SUFFICIENT & NECESSARY CONDITIONS

The notions of sufficient condition and necessary condition play a very important role in good reasoning because we use them to assess the support of premises, the truth of various statements, the support in arguments from analogy, the adequacy of definitions & causal explanations, identify the logical form of statements, etc. It is therefore valuable to master these concepts as soon as possible.

Instructions: **(1)** Is each (a) proposition sufficient for its corresponding (b) proposition?

(2) Whenever (a) is not sufficient for (b), invent a counterexample (**CE**) *to prove* that it's not sufficient.

Here are two examples:

1) (a) It is cloudy.   (b) It is raining.

CE: *it's possible* to <u>have</u> clouds *<u>without</u>* rain. So, clouds are <u>not</u> sufficient for rain, AND rain is <u>not</u> necessary for clouds.

<u>Stated in general</u>: Since *it's possible* to <u>have</u> X *<u>without</u>* Y, then X is not sufficient for Y, AND Y is not necessary for X.

2) (a) It is raining.   (b) There is at least one rain cloud somewhere.

It's (physically) *impossible* rain *<u>without</u>* at least one rain cloud somewhere.

So, rain is sufficient for at least one rain cloud somewhere, AND at least one rain cloud somewhere is necessary for rain.

<u>Stated in general</u>: Since *it's impossible* to <u>have</u> V *<u>without</u>* W, V is sufficient for W, AND W is necessary for V.

(A) 3) (a) It is snowing.   (b) It is below 25 degrees F. (HINT: water freezes at 32 degrees F.)

4) (a) It is below 25 degrees F.   (b)It is snowing.

5) (a) S/he is raising a child.   (b) S/he has procreated that child.

6) (a) S/he has procreated a child.(b) S/he is raising that child.

7) (a) This is a piece of furniture. (b) This is a table.

8) (a) This is a table.   (b) This is a piece of furniture.

9) (a) This is a square.   (b) It is a four-sided figure.

10) (a) This is a four-sided figure.(b) This is a square.

11) (a) The task is interesting.   (b) It will be done.

12) (a) The task will be done.   (b) It is interesting.

13) (a) I listen to an AM radio.   (b) I listen to a radio station.

14) (a) I listen to a radio station. (b) I listen to an AM radio.

15) (a) It never rains here.   (b) No plant ever grows here.

16) (a) No plant ever grows here. (b) It never rains here.

17) (a) The meal is tasty.   (b) The meal is nutritious.

18) (a) The meal is nutritious.   (b) The meal is tasty.

19) (a) This is an ant.   (b) This is an insect.

20) (a) This is an insect.   (b) This is an ant.

21) (a) You are wearing eyeglasses.   (b) Your eyes are weak.

22) (a) You are wearing prescription glasses.   (b) Your eyes are weak.

23) (a) You regularly wear prescription glasses.   (b) Your eyes are weak.

24) (a) Your eyes are weak.   (b) You wear genuine prescription eyeglasses.

25) (a)We wear sandals.   (b) We wear footwear.

26) (a) We wear footwear.   (b) We wear sandals.

27) (a) This is a book.   (b) It has leaves made of paper.

28) (a) There is a nuclear reactor on campus.   (b) There is radioactive material on campus.

29) (a)This is a hand.   (b1) It has four fingers and (b2) a thumb. (b3) It is a limb.

30) (a) This is an orange.   (b) It is a fruit.

31) (a) This is a fruit.   (b) This is an orange.

32) (a) This is a _____.   (b) It is green.

33) (a) This is a _____.   (b) It is yellow.

34) (a) This is a _____.   (b) It is blue.

35) (a) This is a _____.   (b) It is red.

IS THE FIRST STATEMENT <u>SUFFICIENT FOR</u> THE SECOND ONE? Does the 1st one <u>imply</u> the 2nd one?

A car accident has occurred. A person is injured.

A person is injured. The person had an accident.

S/he has lots of money. S/he plays the stock market.

Karl is a rocket scientist. Karl is a genius.

Mary received an A on her test. Mary passed the course.

This is a teenage boy. He's out of control.   This teenage boy is out of control. This is a teenager.

(B) <u>**INSTRUCTIONS**</u>: **(a)** Identify the intended sufficient condition <u>***in***</u> the following statements. Some of them are tricky! **(b)** Determine whether or not it is in fact a sufficient condition by constructing a counterexample against the claim.

For example, "By lowering the cost of alcohol beverages at the social event, delinquency is encouraged."
(a) The lowering of the cost of alcohol beverages at the social event ***is presented as being sufficient for*** encouraging delinquency. **(b)** Here are some counterexamples proving that it is not sufficient: *It's possible that* only a small amount of alcohol is sold to each individual during the whole duration of the event. *It's possible that* the participants drink very little alcohol.

Note that SUFFICIENT CONDITIONS CAN BE EXPRESSED
by CONCEPTS, e.g. in "All humans are mortal" the concept of being human is presented as being sufficient for being mortal;
by PROPOSITIONS, e.g., in "If *x* is a human, then *x* is a mortal", the proposition "x is a human" is presented as being sufficient for the proposition "x is mortal";
by STATEMENTS, e.g., in the argument "S/he is a human being, therefore s/he is mortal", the premise/reason "S/he is a human" is presented as being sufficient for the conclusion that s/he is mortal.

