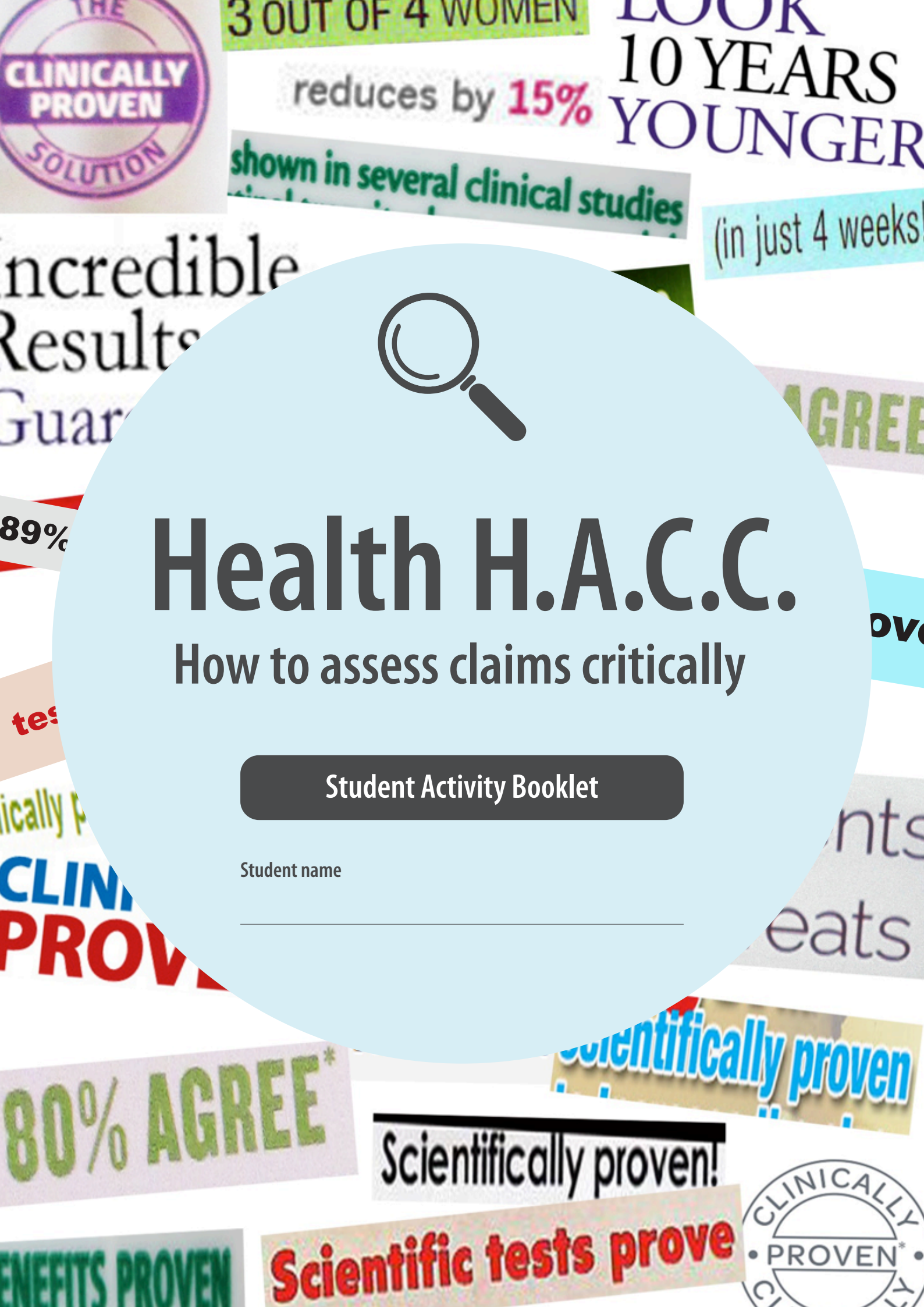


Health H.A.C.C.

How to assess claims critically

Student Activity Booklet

Student name

_____

Activity 1: Identify the components of health claims

Health claims are statements that include an **intervention**† and an **outcome** (which is the result of using the treatment, such as improved health, enhanced abilities, or better results). They often use dramatic language (such as "dramatic improvement", "miraculous", "breakthrough", and "cure").

In the following examples, the intervention is underlined, and the outcome is **bolded**.

"Garlic pills are clinically proven to **improve math scores**"
"80% showed dramatic **improvement in their skin** after using Best-Science* skin cream"
"New research has shown that sleeping-in on the weekend, is **good for the heart**"

Here are some real headlines from a variety of websites.

As in the examples above, underline the interventions and circle/highlight the outcomes.

a. 

How your morning coffee might slow down aging[1]

b. 

Tweaking brains with 'smart drugs' to get ahead in Silicon Valley[2]

c. 

This Natural Recipe Treats Joint Pain Fast[3]

d. 

How Bee Venom Can Keep Your Skin Looking Youthful[4]

e. 

New Drugs May Stop Migraines Before They Start[5]

f. 

DNA Testing Is The Key To Your Best Skin And Perfect Diet[6]

† An intervention is anything that is used/done to alter a situation or condition – such as tablets, creams, drinks or activities - by "intervening". For example, if someone has a headache (the condition), they might take a pain-killer tablet (the intervention) to reduce the pain (the outcome). More examples:

- After someone injures a knee, they may experience limitations in movement (the condition). Physical therapy can be used to improve their movement. In this case, the "physical therapy" is the intervention to change their condition.
- If a doctor suspects someone has a food intolerance (the condition), they may advise the person to avoid the food they may be intolerant of, to see if their symptoms improve. In this case, the intervention is "avoiding the particular food" to see if there is a change in their situation.
- Sometimes it can be simpler to use the word 'treatment' in place of 'intervention'.

