Our experience is divided into two parts: the first part is the shortest and it consists of simply asking the child to list the things that he has seen on the board. This request is made immediately after the board is hidden behind a screen; only 4 children recalled all 6 objects; 10 children forgot only one object; 8 children forgot two objects; a single child omitted 3 of the objects. The average number of recalled objects is between 4 and 5.

Not surprisingly, it is to be noted that the omissions were not evenly distributed on all objects. [256]
Number of times that each object has been forgotten

The stamp........................................ 10 times
The label........................................... 9 times
The button......................................... 4 times
The penny.......................................... 3 times
The portrait...................................... 2 times
The picture....................................... 0 times

The portrait and the picture are the objects that were least forgotten. Why do these two objects so often and so strongly attract the attention of children? I think it is because they are more interesting than a button or a stamp. They are more interesting because they contain more elements than the other objects. These elements are also less familiar to them and are thus more likely to be perceived. The label and the stamp in particular are often forgotten since these objects have nothing to induce curiosity. The stamp is also fixed in the top right of the board, which is neither a location where reading begins or where reading ends. The location of the stamp is thus a non advantageous place. The button too, bears nothing striking in particular. However, the penny, which is also a familiar object, seems to have benefited from the advantage of its position on the board, that is on the top left, a location where the reading of a page usually begins.

QUESTIONS GIVEN TO THE CHILD IN THE EXPERIMENT ON FORCED MEMORY

The penny. - 1° Is it French or foreign? 2° Is it presented on its face side or tail side? 3° Is the head on the coin crowned or not? 4° Is it new or old? 5° Is it damaged or intact?

The button. - 6° What is its shape? 7° What is its [257] color? 8° Is this color plain or mixed with another color? 9° The button is made of cloth or of some other substance? 10° What is in the centre of the button? 11° How many holes? 12° How is the button fixed on the board? 13° Where do the strings run? 14° What is the color of the strings?

The portrait. - 15° What is its shape? 16° What color is it? 17° What does it represent? 18a° Is the person’s body entirely visible? 18b° Up to what body part is he seen? 19° Who is he? 20° What does he do? With his right hand? 21° What is the color of his jacket? 22° What is the color of his vest?

The label. - 23° To what store does it belong? 24° What color is it? 25° What is its shape? 26° Is it rectangular everywhere? Draw it. 27° Does it bear some inscription or not?
28° Tell all the inscriptions that you have read. 29° How is it attached to the board? 30° What is the direction of the pin? 31° What color is the pin?

The stamp. - 32° From which country is it? 33° What is its value? 34° What color is it? 35° Is it new or has it been used?

The picture. - 36° What is its shape? 37° What color is it? 38° What does it represent? 39° How are the people dressed? 40° Are there among them women and children? 41° What do we see in the house?

Not all of these 41 questions are necessarily given to the same child. Nonetheless I always tried to ask them all of these questions in order to put the children under uniform conditions. However there are children who anticipated questions, and described the details that they remembered spontaneously. They thus responded to questions that we did not ask them. [257] Other children made errors of imagination and in such case we could not ask them the usual questions. When a child is completely wrong about the picture and described a scene very different from the one presented to them, we are obligated to follow him in his invention in order to make him specify his mistakes. In such situation we must therefore abandon the usual questions. I have given above in their exact wordings, examples of questions I used. The employed terms are extremely important and any change, no matter how small it may seem, could influence the child and even completely change his answer. I relate now an interesting example to illustrate the importance of using appropriate terms. A child told me that the label was attached to the board by a string, I then told him: you saw the string? These words were unintentionally spoken by me with a marked intonation in the voice. The boy immediately replied: "I did not see it." Before my request, he admitted that the string was present, he was in fact wandering if he has really seen a string, or if it was an assumption, but my precise question drew his attention to this point, which aided him to distinguish between a memory and a supposition. I must precise that the questions were not made in a commanding voice. I invited the child to choose between two opposing alternatives, or I asked him a specific question, but the child was still free to respond: "I do not know." (...)