(1) **When** bad times assail a nation's economy, some businesses, such as shoe repair and used cars, flourish.
(2) **No** pain, no gain.
(3) Victory belongs to the one who endures.
(4) To be upset over what you don't have is to waste what you do have.
(5) More marriages might survive **if** the partners realized that sometimes the better comes after the worse. (Dough Larson)
(6) **Only** dogs are mammals.
(7) **Only** mammals are dogs.
　　Only *A's* are *B's*.
(8) **Only** a marriage between a male and a female person will be recognized in this state.
(9) **If** you haven't any charity in your heart, you have the worst kind of heart trouble. (Bob Hope)
(10) **If** the economy slows down, the people who are most badly affected are those who work for others.
(11) **Where** there is physical awareness in our bodies there is blood circulating.
(12) **Where** there is blood circulating in our bodies there is health.
(13) Pleasure is nature's sign of approval. (Oscar Wilde)
(14) One forsakes pleasure only for the sake of greater ones. (Pascal)
(15) A person becomes what s/he thinks. (Upanishads)
(16) Like the garden, like the gardener.
(17) Lie with dogs, rise with fleas.
(18) **It is impossible** for anyone to begin to learn that which he thinks he already knows.
(19) **When** a bore leaves the room, one feels as if someone came in.
(20) **When** a habit begins to cost money, it is called a hobby.
(21) **Whenever** there is too much of anything, something is missing.
(22) People who think that money will accomplish anything will do anything for money.
(23) **If** a crook kisses you, count your teeth.
(24) **If** you want to look smart to everyone, agree with everyone.
(25) **If** you want *x*, then do *y*.
(26) Trees bend <u>**only when**</u> young.
(27) We **cannot** be sure that we have something worth living for **unless** we are ready to die for it. (E. Hoffer)
(28) Smart people speak from experience.
(29) Smarter people, from experience, don't speak.
(30) The extravagance of today is tomorrow's necessity.
(31) A person's character is his/her fate.
(32) **When** a community puts its identity for sale, as it does in tourism, it becomes what the tourists want.
(33) Whoever is happy will make others happy.

(34) **In order to** know someone, examine carefully what s/he has done in a great variety of challenging situations.

(35) **In order to** do *x*, do *y*.

(36) **In order to** do know someone, you **must** examine carefully what s/he has done in a great variety of challenging situations.

(37) **In order to** do *x*, you **must** do *y*.

<u>ANSWERS</u> (A)

3) (a) It is snowing.   (b) It is below 25 degrees F. (HINT: water freezes at 32 degrees F.) 3(a) is not sufficient for 3(b), and 3(b) is not necessary for 3(a). Here are eight counterexamples: *It's possible that* it's snowing and the temperature is either 32F, 31F, 30F, 29F, 28F, 27F, 26F, or 25F. *Each possibility proves that* 3(a) does not logically imply 3(b), and that 3(b) is not a necessary condition for 3(a).

4) (a) It is below 25 degrees F. (b)It is snowing.
4(a) is not sufficient for 4(b), and 4(b) is not necessary for 4(a). Here is a counterexample: It *could* be below 25F and a clear day.

5) (a) S/he is raising a child.   (b) S/he has procreated that child.
5(a) is not sufficient for 5(b), and 5(b) is not necessary for 5(a). Here are three counterexamples: S/he *could* have adopted, kidnapped, or even "bought" the child from illegal "adoption" networks.

6) (a) S/he has procreated a child.   (b) S/he is raising that child.
6(a) is not sufficient for 6(b), and 6(b) is not necessary for 6(a). Here are three counterexamples: *It's possible that* s/he gave the child up for adoption, abandoned, or killed the child in the past.

7) (a) This is a piece of furniture.   (b) This is a table.
7(a) is not sufficient for 7(b), and 7(b) is not necessary for 7(a). There are as many counterexamples as there are pieces of furniture that are <u>not</u> tables. It *could* be a chair, a bed, a sofa, a rocking chair, a bookshelf, etc.

***8)** (a) This is a table.   (b) This is a piece of furniture.
8(a) <u>is</u> a <u>sufficient</u> condition for 8(b), and 8(b) is a necessary condition for 8(a), for it is by definition <u>im</u>possible for 8(a) to be true and 8(b) to be false.

*9) (a) This is a square.   (b) It is a four-sided figure.
9(a) <u>is sufficient</u> for 9(b), and 9(b) is necessary for 9(a), since it is by definition <u>im</u>possible for 9(a) to be true and 9(b) to be false.

10) (a) This is a four-sided figure.   (b) This is a square.
10(a) is not sufficient for 10(b), and 10(b) is not necessary for 10(a). There are as many counterexamples as there closed four-sided figures that are *not* squares, e.g., a trapezoid, a rhombus, a parallelogram, or any one of infinitely many others.

11) (a) The task is interesting. (b) It will be done.
11(a) is not sufficient for 11(b), and 11(b) is not necessary for 11(a). Counterexamples: *It's possible that* there's not enough time, not enough money, not enough help, one gets sick, it's illegal, or it's immoral, etc.

12) (a) The task will be done. (b) It is interesting.
12(a) is not sufficient for 12(b), and 12(b) is not necessary for 12(a). Counterexample: It *could* be boring, and done out of duty or necessity.

13) (a) I listen to an AM radio. (b) I listen to a radio station.
13(a) is not sufficient for 13(b), and 13(b) is not necessary for 13(a). Counterexample: I *could* be listening to static.

14) (a) I listen to a radio station.   (b) I listen to an AM radio.
14(a) is not sufficient for 14(b), and 14(b) is not necessary for 14(a). CE: I *could* be listening to FM radio, or satelite radio.

15) (a) It never rains here.   (b) No plant ever grows here.
15(a) is not sufficient for 15(b), and 15(b) is not necessary for 15(a). Counterexample: *It's possible that* there is proper irrigation.

16) (a) No plant ever grows here.   (b) It never rains here.
16(a) is not sufficient for 16(b), and 16(b) is not necessary for 16(a). Counterexamples: *It's possible* the soil is contaminated, or "here" refers to a place where there is only concrete, or only iron, etc., and it's a place where it does rain.

17) (a) The meal is tasty.   (b) The meal is nutritious.
17(a) is not sufficient for 17(b), and 17(b) is not necessary for 17(a). There are just as many counterexamples as there are tasty junk foods.

18) (a) The meal is nutritious.   (b) The meal is tasty.
18(a) is not sufficient for 18(b), and 18(b) is not necessary for 18(a). Counterexamples: It *could* be tasteless, or taste badly.

*19) (a) This is an ant.   (b) This is an insect.
19(a) is sufficient for 19(b), 19(b) is necessary for 19(a). For it's impossible for 19(a) to be true and 19(b) to be false.

20) (a) This is an insect.   (b) This is an ant.
20(a) is not sufficient for 20(b), and 20(b) is not necessary for 20(a). There are as many counterexamples as there are insects that are *not* ants. It *could* be a butterfly, a bee, a mosquito, a fly, etc.