* invented brand / product for educational purposes within the Health H.A.C.C. program. Any similarities to real brands is an unintentional coincidence.

Your turn! See how easy it is to generate a fake health news claim. Share yours with the person beside you.

FAKE HEALTH NEWS GENERATOR

Your eye colour	First letter of first name	Birth month	First letter of last name
Light brown = Putting	A = raw onions	JAN = in your bed	A = removes toxins.
Dark brown = Rubbing	B = alkaline water	FEB = in your hair	B = cures cancer.
Blue = Sleeping with	C = tin foil	MAR = under your doormat	C = helps you lose weight.
Green = Sprinkling	D = essential oils	APR = on your face	D = reduces allergy symptoms.
Other = Visualising	E = amethyst	MAY = on your third eye	E = blocks EMF radiation.
	F = avocado	JUN = around your neck	F = cures acne.
	G = coconut oil	JUL = in your handbag	G = makes you smarter.
	H = urine	AUG = on your palm	H = wards off negative energy.
	I = epsom salt	SEP = in your sock	I = fixes joint pain.
	J = turmeric	OCT = up your nose	J = relieves constipation.
	K = healing crystals	NOV = in your ear	K = boosts your serotonin.
	L = raw eggs	DEC = in your underwear	L = protects from bee stings.
	M = ginger		M = fixes back pain.
	N = quantum energy		N = cures migraines.
	O = organic walnuts		O = realigns your chakras.
	P = kombucha		P = will help you find love.
	Q = hemp		Q = cleanses your liver.
	R = the frequency of love		R = cures sinus pain.
	S = garlic		S = rebalances your hormones.
	T = detox pads		T = unclogs arteries.
	U = broccoli juice		U = prevents heart disease.
	V = moonlight		V = fights muscle cramps.
	W = activated charcoal		W = reduces air contaminants.
	X = brain pills		X = helps others pronounce your name.
	Y = inspirational quotes		Y = helps you sleep.
	Z = a mandala		Z = reveals how many past lives you've had.

(Acknowledgements to ABC Science for the generator)

Activity 2: Considering headlines

You may want to work in pairs.
Consider two health story headlines:

"Scientific research shows 80% of people using Best-Science Skin Cream* showed dramatic skin improvement"

"A MIRACLE CREAM TO SOLVE YOUR SKIN PROBLEMS"

a) Is one headline more convincing than the other? Why?

Let's say you researched the source of the information within the headlines above and found that it came from a study. Box 1 has some of the study details.

Once you read the full text of the study, you find the details in Box 2.

Box 1.

Population:	**Adults**
Intervention:	**Best-Science Skin Cream***
Comparison:	**No Best-Science Skin Cream***
Outcome:	**Skin condition**

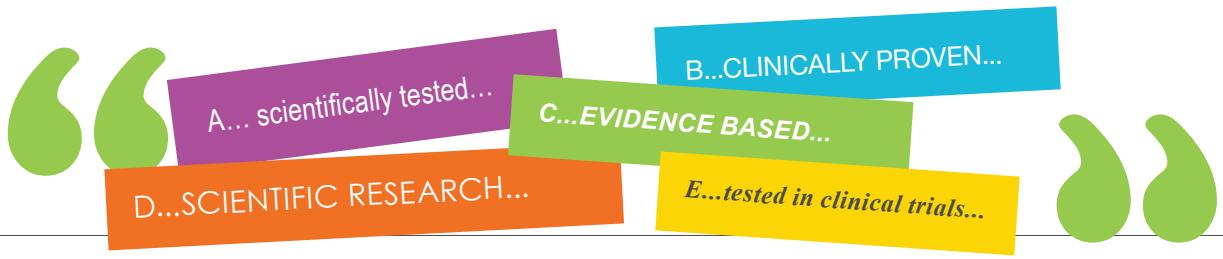
Box 2.

- **10 people were paid to participate**
- **They were given some skin cream to try for 7 days**
- **Then they were asked to discuss the effects of the cream:**
  - **2 of the participants say they thought their skin felt the same,**
  - **the other 8 participants say that they felt their skin had improved, saying they noticed:**
    - **decreased blemishes**
    - **less wrinkles**
    - **brighter skin**

b) What can you say about Best-Science Skin Cream* after reading this study? Why?

c) You notice Best-Science Laboratories* (who produce the skin cream) have funded the research. What do you think of this? Justify your opinion.

Activity 3: Common terminology and assumptions in health intervention claims



Separate into small groups and choose one of the statements above:

a) For the statement your group chose, i) define the statement,

_____

ii) and when used in a health claim, what does it indicate about the information provided?

_____

_____

b) Other types of 'danger words' are often used in health claims. Many people have assumptions about how they know that a health intervention works or what they think "must be better". In the two lists below, draw lines to match up the words/phrases with the assumption that it is implying.

Word or phrase	Targeted assumption
"… used for generations…" or *"…used and trusted for years…"*	New is better - New, brand-named, or technologically impressive treatments are better than existing treatments.
"… exclusive…" or *"… top of the range…"*	Old is better - widely used treatments or treatments that have been used for a long time are effective and safe.
"targeted treatment – designed just for you"	Earlier is better - it is always better to detect and treat diseases earlier.
"… using the latest technology…" or *"… cutting edge science…"*	More is better - increasing the amount of an intervention, increases the benefits of it.
"… use now, so you don't leave it too late…"	More expensive treatments are better than available alternatives.
"… high-potency…" or *"… a stronger, more powerful dose to cure you quicker…"*	Personalised testing is better as it means you can know in advanced if you will benefit from an intervention.

c) Circle which of the above assumptions are accurate.

d) If there is time and if the Internet is available, find examples (such as in advertisements or news stories) of where one of the statements at the beginning of this activity has been used in a health claim and note whether it was an appropriate use of the terminology.