CONCLUSIONS ON THE ERRORS OF MEMORY DUE TO FORCING

[282] Here are the general analyses that we can draw on this topic of research. These considerations only apply to experiments conducted specifically with well defined objects similar to those that we have described. It is possible that other experiments using other
objects would lead to somewhat different conclusions, but I think these differences would not be very important.

What is striking, first, in reading the results, is that the object fixed on the board has an essential individual attribute that is rarely unrecognized. For example, the penny, one could forget the portrait on it or the deterioration of its outline, but no one has forgotten that it was a penny. No child said: "I remember seeing at the top of the board a round obscure object, I don’t know what it is." The same remark can be made for the stamp. Many errors have been committed on its value, [283] its color, etc. but no child has ever said: "I remember a small bright area, in such and such color." The same observation was made for the label, the button, the portrait and for the picture. The memory of the individuality of these objects was even more specific, it is surprising to see that the children never or almost never forgot that the penny and the stamp were French. Moreover, very few mistakes were made on the label, since 17 students remembered that it was a label from the “Bon Marché”. These are obviously the key attributes of the object and it is these attributes that are encoded most deeply in memory, while the details of color and form, which are incidental and could be changed without altering the object as such, have a strong tendency to disappear from the mind.

The errors committed by the children bear a singular characteristic: the false information given by the children has all the precision and details of true memories. All our observations converge to show that a memory can appear precise but is entirely false. A child can not only believe that the stamp is used, but can also describe the design of the postmark and even remember the letters he saw on the seal. He may also draw a string with precision although he has not seen it, etc. An unsuspecting mind may consider these information so clear, so detailed as evidence of memory accuracy. We demonstrated that the apparent precision of memories is not inconsistent with the fact that they are false.

Another characteristic of the errors is that they are no less frequent in situations of spontaneous recollection of memories than they are in situations where a person is able to remember information only with the help of others.

The memory for the stamp was most often forgotten by the children. Twelve times, they could not name it, but whenever we asked them: "Did you see a stamp?" they responded affirmatively. It is therefore interesting to know if the memory for the stamp, when it has not

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5 With regard to the sphere of justice, this issue is of capital interest. Often we hear people say that the testimony seems correct because the witness was very clear and very precise in his statements, and these people, who may be jurors or judges, will probably, all things being equal, accord more credibility to a clear and seemingly precise testimony, given without hesitation, than to the testimony of a person who hesitates, who doubts, who refuses to give a precise answer (...) [Binet’s note]
been voluntarily recalled by the subject, but was only recognized by him, is less accurate than the memory that arises spontaneously. I compared the average errors for the twelve times where memories were based on recognition, to the average errors committed in spontaneous recollection. The two error means were exactly the same: 1.58 (that is to say a mistake and a half) for the memories recalled by suggestion, and 1.66 for the memories recalled voluntarily and freely. Therefore, remaining within the limits of our experiment, we can conclude that memory accuracy is independent of its power of revival.

The nature of the errors presents significant variations. However since not much is known on this matter, it is currently difficult to propose an elaborate classification of these errors. Nonetheless it seems important to distinguish errors based on logic or due to practical mind, which consists of imagining, for instance, a string or a pin to explain how a label or a button is attached to the board – and errors of invention, which consists of constructing an object that has no visible connection with reality, and therefore is impossible to explain. This latter kind of error is less frequent than the first one.