21) (a) You are wearing eyeglasses.   (b) Your eyes are weak.
21(a) is not sufficient for 21(b), and 21(b) is not necessary for 21(a). Counterexamples: They *could* be sunglasses, or they could be plain glass eye glasses, worn to change your image, to perform a play, etc.

22) (a) You are wearing prescription glasses.   (b) Your eyes are weak.
22(a) is not sufficient for 22(b), and 22(b) is not necessary for 22(a). Counterexample: It is still *possible* for someone to wear them despite not having weak eyes. The fact that this is unlikely does not eliminate the possibility. The combined unlikelihood of all such counterexamples proves the likelihood of the conditional statement, IF 22(a) is true, THEN 22(b) is true.

23) (a) You regularly wear prescription glasses. (b) Your eyes are weak.
23(a) is not sufficient for 23(b), and 23(b) is not necessary for 23(a). Counterexample: It is still *possible* for someone to wear them despite not having weak eyes. The fact that this is extremely unlikely does not eliminate the possibility. The combined extreme unlikelihood of all such counterexamples proves the extreme likelihood of the conditional statement, IF 23(a) is true, THEN 23(b) is true.

24) (a) Your eyes are weak.   (b) You wear genuine prescription eyeglasses.
24(a) is not sufficient for 24(b), and 24(b) is not necessary for 24(a). Four counterexamples: *It's possible* you can't afford eyeglasses, you just do not want to wear them, they are not available, or they have not yet been invented.

*25) (a) We wear sandals.   (b) We wear footwear.
25(a) is sufficient for 25 (b), and 25(b) is necessary for 25(a), for it's impossible for 25(a) to be true and 25(b) to be false.

26) (a) We wear footwear.   (b) We wear sandals.
26(a) is not sufficient for 26(b), and 26(b) is not necessary for 26(a). There are as many counterexamples as there is footwear other than sandals. They *could* winter boots, hiking boots, dress boots, dress shoes, running shoes, flip flops, moccasins, slippers, etc.

27) (a) This is a book.   (b) It has leaves made of paper.
27(a) is not sufficient for 27(b), and 27(b) is not necessary for 27(a). Counterexamples: They *could* be made of plastic, wood, goat skin (parchment), the skin of lots of animals, or even slabs of rock or steel (for heavy reading!)

28) (a) There is a nuclear reactor on campus.   (b) There is radioactive material on campus.
28(a) is not sufficient for 28(b), and 28(b) is not necessary for 28(a). *It's possible* that its nuclear material has been transported somewhere else. [Keep in mind the following analogy: combustion engine is still a combustion engine even if it has no gas for the combustion.]

29) (a)This is a hand.   (b1) It has four fingers and (b2) a thumb. (b3) It is a limb.
29(a) is not sufficient for 29(b1), and 29(b1) is not necessary for 29(a). *It's possible that* someone has lost one or more fingers through injury, or was born with one or more fingers missing.

29(a) is not sufficient for 29(b2), and 29(b2) is not necessary for 29(a). One could have lost a thumb in an accident.
*29(a) is sufficient for 29(b3), and 29(b3) is necessary for 29(a), for it's impossible for 29(a) to be true and 29(b3) to be false.

30) (a) This is an orange.   (b) It is a fruit.
30(a) is sufficient for 30(b), and 30(b) is necessary for 30(a) because it's impossible for 30(a) to be true and 30(b) to be false.

31) (a) This is a fruit. (b) This is an orange.
31(a) is not sufficient for 31(b), and 31(b) is not necessary for 31(a). There are as many counterexamples as there are fruits other than oranges. It could be an apple, a papaya, a guanabana, a curuba, a cherry, a raspberry, a blueberry, a banana, a pear, a pineapple, a cantaloupe, etc.

(B) *STUDENTS: The following answers represent ongoing reflection. If you can improve them significantly, you will get bonus points!!!!*

(**1**) **When** bad times assail a nation's economy, some businesses, such as shoe repair and used cars, flourish.
(a) The proposition, "Bad times assail a nation's economy", is presented as being sufficient for the proposition "Some businesses flourish". The examples are not part of either proposition.
It is equivalent to the conditional proposition, IF bad times assail a nation's economy, THEN some businesses flourish.
(b) To show that "Bad times assail a nation's economy" is not sufficient for some businesses some businesses, or in other words, to refute this conditional proposition, or any of its equivalent formulations, one would first have to clarify "bad times" and "flourish", for the way these are defined affects our ability to construct counterexamples. Secondly, to construct counterexamples, we either identify actual cases in the history of humanity where bad times have assailed a nations economy, but *no* business flourished during those bad times, or imagine such cases. We can certainly imagine such bad times, such as an extensive nuclear war or an extensive epidemic that affects most people, so the saying is false. However, since my imagined counterexample is extremely unlikely, and since I cannot think of any actual cases in human history where no business flourished during bad times, then, relative to my limited knowledge and current abilities to use my imagination, the saying is not true, but extremely probable.

(2) No pain, no gain.
(a) Not having pain, the absence of pain, is presented as being sufficient for the absence of gain.
Equivalently: pain is necessary for gain.
In the standard conditional form: IF there is no pain, THEN there is no gain.
Equivalently, in the standard form: IF there is gain, THEN there is pain.
(b) To refute this conditional proposition, we would first need to clarify the likely intended meaning of "gain" and "pain". I have heard this expression used only in athletic contexts. In those contexts the conditional proposition is, "IF there is athletic gain (e.g., improvement in performance), THEN there is (or has been some) physical pain". I suspect that the intended meaning in those contexts is: IF there is *significant* athletic gain, THEN there is (or has been some) physical pain. Though any significant gain generally requires effort and sacrifices, there are many situations where there is athletic gain due to rigorous and medically sound training that does *not* involve any physical pain. Therefore, the absence of pain is not sufficient for the absence of gain, or in other words, pain is not necessary for gain: the saying is false. What is the combined likelihood of all the counterexamples? What is *the ratio of* all the significant athletic gains from non-painful training *to* the sum of all significant athletic gains from both non-painful and painful training? We would need to clarify the meaning of "painful" and "significant gain" in order to undertake an investigation that would answer this question. Note that the ratio, and thus the estimated probability of the saying, will vary according to the chosen definitions.