Activity 4: Types of information that are used in health claims

The table below describes some different types of health information.

Type(s) of information	Description
Testimonials and Endorsements (and the opinion of experts)	These are related concepts: A testimonial is a statement that someone from the public makes to confirm that the intervention has helped them. An endorsement is a testimonial about a health intervention from a celebrity or someone who is recognised and admired. Endorsements are used to make the testimonial seem more reliable. Endorsements may also come in the form of opinions from experts or other authorities.
Anecdotes	An anecdote is a short story, and in terms of health interventions, is a story about an experience with a health intervention: • Describes a health problem, and how the person used a health intervention, and whether/how their health problem improved. • An anecdote can be used as a type of testimonial.
Assumptions / hopes / beliefs	When a person assumes/hopes/believes a health intervention will work based on reasons other than evidence. Reasons can include: • it has been used by others for many years • it's a popular brand • it's expensive, therefore perceived to be better quality • if they believe strongly enough that it will work, it will • intervention is essential to getting better (i.e. the problem won't get better on its own)
Explanations about how interventions work	A detailed description of how an intervention works: • How the intervention causes the claimed improvement in the health problem. • May sound logical, convincing, and use scientific concepts in the explanation. • However, the description may not be accurate.

Using the options on the previous page, identify the type of information listed:

Information example	Information type
a) Someone from the public is quoted saying, "I used to have foot pain all the time, but then I started wearing Best-Science* brand gel inserts, and I have not suffered from foot pain since I started wearing them."	
b) A friend, who wears Best-Science* brand gel inserts, tells you that the gel-inserts work really well and suggests you try them for yourself.	
c) Someone purchased the most expensive gel inserts to be certain that they would get relief from their foot pain.	
d) A famous athlete tells everyone that their Best-Science* brand gel inserts make them run faster, and that's why they run in record-breaking time.	
e) "Charlie3000" has posted on a discussion board: "I recommend Best-Science* brand gel inserts to all my friends, they really work!"	
f) Someone is keen to use Best-Science* brand gel inserts, because they looked them up on the internet and the website looked professional, with detailed scientific descriptions of how the inserts work.	
g) Dr Harvey is shown in an advertisement for Best-Science* gel insert and states "9 out of 10 sports medicine doctors recommend this brand".	

Activity 5: Not all research is created equal. Thinking about conflicts of interest and bias

While information from research studies is more reliable than other types of information that you just looked at (such as anecdotes, endorsements, etc), just because an intervention has been tested in a research study, it does not mean that you can necessarily believe the results.

Even a research study that has been reviewed by researchers' peers and published in a prestigious scientific journal does not guarantee that the study will have reliable results.

Whether the results of a study are reliable depends on a lot of things, including how the study was designed and conducted, and who did the study.

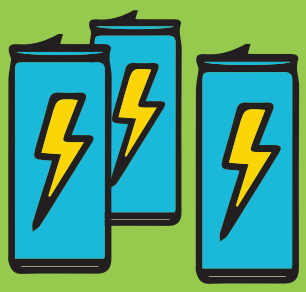
Better studies will have:

- ✓ compared the intervention to something else so that we know what would have happened without the intervention
- ✓ done the comparison in a fair way

The topic of fair comparisons will be covered more in later activities, but to start thinking about it, some of the things are:

- Are there **conflicts of interest**? These can exist when someone who is involved in the research stands to benefit in some way from the results.
- Is there likely to be **bias**? Bias is a type of error that may affect the results of a study because of weaknesses in its design, analysis, or reporting. Some of the sources of bias might be due to intentional decisions (such as decisions about aspects of study design) and some can be due to unintentional (subconscious) influences. A good study will minimise both.

Consider a study that was conducted to assess the effects of an energy drink which claimed to improve athletic ability.



1. **Analyse the options below and choose which process (A or B) is more likely to be fair: (and therefore, is more likely to produce a more reliable result)**

Study details	Options	A or B
The study is funded by…	A. an organisation whose interest is in scientific fact, public health, and how to improve healthcare. B. the company who has created the drink.	
The people who conducted the study…	A. work for the drink company. B. do not work for the drink company.	
To assess the effects of the drink, a large group of students…	A. use the drink and measure their athletic ability. B. split into two groups: one group use the drink while the other group doesn't, and both groups measure then compare their athletic ability.	
To separate the total group of students into two groups…	A. the students are told to separate themselves into two groups. B. students are asked to each take a sealed envelope – inside is a note to indicate a group.	
The students in the two comparison groups…	A. know if they are using the energy drink or not (maybe they can see or taste a difference). B. don't know if they are using the energy drink or not (both drinks look and taste very similar).	
An assessor will measure each student's athletic ability. The assessor…	A. is told whether the person has been using the energy drink or not. B. is not told whether the person has been using the energy drink or not.	

Activity 6: Observational vs experimental studies

There are two broad categories of studies that evaluate health interventions.

Observational study: where the researcher observes, but does not alter what occurs

Experimental study: where researchers intervene and manipulate the independent variable (the intervention) and measure how that alters the dependent variable (the outcome)

Within each of these categories, there are many different types of studies.

In health intervention research, only one type of study design can establish causation (i.e. does the intervention **cause** the observed change in the outcome). This type of study is a **randomised controlled trial** (it will be explained in more detail in the next lesson) and this is an important study type that can provide reliable health claim information.

a. Classify each of the studies below as either observational or experimental.