[285] Finally, I note another characteristic of these errors: their specificity. A child saw the stamp and described it. His description may be correct on one point and false on another. He can say exactly the color of the stamp but can mistake its value. It is in fact what occurred most often. It is very rare that one of our participants make mistakes on the color, on the value and also on the condition of the stamp. Full error occurred only three times (24 subjects). There were 8 participants who made a mistake on only one point and 11 participants erred on two points, but were exact on the other points. This dissociation of perception and this specialization of the error, have a double importance for psychology and for the practical science of testimony. To psychology, it suggests that the complex elements of perception are independent of each other and may have separate and independent existence. Can we in a perception imagine two pictures; even more can we fuse a digit and the color in which it is printed? It is possible, however, after seeing the digit, to remember only the color or the shape. Our memory dissociates what for our perception seems inseparable. We have already documented this fact in previous experiments on a visual calculator, Mr Diamandi. In practice, these dissociations prove to us that it would be wrong to believe that when someone makes a correct response on parts of a memory, he is also right for the rest. Often in judicial affairs, the truthfulness of a witness is discussed and if by chance his testimony may

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6The issues we deal with right now are so new that they give rise to new unnoticed facts. They point out the utility of creating a practical science of testimony by studying memory errors, the means to recognize them, and recognize the signs of truth. This science is too important to not be developed one day. [Binet’s note]

be verified on a point, [286] the other points that are not verifiable also seems to get more evidential value. Without doubt, each case must be considered individually and, in general, we must admit the partial dissociation of memories. Therefore given a series of memories \( a, b, c, d, \) etc., we must not consider that if \( a \) is true, it is a proof that \( b, c, d, \) etc. are accurate as well. (…)

**DIFFERENCE BETWEEN SPONTANEOUS MEMORY AND FORCED MEMORY**

[287] We have seen that by asking participants to answer specific questions, we forced their memory and we brought them to commit numerous errors. It seemed useful to examine whether our interpretation was correct or not. We have, in another school, administered a somewhat different kind of experiment. We showed to children the same board and the same objects for 12 seconds and then instead of questioning them about what they have seen, we invited them to write all their memories with the lone recommendation to describe all the details that they have noticed and not merely naming the objects.

This control experiment lasted only one afternoon and concerned 12 primary school children in a superior class. [288] These children knew me, because I did some research with them previously. I took them in groups of three in the director’s office, and I gave them a collective explanation which was as complete as the one I quoted above. Each child was isolated and I put in his hands the board with the objects for 12 seconds. I then invited him to write everything he remembered. The children were seated at different tables sufficiently distant from each other in order to render copying impossible. I remained with them and monitored them closely. I did not reveal the time granted for this task, but I waited 20 minutes before picking up the copies. During the 20 minutes, some children never stopped writing: while others finished earlier, but realizing that their copies were not taken away, they thus remained focused and would write from time to time and add a few words. I asked some of them: "Have you finished?" But they were embarrassed and did not respond. After casting a glance at their neighbor, who continued writing, they preferred to add a few more words. It is therefore possible that by prolonging the experience, it weighed on them. We thus exerted some stress on them, but this constraint is not comparable to direct questions.

Copies written by children show a lot of variability both in terms of the amount of details given and the nature of these details. The advantage of experiments that leave a lot of freedom is that they favor the manifestation of individual differences.
Differences in the number of lines written are very significant and are even more valuable since they concern children of roughly the same age and belonging to the same school year and having therefore the same cultural knowledge. In addition, all external conditions were created to equalize the results. Indeed the children were placed by threes in the same room and those who had a tendency to write only a little were motivated by those who wrote more. There was therefore a significant difference in the amount of memories and the ability to reconstitute long and detailed descriptions. I think that a test like this one, imparts lot of information on children’s intelligence.