(3) Victory belongs to the one who endures.
This one is tricky, for it can be used to make two distinct claims. So, we have two claims to evaluate.
  (A) The linguistic structure of the saying (i.e., the subject, grammar, and predicate) indicates that **(a)** something being a victory is sufficient for belonging to the one who endures. Equivalently: IF something is a victory, THEN it belongs to the one who endures. **(b)** To determine whether this saying, in either equivalent form, is true, we must clarify "endures" and consider the various contexts where the saying would be used. A charitable interpretation of "endures" is "persist" and "not give up". This concept can used in the following contexts:

(i) Victory in a sport belongs to the one who endures/persists/does not give up in the sport.

(ii) Victory on the battlefield belongs to the one who endures/persists/does not give up on the battlefield.

(iii) Victory on the debate team belongs to the one who endures/persists/does not give up in the debate.

(iv) Victory against germs (against a disease) belongs to the one who endures/persists/does not give up against the germs.

For each one of these situations, which involve a more specific application of the general saying, we can construct counterexamples:

CE(i) *It's possible* to be victorious in a sport even after giving up when the other team or opponent makes terrible mistakes; or they cheat and are caught.

CE(ii) *It's possible* to be victorious on a battle field even after ceasing to fight (i.e., ceasing to endure) when the enemy makes terrible mistakes, such as blowing itself up; or some other platoon or division comes to our rescue just as we cease to endure; or we have been doing much better than we realized and the enemy surrenders just as we cease to endure, etc.

CE(iii) *It's possible* to be victorious in a debate even after giving up when the opposing team makes or has made terrible mistakes; or we have been doing much better than we realized.

CE(iv) *It's possible* to be victorious against germs (against a disease) even if we have given up, when a cure has just been found; or we have been doing much better than we realized; or there is a miracle.

Each one of the counterexamples against their respective specific interpretation of the general saying proves that the saying is false. However, all these counterexamples are together improbable; and I suspect that even if similar counterexamples against other specific interpretations of the saying were constructed, they too would be improbable. So, even though interpretation (A) of the saying results in a false saying, the combined unlikelihood of the counterexamples supports the conclusion that this interpretation results in a likely saying.

(B) The second interpretation centers on the relation of "belonging", which means in the saying that **(a)** enduring is sufficient for victory. This can be simply expressed as: IF one endures in x, THEN one is victorious in x. Let us evaluate the saying according to the charitable interpretation mentioned above, and consider the specific contexts where that interpretation could be applied:

(i) If one endures/persists/does not give up in a sport, then one is victorious in that sport.

(ii) If one endures/persists/does not give up on the battlefield, then one is victorious on the battlefield.

(iii) If one endures/persists/does not give up on the debate team, then one will win the debate.

(iv) If one endures/persists/does not give up against germs (against a disease), then one will win against the germs.

There are counterexamples against all of these examples, and most other applications of this interpretation of the proverb because endurance/persistence/not giving up, though extremely important to accomplish many goals, is usually not enough to realize those goals. For example:

CE(i) *It's possible* to endure/persist/not give up in a sport, be terrible players, and lose.

CE(ii) *It's possible* to endure/persist/not give up on the battlefield, run out of ammunition, or be terrible warriors, etc, and be defeated.

CE(iii) *It's possible* to endure/persist/not give up on the debate time, be inadequately prepared, informed, or intelligent, and lose.

CE(iv) *It's possible* to endure/persist/not give up against a disease, but run out of energy, medicine, or receive improper medical care, etc., and die.

Though endurance is an important factor, the fact that it is usually not enough to reach some desired goal, shows that our counterexamples are together at least probable. Therefore, interpretation (B) results in a saying that is not only false, but also improbable.

Interpretations (A) and (B) are the only two reasonable interpretations I have of this saying. Since it is (A) that results in the most reasonable saying, then (A) is the most charitable interpretation, relative to my current reflection on this saying.

(4) To be upset over what you don't have is to waste what you do have.

(a) The concept of being upset over what one does not have is presented as being sufficient for the concept of wasting what one does have.

Equivalently, in the standard conditional form: IF you are upset over what you don't have, THEN you waste what you do have.

(b) There are many obvious counterexamples against this claim:

It's possible that I'm upset over not making more money, but I wisely use the little money that I do have.
It's possible that I'm upset over my lack of excellent health, but I wisely take care of whatever health I do have.
It's possible that I'm upset over my lack of toys (consumer products in the widest sense possible), but I take good care of the toys that I do have.
The literal interpretation of this saying results in something so obviously false that the saying is probably intended to mean something else. The following would still be vulnerable to many similar counterexamples: "To be upset over what you don't have is to *fail to appreciate* what you do have". However, the following is probably what is intended to be communicated: "To be upset over what you don't have *makes it more difficult to fully appreciate* what you do have *while you are upset*". Though true, it does not have the same impact as the false saying.