	Study description	Observational or Experimental?
	1. A questionnaire was sent to households across Australia to collect data about who experienced regular headaches and who did not. People were also asked on the questionnaire how often they exercise to assess if there was a connection between exercise and headaches.	
	2. Researchers identified a group of students who regularly chewed gum and another group who did not. Five years later, both groups were assessed to see if there was a difference between the groups in the number of students who developed tooth decay.	
	3. A medicated cream was tested in a study involving people with knee pain by randomly allocating the people to either receive the cream or not.	
	4. At the end of a school year, students with high marks and low marks in a subject were identified. Researchers looked to see which students had exercised, on average, for more than 6 hours per week that year to explore whether exercise had an impact on school marks.	
	5. Researchers check whether a cream for acne (pimples) resolves it faster by giving the cream to a group of high school students and asking them to submit face photographs every day for two weeks.	

b. Based on only the information given, which of these studies is likely to produce the most reliable results and why? Justify your opinion.

One of the big advantages of experimental studies (particularly randomised controlled trials) is that the researchers can try and control for other variables that can influence the outcome being measured (and hence the study results). These are known as **confounding variables**.

In treatment comparisons, confounders are any factors other than the treatments being compared which may affect the health outcomes being measured.

For a variable to lead to confounding, it must differ between the treatment and comparison groups, and affect the outcome of interest.

Consider an experimental study that was conducted in two groups of students to assess the effects of an energy drink on athletic ability.

c. List 3 variables, other than the energy drink, that might be confounding variables and impact the results.

i.

ii.

iii.

In the next lesson, you will discover some of the ways that studies can be designed so that the impact of confounding variables is controlled.

Activity 7: Fair comparisons

Consider this health claim:

<u>Pain-Stop Cream</u> reduces **muscle soreness** in people who have sore legs after sport activities"*

Imagine you looked up the study that the claim was based on and found this information:

> *"These results are from a study of two groups of people with muscle soreness; one group used the cream, while the other group did not. The group that used the cream had less muscle soreness at the end of the study, which went for 6 weeks."*

a) Do you think this cream is effective at reducing muscle soreness? Circle one of the below answers and explain why you think this is the answer.

Yes No Cannot tell

_____

_____

_____

Let's provide more information about the study to help you decide.

b) In each scenario below, consider whether the comparison between the groups would be fair:

	Group using the cream	Group not using the cream	Is this a fair comparison? Yes or no?	Why?
i	Participants are fit and athletic teenagers with no health problems (just sore muscles the day after a sprint race).	Participants are fit and athletic teenagers with no health problems (just sore muscles the day after a sprint race).		
ii	Participants are fit and athletic teenagers with no health problems (just sore muscles the day after a sprint race).	Participants are over the age of 60, not very athletic and often have sore muscles.		
iii	Participants received leg massages and had a daily hot bath during the study.	Participants received leg massages and had a daily hot bath during the study.		
iv	Participants received leg massages and took hot baths during the study.	No participants received leg massages or took hot baths during the study.		
v	Participants were given a white odourless cream, in a white tube labelled 'apply to sore muscles as needed'.	Participants were given a white odourless cream, in a white tube labelled 'apply to sore muscles as needed'.		

	Group using the cream	Group not using the cream	Is this a fair comparison? Yes or no?	Why?
vi	Participants were given a white pleasant-smelling cream, in a white tube labelled 'Pain-stop cream'.	Participants were given a yellow cream, in a blue tube labelled 'apply as needed'.		
vii	Participants' muscle soreness was assessed daily by asking them to record their level of soreness on a scale from 0 (no soreness) to 10 (maximum soreness). Participants received a text message daily from the researchers and had to respond with their 'score'.	Participants' muscle soreness by assessed by asking them to complete a 1 page questionnaire at the end of the study (6 weeks) and mail it back to the researchers.		
viii	30 of the 60 participants in this group dropped out of the study.	15 of the 60 participants in this group dropped out of the study.		
ix	Ten of the 60 participants in this group never applied the cream. When doing the analysis of the data, the researchers counted the outcomes of these 10 people in with the outcomes of the 60 participants who were not given the 'Pain-stop cream'.			

c) Place the words below into the correct place to create a summary list of the main things that make comparisons of interventions fair.

Counted	Everyone	Equally	Randomisation
Allocated	Similar	Outcomes	Blinded

At the beginning of the study, the groups being compared should be _____.

Study participants should be allocated into the groups using _____.

If possible, study participants should be _____ about which interventions they are receiving.

Apart from the interventions being compared, participants in the study groups should be cared for _____.

_____ should be assessed in the same way in the groups that are being compared.

Outcomes should be measured for _____.

Participants' outcomes should be _____ in the group to which they were _____.

Activity 8: More or less reliable?

For each process below, indicate whether doing this as part of a study will increase (insert ↑) or decrease (insert ↓) the reliability of a study's results.

	↑ or ↓
a. Having one group in a study.	
b. Having an intervention group (where the participants receive the intervention) and comparing the results with a control group (where the participants don't receive the intervention).	
c. Researchers allocate the participants who more likely to benefit from the intervention into the intervention group.	
d. Researchers allocate healthier participants to the intervention group.	
e. Researchers use 'randomisation' to randomly allocate participants to groups.	
f. Participants are informed of which group they are allocated to.	
g. Researchers are aware of which group the participants are allocated to.	
h. Neither participants nor researchers are aware of which group the participants are allocated to.	
i. Outcomes are only analysed for participants who took the intervention for the entire duration that it was prescribed.	
j. Outcomes are measured for nearly all of the participants in the study.	
k. Subjective outcomes (eg. mood, level of pain) are assessed using measures that have been shown to be a reliable method of assessing these outcomes.	
l. The intervention group receives two additional visits from the research team, one at the beginning and one half-way through the study.	

