**Single-blind** describes [experiments](http://en.wikipedia.org/wiki/Experiment) where information that could introduce bias or otherwise skew the result is withheld from the participants, but the experimenter will be in full possession of the facts. In a single-blind experiment, the individual subjects do not know whether they are so-called "test" subjects or members of an "[experimental control](http://en.wikipedia.org/wiki/Randomized_controlled_trial)" group. Single-blind experimental design is used where the experimenters either must know the full facts (for example, when comparing sham to real surgery) and so the experimenters cannot themselves be blind, or where the experimenters will not introduce further bias and so the experimenters need not be blind. However, there is a risk that subjects are influenced by interaction with the researchers – known as the [experimenter's bias](http://en.wikipedia.org/wiki/Experimenter%27s_bias). Single-blind trials are especially risky in psychology and social science research, where the experimenter has an [expectation](http://en.wikipedia.org/wiki/Observer-expectancy_effect) of what the outcome should be, and may consciously or subconsciously influence the behavior of the subject.

A classic example of a single-blind test is the "[Pepsi challenge](http://en.wikipedia.org/wiki/Pepsi_challenge)". A tester, often a marketing person, prepares two sets of cups of cola labeled "A" and "B". One set of cups is filled with Pepsi, while the other is filled with Coca-Cola. The tester knows which soda is in which cup but is not supposed to reveal that information to the subjects. Volunteer subjects are encouraged to try the two cups of soda and polled for which ones they prefer. One of the problems with a single-blind test like this is that the tester can unintentionally give subconscious cues which influence the subjects. In addition, it is possible the tester could intentionally introduce bias by preparing the separate sodas differently (e.g., by putting more ice in one cup or by pushing one cup closer to the subject). If the tester is a marketing person employed by the company which is producing the challenge, there's always the possibility of a [conflict of interest](http://en.wikipedia.org/wiki/Conflict_of_interest) where the marketing person is aware that future income will be based on the results of the test.

In a [police photo lineup](http://en.wikipedia.org/wiki/Police_lineup), an officer shows a group of photos to a witness or crime victim and asks him or her to pick out the suspect. This is basically a single-blind test of the witness' memory, and may be subject to subtle or overt influence by the officer. There is a growing movement in law enforcement to move to a double blind procedure in which the officer who shows the photos to the witness does not know which photo is of the suspect.

Here’s another example. Jack enjoys experimenting with cookery, changing recipes to learn how to make some of the foods he prepares taste better. On the grocery store shelf he finds a box of pure cocoa with no sweeteners or other additives. He asks himself, ‘how would chocolate cookies made with that pure cocoa compare with cookies made with the baking chocolate I always use?’ He finds in a cookbook a formula for substituting cocoa for baking chocolate, and he bakes two batches of cookies. He refers to those with cocoa as "A" and those with baking chocolate as "B". Jack invites a group of friends over and offers the cookies, which he has separated into two cookie jars, one labeled ''A" and the other labeled "B" He explains to them that, without knowing the difference, or while "blind" to the difference, they are to try each kind of cookie and tell him which they prefer.

**Double-blind** describes an especially stringent way of conducting an [experiment](http://en.wikipedia.org/wiki/Experiment) which attempts to eliminate subjective, unrecognized biases carried by an experiment's subjects *and* conductors. Often but not exclusively applied to experiments on human test subjects, first used by [W. H. R. Rivers](http://en.wikipedia.org/wiki/W._H._R._Rivers) in the investigation of "war neurosis", better known as "[shell shock](http://en.wikipedia.org/wiki/Shell_shock)". In most cases, double-blind experiments are held to achieve a higher standard of scientific rigor than blind or non-blind experiments.

In a double-blind experiment, neither the participants nor the researchers know which participants belong to the [control group](http://en.wikipedia.org/wiki/Control_group), as opposed to the test group. Only after all data have been recorded (and in some cases, analyzed) do the researchers learn which participants were which. Performing an experiment in double-blind fashion can greatly lessen the power of preconceived notions or physical cues (e.g., the [placebo effect](http://en.wikipedia.org/wiki/Placebo_effect), [observer bias](http://en.wikipedia.org/wiki/Observer_effect_%28psychology%29), [experimenter's bias](http://en.wikipedia.org/wiki/Experimenter%27s_bias)) to distort the results (by making researchers/participants behave differently than they would in everyday life). [Random assignment](http://en.wikipedia.org/wiki/Random_sample) of test subjects to the experimental and control groups is a critical part of any double-blind research design. The key that identifies the subjects and which group they belonged to is kept by a third party, and is not revealed to the researchers until the study is over.

Double-blind methods can be applied to any experimental situation in which there is a possibility that the results will be affected by conscious/unconscious [bias](http://en.wikipedia.org/wiki/Bias) on the part of researchers, participants, or both. For example, in animal studies both the caretaker of the animals and the assessor of the results have to be blinded; otherwise the caretaker might treat control subjects differently and alter the results.[[7]](http://en.wikipedia.org/wiki/Blind_experiment#cite_note-PetrieWatson2013-7)

Computer-controlled experiments are sometimes also erroneously referred to as double-blind experiments, since software may not cause the type of direct bias between researcher and subject. Development of surveys presented to subjects through computers shows that bias can easily be built into the process. Voting systems are also examples where bias can easily be constructed into an apparently simple machine based system. In analogy to the human researcher described above, the part of the software that provides interaction with the human is presented to the subject as the blinded researcher, while the part of the software that defines the key is the third party. An example is the [ABX test](http://en.wikipedia.org/wiki/ABX_test), where the human subject has to identify an unknown stimulus X as being either A or B.

Double-blinding is relatively easy to achieve in drug studies, by formulating the investigational drug and the control (either a [placebo](http://en.wikipedia.org/wiki/Placebo) or an established drug) to have identical appearance (color, taste, etc.). Patients are randomly assigned to the control or experimental group and given random numbers by a study coordinator, who also encodes the drugs with matching random numbers. Neither the patients nor the researchers monitoring the outcome know which patient is receiving which treatment, until the study is over and the random code is broken.

Suppose, for example, a scientist has been much involved in the research on a treatment for the common cold, one that relieves symptoms and actually hastens recovery. Let's say scientist Blackmore has total faith in her new cold remedy and very much wants to see her discovery go over in a big way. The problem is this: How can Blackmore do her experimenting and be totally honest about the results, not kidding herself or anyone else? To do this, she uses a double-blind experimental design. First, she gets someone she trusts to make up some pills in two batches, one that contains the new treatment for colds and the other one a placebo. Next, she recruits a suitable number of people to take part in the experiment. They are told that they will be randomly assigned to the experimental or to the control group by the tossing of a coin or by taking names out of a hat. The subjects are blind to which group they will be in. Now, here is where the double-blind factor enters. Blackmore herself does not know which group each subject is in. She gets her trusted associate to give out the pills to each subject, and neither the subjects nor Blackmore knows who receives which one. After enough time has passed for the subjects to have colds and to use their pills, Blackmore interviews each subject. She questions them about the effectiveness of their treatments and summarizes the effectiveness of each in a report. When she is finished, Blackmore's associate shows her which subjects received the new treatment and which subjects received the placebo pills. Only then can Blackmore and others honestly judge the effectiveness of her cold treatment. This use of a double-blind experimental design is complex and costly. Even so, it is a very important form of experimenting, and it has great advantages when both subjects and experimenter know too much about the goals of the experiment.

Sources: <http://en.wikipedia.org/wiki/Blind_experiment> and <http://www.education.com/reference/article/blind-double-blind-experiments/>