The number of lines written does not by itself reflect the amount of memories. There are several children who instead of only describing their memories, put forward their knowledge, for example they outline the usefulness of stamps, coins, labels, etc. (...) I also considered the number of objects remembered and it did not vary a lot from one child to the other: there are 9 of them who have retained 5 objects, 2 have remembered 6, and only 1 remembered 4. If we content ourselves with the number of recalled objects, we might conclude that all children have roughly the same memory and in this way, we would be committing a very serious error. Among the 9 children who have all retained 5 out of 6 items, there are some who have given so much detail that their memories are 4 or 5 times superior to the others. On the basis of these copies, I am inclined to consider as inaccurate and incomplete any particular experiment that assesses the memory of a person by relying on the number of objects that he could recall after a given time. [291] I once conducted several tests in this very domain but have not published them. I believe that such method is defective in estimating memory. An object is not a simple thing, it consists of various attributes that are often complex and are decomposed in memory. As we have previously shown, a person who can recall the existence of an object that he saw on the board, for example the stamp, but can add nothing else, has certainly a memory that is less extensive than another person who can say exactly the color of the stamp, value, etc..

To assess memory performance, we must not just count the number of lines of description and even more we must not satisfy ourselves with the number of objects remembered. We should also detail the recalled memories. (...) [294] Errors of imagination and errors of memory, committed by the children are much less than those committed by the other children who were forced to answer our questions. We find in fact:
2 children who did not commit any error.
2 children who have committed one error.
1 child who committed two errors.
4 children who have committed 3 errors.
3 children who have committed 4 errors.

In experiments of forced memory, the minimum error was 5 and the maximum was 14, the difference is thus considerable. We conclude that the experiment of forced memory is much more prone to error than the experiment of spontaneous recall. Merely asking a specific question orally to the child increases his memory errors. Hence in order to have the maximum of truth in children’s testimony, a practical advice is to avoid asking questions, not even questions that are free from any specific suggestion. Instead, tell him to write down everything he remembers, and leave him face to face with his paper. What is the psychological reason that explains why an interrogation that is free of suggestions causes in a child more memory errors than a spontaneous narrative writing? In my point of view, the difference [295] relies on the fact that a child, even at the age of 12 years, is still in difficulty to understand the distinction between something that was seen or observed, from his reasoning or invention. (...).

SUGGESTION BY QUESTIONS

[296] From everything that we have learned so far, it is extremely plausible that if we replace memory forcing by suggestion, it will give rise to more errors. I conducted this study specifically to investigate the influence of words and phrases on suggestion. It seemed useful for me to ponder on the importance of grammar and syntax. I mentioned earlier that every nuance of inflection of the voice has a great influence on the effect of a suggestion but we cannot at present, unless we use phonographs, consider the inflections of voice. However it is much easier to weigh the value of each word, by substituting one word with another, by using various turnings of phrases and by taking care that the participant always read the written questions in order to avoid variations in the accentuation of the voice. The use of written questions aids in eliminating much of what is indefinable and immeasurable in our personal actions.

I used three different sets of questions and each child responded to only one of them. My goal was not to study individual suggestibility, but to investigate whether the grammatical
form of the questions, the turnings of words and the kind of questions have an influence on the response.

The first question is a memory forced exercise. We now know the full value of this term and we also know the result of this forcing. For participants who are blind to the purpose of our study, this question seems very simple and very rational in its desired accuracy and would not suspect that it can cause so many errors of memory and imagination in children. As it can be noted, the questions are roughly the same to those I asked orally in [297] experiments on other children, but there is a great difference between an oral interrogation and a written one. In the first case, we are closed to the participants. We look at them in their eyes from time to time and despite ourselves, we also employ voice intonations that are insinuating or compelling. Said differently, we exert a personal influence and the effectiveness of this influence depends on the moral authority that we have. Inversely, the written question is more impersonal (without, however, being entirely, because the person who wrote the questions is present in the office of director and supervises).

Here is the first questionnaire

**FIRST SET OF QUESTIONS**
**(WITHOUT SUGGESTION, BUT WITH MEMORY FORCING)**

*The button.* – 1° How is it attached to the carton? 2° Is it damaged or is it intact? Draw it.
*The portrait.* – 3° What color is it? 4° Can you see the legs of the man, or not? 5° Is the head naked or covered? Draw. 6° Does he have an object in his right hand or not?
*The penny.* – 7° Is it intact or damaged?
*The stamp.* – 8° Is it new or is it post-marked? Draw.
*The label.* – 9° How is it attached to the board?
*The picture of a crowd.* – 10° What do we see in this photograph?
11° – How many items were on the board? List them all.