Class Activity D - Bad Science Bingo

In the ad that you will be shown, can you spot **5 examples of bad science** that are listed in the grid below?

Be the first to find 5 in a row (either vertically, horizontally, or diagonally) and call out BINGO. You must be able to explain WHERE in the ad each of the examples of 'bad science' are.

BINGO BOARD 1

Use of the phrase 'scientifically tested' as support for a claim	Unsupported statement	Newer is not necessarily better	Expert opinion is not always right	Comparison groups were not treated equally
Hope may lead to unrealistic expectations	Celebrity endorsement	Volunteer bias	Many participants not followed up	Explanations about how treatments work can be wrong
Small sample size	No control group	No attempt to minimise placebo effect	Conflict of interest	Anecdotes are unreliable evidence
People's outcomes were assessed differently	More is not necessarily better	Comparison groups were different	Lack of blinding	Correlation ≠ Causation
Claims made about effect on people, but tested only on animals	Misleading subgroup analyses	Measurement of an outcome that does not matter to people	More expensive treatments are not necessarily better	Common practice is not always evidence-based

In the ad that you will be shown, can you spot **5 examples of bad science** that are listed in the grid below?

Be the first to find 5 in a row (either vertically, horizontally, or diagonally) and call out BINGO. You must be able to explain WHERE in the ad each of the examples of 'bad science' are.

BINGO BOARD 2

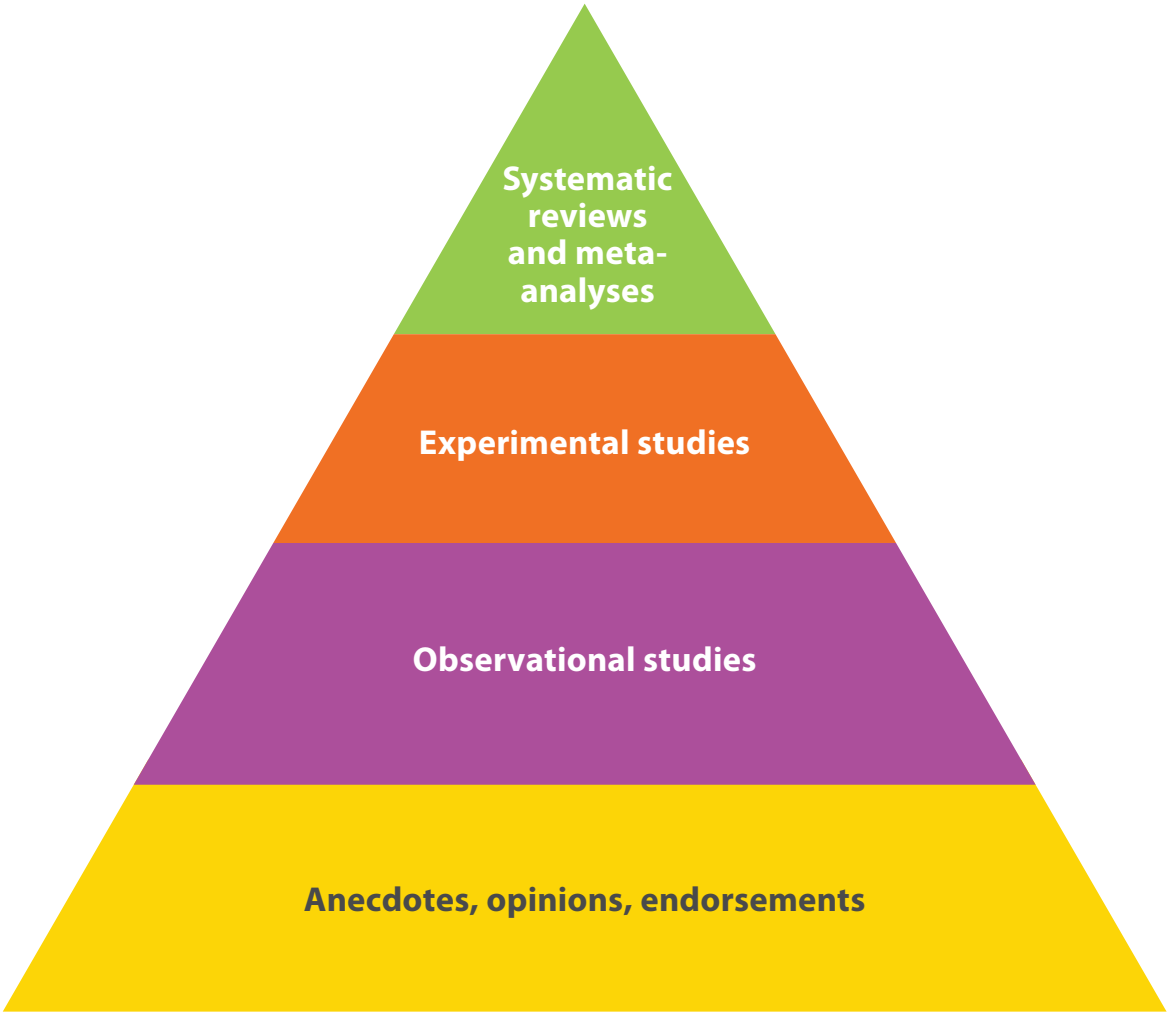
Hope may lead to unrealistic expectations	Claims made about effect on people, but tested only on animals	People's outcomes were assessed differently	People were not blinded to which treatment they were getting	Conflict of interest
Expert opinion is not always right	More expensive treatments are not necessarily better	Explanations about how treatments work can be wrong	Comparison groups were not treated equally	More is not necessarily better
Use of the phrase 'statistical significance' as the only support for a claim	Correlation ≠ Causation	Comparison groups were different	Treatment is not practical for most people	Volunteer bias
Unsupported statements	Newer is not necessarily better	No comparison group	Many participants not followed up	Celebrity endorsement
Dramatic language/strong claim	Data are presented from only select subgroup analyses	Lack of random allocation to groups	Measurement of an outcome that does not matter to people	Earlier is not necessarily better

Hierarchy of evidence

A **systematic review** is a summary of studies addressing a clear question, using systematic and explicit methods to identify, select, and critically appraise relevant studies, and to collect and analyse data from them.