(**5**) More marriages <u>might</u> survive **if** the partners realized that sometimes the better comes after the worse.
Here is the same conditional proposition, but in its *standard form*:
IF the partners realized that sometimes the better comes after the worse, **THEN** more marriages <u>might</u> survive.
(**a**) The proposition, "the partners realized that sometimes the better comes after the worse" (which is the *antecedent* of the conditional proposition), is presented as being sufficient for the proposition, "more marriages <u>might</u> survive" (which is the *consequent* of the conditional statement).
(**b**) In order to determine whether the antecedent is in fact sufficient for the consequent, we must carefully take into consideration the guarding qualifier "might". The saying is presented in the following form: IF A, then *might* (maybe, perhaps, possibly) B. This use of "might" can be interpreted in two different ways:
(**i**) "Might" qualifies the alleged relation of sufficiency of A for B, and this can be symbolically represented as:
  POSSIBLY(IF A, THEN B.**)**
(**ii**) "Might" qualifies the consequent B, and this can be symbolically represented as:
  IF A, THEN **POSSIBLY(**B**)**.
So, whenever someone uses a qualifier (which also includes assuring qualifiers such as "probably" and "necessarily") we must ask ourselves two questions: *Is the author/speaker intending to mean (i) or (ii)?* In most cases where there is a guarding qualifier (e.g., can, may, might, maybe perhaps, possibly) in the consequent of a conditional proposition, people are typically acknowledging that its antecedent is *in fact not sufficient* for the consequent, but that antecedent is nevertheless *possibly* sufficient for B. As you can see, this seriously weakens the claim being made. The advantage of making a weak claim is that it does not require much evidence to establish it. For instance, in order to refute POSSIBLY P, all one needs to show is that P is not self-contradictory. For example, since "There is a million dollar bill in your back pocket right now" is not self-contradictory, then "*It is possible* that there is a million dollar bill in your back pocket" *is* true, even though it is *astronomically unlikely* that there is now one in your back pocket (unfortunately!). However, whenever we weaken our claims in order to "protect" them, we make them less interesting, we make them trivially true: "You have a million dollar bill in your back pocket" is much more interesting than "You *possibly* have a million dollar bill in your back pocket now", but the former is false (unfortunately!). The author of the saying probably intended to mean: POSSIBLY (IF the partners realized that sometimes the better comes after the worse, THEN more marriages would survive). This is true because the conditional statement, "IF the partners realized that sometimes the better comes after the worse, THEN more marriages would survive", is *not* self-contradictory. In order to refute this interpretation of the saying I would have to show that it's IMPOSSIBLE (IF the partners realized that sometimes the better comes after the worse, THEN more marriages would survive). I cannot do this because the conditional statement is consistent. Therefore, the saying is quite true, but unfortunately, only trivially true.

(**6**) **Only** dogs are mammals.
(**7**) **Only** mammals are dogs.
  Only *A's* are *B's*.
I'm going to discuss these together in order to contrast them. Proposition (6) is obviously false, and we would falsify it by identifying any mammal that is *not* a dog. Note the structure of the counterexample: a cow is a mammal, but it is not a dog. That kind of counterexample refutes the following propositions:
(i) Only dogs are mammals.
(ii) If something is a mammal, then it's a dog.(The equivalent standard form of "Only dogs are mammals".)

(iii) For something to be a mammal, it must be a dog.

These three propositions are logically equivalent, for whatever confirms one, also confirms the others; and whatever falsifies one, also falsifies the others. By contrasting (i), (ii) and (iii), we can deduce that "only" in such propositions as (i) introduces a necessary condition. So the general propositional form, "ONLY A's are B", A is a necessary condition for B, and so B is a sufficient condition for A. So, in **(6)**, **(a)** being a dog is presented as a necessary condition for being a mammal, and consequently, being a mammal is presented as being a sufficient condition for being a dog. **(b)** Proposition (6) is shown to false by all the mammals that are not dogs (e.g. humans, pigs, cats, horses, etc.).

Proposition (7) is true by definition. For being mammals is presented as being necessary for being a dog.

(8) Only a marriage between a male and a female person will be recognized in this state.

(a) The concept of a marriage between a male and a female is advanced as being necessary for the concept of a marriage being recognized by this state.

Equivalently, in standard conditional form: IF a marriage is recognized by this state, THEN it is a marriage between a man and a woman.

(b) Since we don't know what "this state" refers to, we cannot evaluate the truth of this claim. The verification would consist of examining the marital laws of the particular state to which the claim is intended to apply.

(9) If you haven't any charity in your heart, you have the worst kind of heart trouble.

(a) The proposition, "You haven't any charity in your heart", is proposed as being sufficient for the proposition, "You have the worst kind of heart trouble".

(b) For the first proposition (i.e., the *antecedent* of the conditional proposition) to make any sense, "heart" must be interpreted figuratively: it refers to people's capacity for love or compassion. A biological interpretation of "heart" would result in nonsense, and so would be an uncharitable interpretation.

A literal interpretation of "heart" in the second proposition (i.e., the *consequent* of the conditional proposition) results in an obviously false conditional proposition, for there are lots uncharitable people who have medically healthy hearts. This suggests that the author (Bob Hope) is also using this second "heart" figuratively. The consequent is a humorous way of expressing that anyone lacking any charity is in the *worst* kind of moral situation. Since the second proposition (i.e., the *consequent* of the conditional) is stated so strongly, the conditional proposition is vulnerable to some counterexamples. Consider the following: *It's possible* for someone to have no charity in his/her heart, but to harm no one; and for someone else to have a few specks of charity in his/her heart for a few individuals, but to diabolically harm many individuals. Though both individuals are in serious moral problems, it is the second individual who is in the *worst* moral situation. In order to avoid this kind of counterexample, while still retaining some of the humor, the saying could be rephrased, "**If** you have no charity in your heart, you have very serious heart trouble".

(10) If the economy slows down, the people who are most badly affected economically are those who work for others.

(a) The proposition, "the economy slows down" (which is the *antecedent* of the conditional proposition), is presented as being sufficient for the proposition, "the people who are most badly affected are those who work for others" (which is the *consequent* of the conditional proposition).

(b) In order to prove that the antecedent is not sufficient for the consequent, we must first bear in mind the context of its use. It would be expressed in a capitalistic economy where businesses will first lay off some of their employees long before the businesses collapse; and those who intend to work only for others will need to wait until business people rehire or start new businesses. In both cases the business people, though working hard to maintain or create their business during economic slow downs, would typically be better off economically then the unemployed. I do not know of any actual cases in the history of humanity where the antecedent is true and the consequent false. And if I am to be consistent with the capitalistic context, I am having difficulty imagining a possible situation in which the antecedent is true and the consequent false. So, relative to my limited knowledge of economic history, and relative to my imaginative abilities at the moment, this proverb seems true.

(11) Where there is physical awareness in our bodies there is blood circulating.

(a) This is a conditional proposition in which the proposition, "There is physical awareness in our bodies"(which is the

antecedent of the conditional proposition) is advanced as being sufficient for the proposition, "There is blood circulating" (which is the *consequent* of the conditional proposition).

Equivalently, in standard conditional form: IF here is physical awareness in part x of our bodies, THEN there is blood circulating to x.