The second set of questions is designed to produce a “half-suggestion”, this type of questions is persuasive; the button! We asked, Is it not attached to the board with a [298] string etc.? The phrase « Is it not » is almost in every question. With this form of language, we give the idea of details. We do not affirm, but we give the appearance of truth. On the other hand by setting full light on the object on which the suggestion is carried out, we draw
attention to this object, and can therefore raise doubt, incite reflection and even favors contradictory thoughts.

Here is the second set of questions.

SECOND SET OF QUESTIONS
(MODERATE SUGGESTION)

1° The button, isn’t it attached to the board with a string?
2° Isn’t it damaged? Draw it.
3° The portrait, wasn’t there some dark color?
4° The person in the portrait, doesn’t he have a leg crossed over the other?
5° Didn’t he has a hat on his head? Draw it.
6° Didn’t he have an object in hand?
7° The penny, doesn’t it have a hole? Where?
8° The stamp isn’t it postmarked? Draw.
9° The label isn’t it attached to the board with a string? Draw.
10° On the picture representing the strike of postmen, isn’t there a small dog?
11° Isn’t there also a man arrested by officers?
12° Isn’t there a seventh object? Draw.
13° Isn’t there an eighth object?

The third set of questions is designed to produce very strong suggestions. The strength of the suggestion may be partly a result of stress in the voice and partly due to the accentuation of the voice exercised by the speaker. However, because I used written suggestions, I forbade myself to [299] use these additives, so I looked for any other method to increase suggestions in my questionnaire. This method did not consist in directly attracting attention to the inaccurate information suggested. Instead it consisted of implicitly accepting the suggestion as a fact and to take it as the starting point for another question. Thus, instead of asking, as in the second set of questions: "the man's portrait, wasn’t there a hat on his head?" - I ask: "draw the shape of the hat he had on his head." This question can only be understood if the hat exists, therefore, we do not question the existence of the hat and we do not incite the participant to ponder on this detail or put it in doubt. Another way to highly induce suggestion is to create a dilemma, thus we asked: Is the portrait brown or blue? – Although in truth it is black. Here is the third questionnaire.
THIRD SET OF QUESTIONS
(STRONG SUGGESTION)

The button. – 1° There are four holes. What color is the string that passes through these holes and fixes the button on the board? – 2° Draw the part where the button is a little damaged.
The portrait. – 3° Is it dark brown or dark blue? – 4° The man has his left leg crossed over the right leg or the right leg on the left one? – 5° Draw the shape of the hat on his head. – 6° What is the object in his right hand?
The penny. – 7° It has a small hole. Where is this little hole? Draw.
The stamp. – 8° The postmark is in the right corner. What city name can be distinguished on the stamp? Draw. – 9° The stamp is red. Is it bright red or dark? [300]
The store label. – 10° Draw the string with which it is attached to the board. – 11° The label is it light green or dark green?
The picture of a crowd. – 12° At what spot is the little dog? – 13° How is the man being arrested by officers dressed?
The seventh item is a print. – 14° What is it? Draw.
15° What is the eighth item?

A first series of experiments with these three sets of questions was conducted on primary school children (fourth and fifth years of primary education).

The children’s ages range from 9 to 12 years old and I knew them a little, since I have conducted an experiment on these same children three months earlier. I called them in groups of twos in the director's office and I showed them for 12 seconds the board with the same objects described previously. Then I addressed the same explanations as in previous experiments and I also informed them that once they have finished studying the board, they would respond in writing to a questionnaire placed in front of their eyes. Various recommendations were added, for example, children should not write the questions but merely respond to each question. Finally, for the questions where they are asked to draw certain objects, these drawings should correspond to the natural size. This latter recommendation is all the more necessary because when children are abandoned to their spontaneity, the drawings are usually very small although they are aware of this reduction compared to the actual size of the object.
A few days later I repeated the same experiment on children from another primary school and who saw me for first time. I took them one by one in the office of the director for a better supervision and to submit them to a thorough interrogation. (...) [302] On average the children took more time to answer the third questionnaire (...).