Systematic reviews are the combined results from multiple similar studies, which have been found using a systematic search of the health literature.

If the data from all the studies are combined together to calculate a total outcome of all the studies, it is a process known as a **"meta-analysis"** (meta-analyses for plural).



Activity 9: Absolute versus relative effects

Consider this health claim:

"Using Stay Away Pimples Cream reduces your risk of having pimples, after 4 weeks of use, by 50%!"*

a) **From only looking at this claim, how effective do you think this cream is at treating pimples? Circle one of the below answers and explain why you think this is the answer.**

Very effective Somewhat effective Not very effective Not at all effective

Now consider this health claim about the same cream.

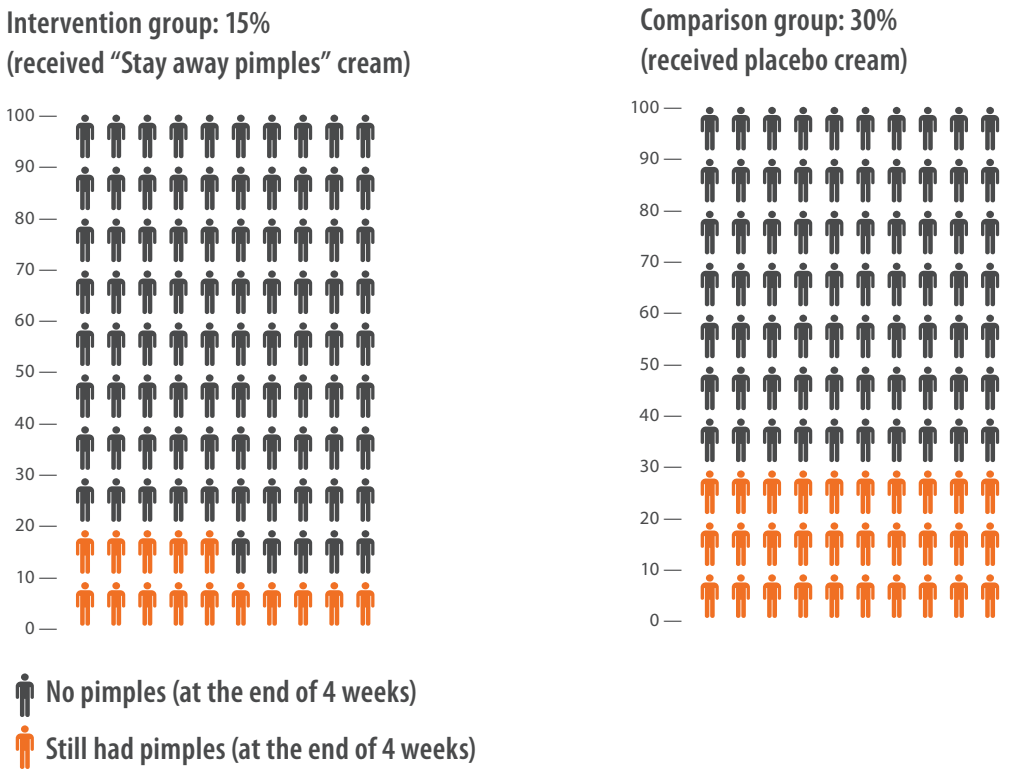
"Using Stay Away Pimples Cream reduces your risk of having pimples, after 4 weeks of use, by 15%"*

b) **From only looking at this claim, how effective do you think this cream is at treating pimples? Circle one of the below answers and explain why you think this is the answer.**

Very effective Somewhat effective Not very effective Not at all effective

Although the numbers in the above two claims are very different, they come from the same study and therefore, the same data.

Let's say that the study had two groups of teenagers with pimples and each group had 100 people. In the group that received the Stay Away Pimples Cream*, 15 of the 100 (15%) participants still had pimples at the end of the 4 weeks of the study. In the comparison group that received a placebo cream, 30 of the 100 (30%) participants still had pimples at the end of the study. This is shown in the figure below.



The numbers in the first claim are presented as a **Relative difference**.
It is calculated as the likelihood (or chance) of an outcome in one group divided by the likelihood in the other group.

In the example above, this would be:

Likelihood (chance) of the outcome (still having pimples) in the intervention group: 15%

Likelihood (chance) of the outcome (still having pimples) in the comparison group: 30%

15 ÷ 30 = 0.5 Then multiply x 100 to get the 50% which is the number used in the claim.

The numbers in the second claim are an **Absolute difference**. This is the simply the difference between the two groups.

In this example, this would be: 30% - 15% = 15%.

Activity 10: Study relevance and outcomes that matter to you

Study relevance

a. If you were considering the research behind a health claim, indicate if the following studies would be relevant to you and/or measure outcomes that matter to you.

If you:	And the research focused on:	Is it relevant? Yes or no
are an adult with asthma	pre-school aged children with asthma	
are a teenager who plays soccer regularly and gets sore legs sometimes	the effects of a knee brace on pain after sport in people with knee osteoarthritis	
live in Queensland and are considering a skin cream to prevent damage from sun exposure	testing a skin cream that prevented skin damage from weather exposure in people who live in Norway	
want to know about the effects of a stress-reducing intervention that you might want to use	testing the stress-reducing effects of the intervention in mice	

Outcomes that matter to you

b. If you were considering the research behind a health claim, indicate if the following studies measure outcomes that matter to you.