(b) Aside from some miraculous or far-fetched science fiction situations it is physically impossible for the antecedent to be true and the consequent false. So, relative to my limited knowledge and limited imagination, this conditional proposition is true.

(12) Where there is blood circulating in our bodies there is health.

(a) This is a conditional proposition in which the proposition, "There is blood circulating in our bodies" (the *antecedent* of the conditional proposition) is presented as being sufficient for the proposition, "There is health" (the *consequent* of the conditional proposition).

Equivalently, in standard conditional form: IF there is blood circulating in part x of our bodies, THEN there is health in x.

(b) There are many situations where the antecedent is true and the consequent is false: blood could be circulating all kinds of poisons (from arsenic, cyanide, hemlock; venom from snakes, insects, and spiders; from pollution); blood could also be circulating damaging bacteria or viruses. And there would not be health where the blood is circulating. Therefore, this conditional statement is certainly false: the antecedent is not sufficient for the consequent. There are also lots of counterexamples from living people who are not healthy: overweight, generally malnourished, generally stressed out, generally sleep-deprived, etc. In these cases blood is circulating to certain bodily parts that are not healthy. Of course, the way one defines "health" will either include these counterexamples and more, or exclude some of these counterexamples and others. Since the interpretation of "health" affects our construction of counterexamples, it is important to clarify. IF we define it very broadly, then the second group of counterexamples would also apply. So, relative to this interpretation of "health", how probable is this conditional proposition? What is the ratio of the number of times the conditional proposition is true to the sum of the number of times it is true, and the number of times it is false? In other words, what is the ratio of the number of times the antecedent and consequent true to the sum of the number of times the antecedent is true and consequent false and the number of times the antecedent and consequent are both true? Of course we can't find precise numbers, especially since we don't know if this conditional proposition is supposed to all of humanity now, or to a certain portion of humanity at a specific time and place. If I assume that it is about North Americans, the fact that the majority of people have unhealthy life styles suggests that the ratio seems to be at least slightly above 50%: the combined likelihood of the counterexamples is thus slightly likely. Hence, relative to the broad understanding of "health", my assumptions, this conditional proposition is only slightly unlikely.

(13) Pleasure is nature's sign of approval. (Oscar Wilde)

(a) The concept of pleasure is proposed as being sufficient for the concept of nature's approval.

Equivalently, in standard conditional form: IF something is pleasurable (*antecedent*), THEN nature approves it (*consequent*).

(b) In order to evaluate the truth of this claim, we must clarify what "nature's sign of approval" means. There are at least two reasonable interpretations. So, we will have to evaluate two claims.

  (A) IF something is pleasurable, THEN it is healthful.

Since many pleasurable things/activities can be made poisonous or unhealthful, and I suspect that some poisons or unhealthy conditions are delicious (e.g., in most cases of food poisoning, the food tasted good). So, this interpretation leads to a false claim. However, how likely is this interpretation? Think of the ratio of the number of all the pleasurable things/activities (including junk foods) that are unhealthful to the sum of all the pleasurable things/activities that are healthful and all the pleasurable things/activities that are unhealthful. The ratio seems only moderately small, which means that the combined probability of all the counterexamples is roughly moderately small. Hence, the probability of the saying is *roughly* only moderately high.

  (B) The second interpretation: IF something is pleasurable, THEN it is morally acceptable.

Since some pleasurable things/activities (e.g., vengeance, deception, theft, sexploitation, gluttony, exploitation, and think of all the pleasures that we humans can experience in hurting others, etc.) are morally unacceptable, then this interpretation is also false.

However, how likely is this interpretation? Think of the <u>ratio of</u> the number of all the pleasurable things/activities that are <u>immoral</u> <u>to the sum of</u> all the pleasurable things/activities that are moral and all the pleasurable things/activities that are <u>immoral</u>. Relative to my understanding of the world and morality (and maybe some wishful thinking!), the ratio seems only small, which means that the combined probability of all the counterexamples is roughly small. Hence, the probability of the saying is *roughly* high.

Interpretation (B) is the more charitable one.

(14) One forsakes pleasure only for the sake of greater ones. (Pascal)
(a) The concept of forsaking pleasure is proposed as sufficient for the concept of seeking greater pleasures. Equivalently, in standard conditional form: IF one forsakes a pleasure (*antecedent*), THEN one does so for the sake of a greater one (*consequent*).
(b) There are many cases confirming this claim. If we thinking only in terms of sensual pleasures, we avoid certain delicious foods in order to experience the greater pleasure of health. If we think in terms of psychological pleasures, we avoid "fun" and entertainment in order to work or study because the remote rewards will bring pleasures (e.g. security) that we consider more important than what we sacrifice. If one believes in spiritual pleasures, one might avoid what s/he considers sinful pleasures for the sake of divine pleasures, which are believed to be better than the sinful ones. To prove that this claim is false, we need a case where the antecedent is true and the consequent false. It all depends on how we define "pleasure". If it is limited to physical/sensual pleasures, then consider the extreme and uncommon possibility where one sacrifices his/her life for some cause or person. This entails the sacrifice of all future pleasures – as we understand them in our lives. Imagine that this individual also believes that there is nothing after death, and believes that s/he will get nothing for sacrificing his/her life. If such an individual gets some satisfaction in sacrificing him/herself, there does not seem to be any reasonable way of defining "pleasure" in such a way that this personal satisfaction is greater pleasure than all (whether individually or combined) future pleasures s/he would have experienced had s/he not sacrificed his/her life. Think also of the possible cases where people sacrifice their lives not because they believe they will get some eternal and more pleasurable afterlife, but because they believe that their sacrifice is the right thing to do. We thus have two a counterexamples, so the saying is false. Given most people's lives, these are extremely uncommon. So, the counterexamples are together extremely unlikely. Consequently, this saying is extremely likely, even though the purported sufficient condition is not in fact sufficient.