Five children were subjected to the first set of question, 11 answered to the set, and 11 others completed the third, thus the total number of participants was 27. I considered the number of children sufficient, because the results that I obtained are so typical. (...)

Table. Number of errors committed by subjects

<table>
<thead>
<tr>
<th>First set of questions</th>
<th>Second set of questions</th>
<th>Third set of questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 participant committed 0 error</td>
<td>1 participant committed 1 error</td>
<td>2 participants committed 5 errors</td>
</tr>
<tr>
<td>1 participant committed 2,5 errors</td>
<td>1 participant committed 2 errors</td>
<td>1 participant committed 6 errors</td>
</tr>
<tr>
<td>1 participant committed 3 errors</td>
<td>1 participant committed 3 errors</td>
<td>2 participants committed 7 errors</td>
</tr>
<tr>
<td>1 participant committed 4 errors</td>
<td>2 participants committed 4 errors</td>
<td>3 participants committed 8 errors</td>
</tr>
<tr>
<td>1 participant committed 5 errors</td>
<td>1 participant committed 5 errors</td>
<td>3 participants committed 11 errors</td>
</tr>
<tr>
<td>3 participants committed 6 errors</td>
<td>1 participant committed 8 errors</td>
<td></td>
</tr>
<tr>
<td>1 participant committed 9 errors</td>
<td>2 participants committed 5 errors</td>
<td></td>
</tr>
</tbody>
</table>

Our results show conclusively that the type of questions can influence the response and induce errors. This point seems important to highlight. We often hear in a court case that a witness vouches for a certain fact and even reconfirms. However before assessing the value of the testimony, I believe that it is important to firstly ask the witness if he has made a spontaneous statement or has only made statements in order to respond to a question? If the latter alternative is the case, it is important to know the nature of the question, because it forms with the answer an indivisible whole and thus exerts a great influence on the response. If a response is isolated from the question which induces it, this response has a dubious value. I would add that the best testimonies are those that are given spontaneously, without specific questions asked, [317] and without any form of pressure. We have seen that in a spontaneous testimony, errors are still possible, but their number is fewer than in an interrogation. If I wanted to know the truth from a child about an event that the latter has attended, I would not ask him any questions. Instead, I would tell him to write down everything he remembers and I would even take information on the speech that I would use to invite him to write. In order to limit my influence on the child, I would then leave him alone with a paper and a pen. It is likely that the conditions of legal proceedings would not always allow the use of this method.
Thus if an interrogation technique is used, it is of great importance that the clerk or rather the reporter, writes exactly the wordings of the questions, with all the repetitions of spoken language, and he should even take notes on the gestures and accents of the interrogator (…)

[325] Similar experiment on young people. - To determine if the extreme suggestibility of our participants with the third set of questions is due in part to their age, I conducted some comparative experiments on 12 students at Versailles Normal School for teachers. These young people, who saw me for the first time, were aged sixteen to nineteen years old, and were in their first year of studies. They all belonged to a class of 27 students. The participants came in groups of threes in the office of a school teacher and the experiment [326] took place in the presence of this teacher. Each student was seated at a separate table and could not communicate with his comrades. The questionnaires and explanations given to them were the same that I used for the primary elementary school children. Drafting responses lasted for about twenty minutes for each student.

The fact that must be immediately highlighted is that the errors due to suggestions were found in large numbers. Our participants, despite their age, have therefore been influenced by the leading questions. (…)

[329] These results are sufficient to establish an important fact, that is, the method which consists in inducing suggestions by written questions is powerful enough to influence not only children but also eighteen years old young adults.