If you:	And the research measured:	Is this outcome likely to matter to you? Yes or no
experience regular headaches and were considering an intervention that claims to reduce headaches	the level of a chemical transmitter in participants' brains	
	the frequency and severity of headaches	
have a cold and were considering an intervention that claims to improve colds	how quickly participants' fever is reduced and their nose stops running	
	the number of bacteria in participants' nose	

12 SUMMARY POINTS
HOW TO NOT BE FOOLED BY FALSE HEALTH CLAIMS

1. Examine health claims critically

Many claims about health interventions are designed to trick and mislead you.

Ask - what is the evidence behind this claim?

2. Watch out for 'danger' words and phrases

Many claims contain danger words (e.g. dramatic, cure, miracle) and research-sounding phrases (e.g. 'clinically-proven', 'scientifically tested').

Ask – what is the evidence behind this claim?

3. Don't believe the opinion of others – look at the research behind the claim

Many information types (such as anecdotes, testimonials, endorsements) are not reliable sources of information.

Accurate health claims come from reliable research studies.

4. Be aware of conflicts of interest

Conflict of interest (e.g. money, belief that an intervention works) can intentionally or unintentionally distort the results of a study.

Look at who stands to gain from the results of a study or the use of a health intervention.

5. Association is not the same as causation

An association between variables does not always mean that one causes the other.

Check if claims of causation are appropriate.

6. Not all research is created equal

Even health claims from research studies may not be reliable. It depends on the type of study and how well it was designed and conducted.

7. Was the intervention compared to something else?

To test if an intervention works, a research study should compare the intervention to something else so that we know what would have happened without the intervention.

Randomised trials provide the most reliable information about whether interventions work.

8. Was it a fair comparison?

Fair comparisons of interventions are important to minimise bias. Fair comparisons ensure that:

- randomisation is used to allocate participants to groups
- groups are similar at the start of the trial
- participants are blinded to which group they are in (where possible)
- participants are cared for equally (apart from the intervention being tested)
- outcomes are reliably measured for everyone and in the same way in all groups
- participants' outcomes are analysed in the groups they were allocated to

GROUP A

GROUP B

9. Are there enough participants?

Small sample sizes in studies can be problematic. Larger samples often provide more reliable results.

10. One study is usually not enough

One study is usually not sufficient to provide conclusive evidence about whether an intervention works. Studies can often provide contradictory results. Check if a systematic review exists - these are types of studies that systematically find, check, and summarise the results of all known studies of an intervention.

SYSTEMATIC REVIEW

ABSOLUTE

RELATIVE

11. Look carefully at numbers in a health claim – 'relative' numbers can be misleading

Relative numbers can make an intervention look more impressive than it really is. Check the absolute numbers to look at the difference between the groups of the study.

12. Do the advantages outweigh the disadvantages of an intervention?

When considering whether to use a health intervention, consider if the study measured outcomes that are relevant and matter to you. Also think about whether any advantages (or benefits) of the intervention matter more than any disadvantages (such as side-effects, cost, time, inconvenience).

Take home messages

1. **DON'T be fooled by health claims!**
   Recognise claims about health interventions. They are everywhere.

2. **ASK: what is the evidence behind this claim?**

3. **THINK: is the evidence reliable and based on a fair comparison of the intervention?**

Additional activities - Word Search

Find all the words below, and the remaining letters will reveal a secret message!

_ !!

A	N	O	I	T	A	C	O	L	L	A	C	D	O	T
R	S	C	E	R	E	G	N	A	D	B	I	N	T	R
R	A	S	A	C	M	B	B	E	F	S	T	O	O	O
N	E	N	O	U	N	I	I	L	E	O	A	D	B	T
O	R	L	D	C	S	E	A	A	Y	L	M	T	R	S
I	A	F	E	O	I	A	D	L	S	U	E	N	E	I
T	P	A	L	V	M	A	T	I	C	T	T	E	L	D
N	M	S	E	H	A	I	T	I	V	E	S	M	A	E
E	O	F	A	I	R	N	S	I	O	E	Y	E	T	D
V	C	E	A	L	T	H	T	A	O	N	S	S	I	N
R	A	N	E	C	D	O	T	E	T	N	C	R	V	I
E	T	C	I	L	F	N	O	C	L	I	A	O	E	L
T	N	O	I	T	A	V	R	E	S	B	O	D	I	B
N	T	E	R	M	I	N	O	L	O	G	Y	N	M	S
I	L	A	I	N	O	M	I	T	S	E	T	E	!	!