(15) A person becomes what s/he thinks. (Upanishads) As a man thinketh, so is he. (Bible)
(a) In both saying, what one thinks is proposed to be sufficient for becoming what one thinks.
(b) If we interpret "what s/he thinks" so as to include absolutely anything, then the sayings becomes obviously silly: if you think of a banana, you don't become a banana; if you think of quadratic equations, you don't become them, etc. The more charitable interpretation requires us to clarify the intended meaning of "what s/he thinks". These sayings are expressing the cognitive basis of most emotions. For a deeper understanding of this, read the paper, "Thinking and Emotions", on my webpage. If you have already read it, then re-re-re-read it. To express the ideas succinctly, if you typically think depressing thoughts, you will *typically* feel depressed, and you will *usually* eventually act depressed: you will *probably* become depressed. If you *generally* think joyful thoughts, then you will *generally* feel joy, and will *typically* eventually act joyfully: you will *probably* become joyful. If we generally think of doing immoral actions, we *dispose* ourselves to doing them eventually. I have qualified my claims because thinking is not sufficient for all these consequences, for one could be under the influence of some kind of drug, or one's physiology could such that it counteracts the effects of the thinking, or one could be restrained in such a way that could not act on one's thoughts. These counterexamples prove that both sayings are false. However, since the counterexamples are very unlikely, then both sayings are very likely. They would describe human psychology more accurately if they were written as follows: A person *typically* becomes what s/he *typically* thinks. As a man *generally* thinketh, so is he *generally*.

(16) Like the garden, like the gardener.
(a) The proposition, "Like the gardener", is advanced as being sufficient for the command or advice, "Like the gardener". Perhaps the latter would be rephrased into a prescriptive proposition: You should like the gardener.
Equivalently, in standard conditional form: IF you like the gardener (*antecedent*), THEN you should like the gardener (*consequent*).

(b) It requires disciplined work, a close connection to nature, and a caring attitude to life forms to be a successful gardener, all these qualities presuppose other positive qualities, and among all of these qualities, some of them will be valued. So, if we like a garden, then there are going to some qualities in the gardener that we like. However, liking certain qualities in someone is not sufficient for liking him/her because s/he could have weaknesses that override those qualities, e.g., s/he could be a liar, a thief, vulgar, exploitive, murderous, etc. We must also consider the cases where we like a garden but feel neutral toward the gardener. Hence, there are lots of counterexamples against. What is the combined likelihood of all these possible counterexamples? Since most people are likable, I would roughly estimate, that it's at least <u>im</u>probable. Therefore, relative to my view on humans, the saying is probable.

(17) Lie with dogs, rise with fleas.
(a) The proposition, "Lie with dogs" is presented as being sufficient for the proposition, "Rise with fleas". I interpret this saying to mean that IF we participate in the activities with people who are immoral or who are of questionable morality, THEN we will bear some negative consequences.
(b) Relative to this interpretation, the saying is refuted by all the *possible* situations where one mingles with such individuals, participates in a morally acceptable activity, and where nothing negative arises (e.g., none of these people's negative traits influences us during or after the activity). So, the saying is false. But how likely are such possibilities? Given the predominance of human weakness, all these counterexamples appear to be together somewhat <u>un</u>likely. Therefore, the saying is somewhat likely.

(18) It is impossible for anyone to begin to learn that which he thinks he already knows.
(a) The sufficient and necessary conditions can be more explicitly rephrased as follows:
It's IMPOSSIBLE that IF one thinks one already knows about X, THEN one will begin learn about X.
(b) The truth of this claim will depend on how we define "begin to learn". We learn when we acquire new information or skills. Since it is POSSIBLE to be mistaken as to what one already knows about X, and to go through the motions of learning it or of putting oneself in an open state of mind as if one were to learn X, then it is possible to learn what one believes one already knows. This possibility is unlikely because once we believe we know X, it is unlikely that we would go through the motions of learning X or put ourselves in an open state of mind as if we were to learn X. The claim would be more accurate if it were stated as: it is improbable for anyone to begin to learn that which he thinks he already knows.

(19) When a bore leaves the room, one feels as if someone came in.
(a) The proposition, "A bore leaves the room", is advanced as being sufficient for the proposition, "One feels as if someone came in".
Equivalently, in standard conditional form: IF a bore leaves the room, THEN one feels as if someone came in.
(b) By definition, a bore's presence has various unpalatable consequences unto us: s/he drains us in various ways.
The saying is an imaginative way of expressing how relieved we feel once a bore disappears. A clearer but less colorful way of expressing the intended meaning of the saying is that **when** a bore leaves the room (*antecedent*), we feel relieved (*consequent*). Given this interpretation, it is not possible for the antecedent to be true and the consequent false. Therefore, this is a true saying.

(20) When a habit begins to cost money, it is called a hobby.
(a) The proposition, "A habit begins to cost money" is put forward as a sufficient condition for the proposition, "The habit is called a hobby".
Equivalently, in standard conditional form: IF a habit begins to cost money (*antecedent*), THEN it is called a hobby (*consequent*).
(b) The language of this saying implies that it is referring to habits that at some point did not cost money (or perhaps cost very little money), but later began to cost money. There are many counterexamples against this conditional statement in this consumer world.
Going hiking, singing, listening to music: at the beginning we did not have any special equipment, but gradually we started buying more "stuff" (equipment, sheet music, more advanced sound equipment & CDs). One would not be overstretching the concept of hobby by including these activities were considered hobbies.

What about the habits of stealing, cheating, seeking greater status, seeking greater success in any particular field, seeking greater attention, etc. At the beginning, when starting small, these do not cost us anything, but once they do start costing us lots of money, we do *not* call them hobbies. They could in fact become obsessions or manias. There are many such counterexamples, so the saying is false. What is the combined likelihood of all these counterexamples? Given our preoccupation with attention, success, or status, they seem very likely. Consequently, the saying is very <u>un</u>likely. This saying is an imaginative way of making fun of our ability to describe negative activities in a way that makes us adopt a positive attitude toward them.

(21) Whenever there is too much of anything, something is missing.
(a) The proposition "There is too much of anything" is put forth as a sufficient condition for the proposition, "Something is missing".
Equivalently, in standard conditional form: IF there is too much of anything (*antecedent*), THEN something is missing (*consequent*).
(b) Is it possible for the antecedent to be true and the consequent false? In other words, is it possible that there is too much of anything (e.g., weight, energy, impatience, rain, bacteria, viruses, etc.), and that *nothing* is missing? It seems impossible. For on matters over which we have some control (e.g., weight), if there is too much of them, then some form of balance is missing. For matters over which we have no control (e.g., rain), if there is too much of them, then some causal factors that would prevent the excess is missing. Thus, this saying is true.