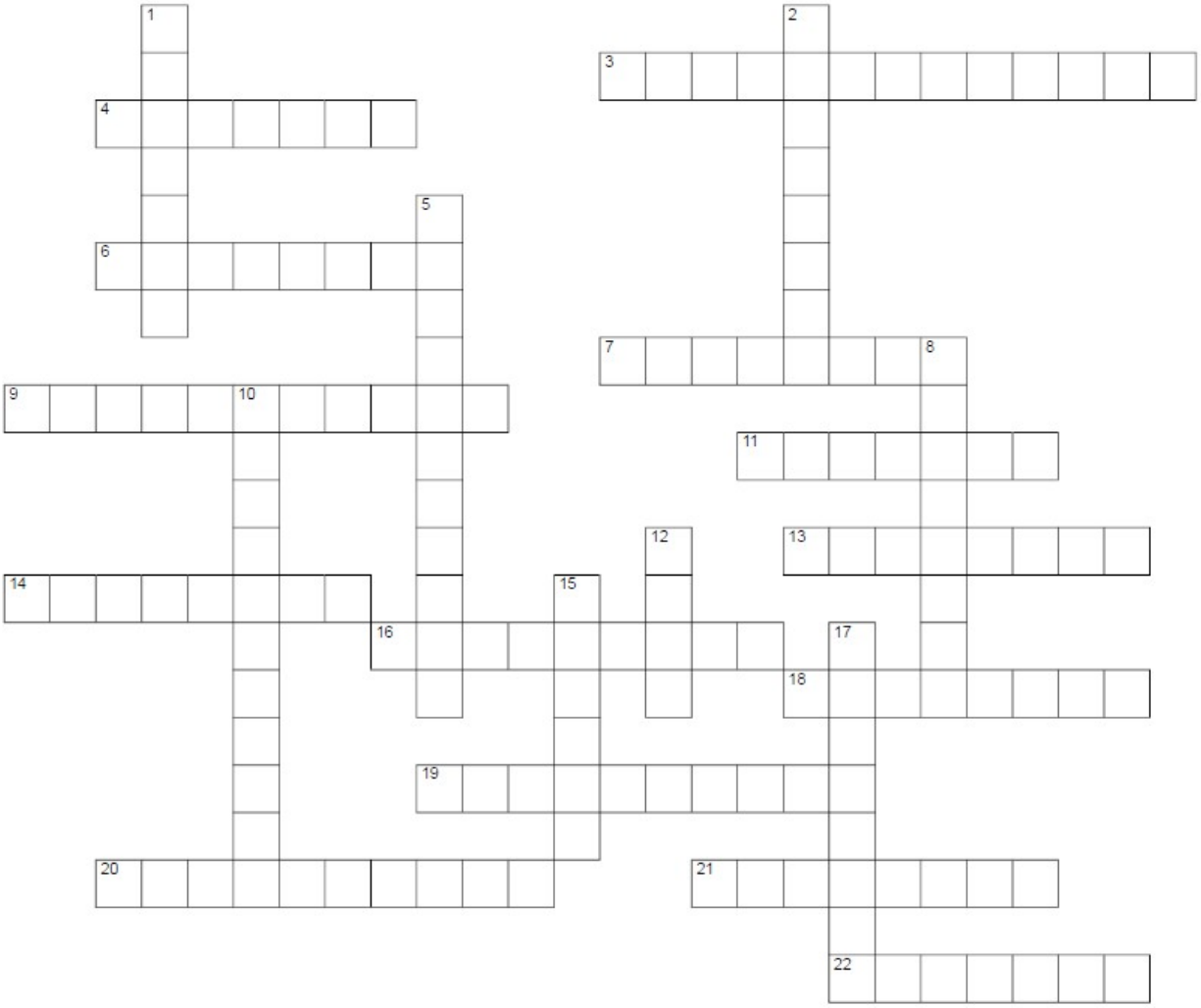
Absolute	Compare	Observation
Allocation	Conflict	Randomisation
Anecdote	Danger	Relative
Association	Distort	Relevant
Bias	Endorsement	Systematic
Blinded	Evidence	Terminology
Causation	Fair	Testimonial
Claim	Intervention	

Created by Puzzlemaker at DiscoveryEducation.com

Additional activities - Crossword

Complete this crossword puzzle, using these words:

randomisation	compared	blinded	absolute	fair
interest	evidence	relevant	testimonial	anecdote
danger	conflict	problematic	reliable	relative
scientific	distort	causation	endorsement	equally
systematic	quality			



Across

3. _____ is the fairest way to allocate study participants into similar groups. (13 letters)

4. Conflict of interest can intentionally or unintentionally _____ the results of a study. (7 letters)

6. It is desirable to have larger sample sizes in studies, because they often provide more _____ results. (8 letters)

7. When looking at the resulting numbers of a study, the _____ numbers can make an intervention look more impressive than it really is. (8 letters)

9. Small sample sizes in studies can be _____. (11 letters)

11. It is difficult to know which health information to believe, because the _____ of health information is highly variable. (7 letters)

13. When considering whether to use a health intervention, consider if the study measured outcomes that are _____ and matter to you. (8 letters)

14. In order for a research study to be able to show the effect of an intervention, the intervention should be _____ to something else. (8 letters)

16. When considering a relationship between two variables, it is important to remember that association is not the same as _____. (9 letters)

18. When the people involved in a study can potentially benefit from the study, there is a conflict of _____, and this can distort the results of a study. (8 letters)

19. Some advertising and product labels use words and phrases that sound _____, but may just be a marketing tool. This kind of terminology can be misleading. (10 letters)

20. _____ reviews find and summarise the results of all known studies of an intervention. (10 letters)

21. When looking at the resulting numbers of a study, the _____ numbers provide a clearer presentation of the difference between the results from the groups in the study. (8 letters)

22. In a fair study, participants are treated _____. (7 letters)

Down

1. Ideally, participants should not know which group they are in. If this is the case, then it can be said that the participants have been _____ to their group allocation. (7 letters)

2. If a study of an energy drink is conducted by people who work for the drink company, then there can be a _____ of interest. (8 letters)

5. A _____ is a statement that someone from the public makes to confirm that the intervention has helped them. (11 letters)

8. Always ask, "what is the _____ behind the health claim?" (8 letters)

10. An _____ is a testimonial about a health intervention from a celebrity or someone who is recognised and admired. (11 letters)

12. The comparison between the groups needs to be _____ in order to minimise bias. (4 letters)

15. Many health claims contain _____ words and phrases, which should alert people that the information is unlikely to be valid. (6 letters)

17. An _____ is a short story about an experience with a health intervention. (8 letters)

References to images and studies used within this booklet.

http://time.com/4634553/is-coffee-bad-aging-caffeine/ (08/07/2017)

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