(22) People who think that money will accomplish anything will do anything for money.
(a) The concept, "people who think that money will accomplish anything" (in which the restrictive clause, "who think that money will accomplish anything", restricts the reference of "people") is proposed to be sufficient for the concept, "will do anything for money".
Equivalently, in standard conditional form: IF a person thinks that money will accomplish anything (*antecedent*), s/he will do anything for money (*consequent*).
(b) It is easy to imagine a case where the antecedent is true and the consequent is false: someone can think that money will accomplish anything, AND be sufficiently ethical, AND NOT do anything (e.g., not torture his/her own children) for money. Therefore the saying is false. However, how probable is this counterexample? It is <u>un</u>likel*y* that if someone is so unreasonable (insane?) so as to believe that money will accomplish anything, and both words, "anything", are interpreted literally, then s/he will be sufficiently reasonable to restrain him/herself from doing the most morally diabolical activities (e.g., slowly torture his/her own children to death). Hence, though false, the saying is likely.
A more accurate formulation of the saying that would have avoided the counterexample would be: people who think that money will accomplish *just about* anything will do *just about* anything for money. Though the actual formulation of the saying results in a false proposition, it is probably presented in this extreme form in order to accentuate the strong connection between what we expect from money and what we are willing to do to obtain money.

(23) If a crook kisses you, count your teeth.
(a) The proposition, "A crook kisses you" (*antecedent*), is advanced as a sufficient condition for the advice/command, "Count your teeth" (*consequent*).
(b) Before assessing the alleged sufficiency of the antecedent, we need to identify its intended meaning. One interpretation is that IF you get some benefit from an untrustworthy person, THEN you should be on guard to protect even what we take to be your most secure possessions (for teeth are rather difficult to steal). Is there any possible situation where one receives such a benefit, but where there is no need to be on guard? I would have a counterexample if I could imagine a possible situation where someone receives such a benefit but does not have anything to lose. However, that is not possible, for in order to receive a benefit, one must be alive, and one could have one's life taken away; moreover, the benefit itself could later be taken away. Nevertheless, it is possible to benefit from an untrustworthy person who cannot menace you because, for example, someone else has much power over him/her. For instance, what if a person who will be executed in a week sends some money to a political leader. The latter is getting some benefit, but has no need to be on guard to protect his/her most secure possessions. One alternative interpretation is simply that IF you get some benefit from an untrustworthy person, THEN you should be on guard in order that s/he won't take advantage of you. Counterexamples: *It is possible that* you benefit from an untrustworthy person, but s/he has no intention of taking advantage of you, or

someone has much power over him/her that prevent him/her from being menacing to you. These counterexamples prove that both interpretations of the saying are false. However, how likely are such counterexamples? Since most people do not have such protection, and most untrustworthy people – by definition – will generally seek to take advantage of whomever to benefit, then together the counterexamples seem unlikely. Hence, relative to my current knowledge and my abilities to use my imagination, the saying seems likely.

(24) If you want to look smart to everyone, agree with everyone.
(25) If you want *x*, then do *y*.
Proposition (25) is just the general form of (24). These kinds of conditional propositions are actually making two distinct proposition.
   (A) (a) According to the surface features of the sentence, the proposition "You want to look smart" (*antecedent*), is presented as being sufficient for the advice/command, "agree with everyone" (*consequent*). The command/advice can be expressed as a prescriptive claim: "you should agree with everyone".
Equivalently, in standard conditional form: IF you want to look smart to everyone, THEN you should agree with everyone
      (b) Of course there are counterexamples where the antecedent is true and the consequent false. *It is possible that* you want to look smart, but you disagree diplomatically and very intelligently with those who are mistaken, and should *not* agree with everyone. Though obviously false, the saying is stated this way in order call our attention to the fact that we tend to think favorably of those who agree with us.
   (B) (a) The saying logically implies something else: IF you agree with everyone, THEN you will look smart to them.
      (b) Despite our favorable dispositions toward those who agree with us, we *can* discover that someone might agree with our position, but for entirely irrational reasons, and so their agreement with us would not make us think highly of them intellectually – at least on the matter in question. Here is another counterexample: *It is possible that* different people hold beliefs that conflict with one another, and they discover that you have agreed with those with whom they disagree. This falsifies the saying. How likely is this counterexample? Given that most people disagree on lots of things, and given the amount of communication among people today, the counterexample seems very likely. Therefore, the saying is also very <u>un</u>likely. Therefore, this conditional proposition is also false.

(26) Trees bend **<u>only when</u>** young.
(a) Because of the use of "only" preceding "when", the proposition, "Trees are young", is advanced as a *necessary* condition for the proposition, "Trees bend".
Equivalently, in standard conditional form: IF trees bend (*antecedent*), THEN they are young (*consequent*).
(b) If we were to take this proposition literally, then before assessing its truth, we need to clarify "bend", for the saying does not specify the degree of bending, nor which part of the tree is to bend. This reference to trees is an imaginative way of expressing the proposition, "IF minds are open, if minds can change, THEN they are young". We can certainly imagine cases of old trees bending to some degree at the level of their trunk, and of old minds that do change, even on fundamental beliefs. So, it's possible for the antecedent to be true and the consequent to be false: the saying is false both literally and figuratively. However, what is the probability of these counterexamples? Again we must first address the vagueness in "bend" and "open"; and with respect to mental flexibility (openness), we would need to specify the kinds of beliefs about which one changes his/her mind, for people (whether old or young) can change their minds on trivial matters, but will hardly change their minds on beliefs that define them. Of course the greater the bending or openness of mind intended in the meaning of these words, then the smaller the likelihood of the counterexamples, for few (very old) people would be that mentally flexible about core beliefs, and few old trees would that flexible; and consequently, the more probable the saying. Conversely, if we define "bend" and "open" such that bending and the openness of mind occur with the slightest change, then the counterexamples become extremely likely, for the great majority of people, even the very old, can change their minds on trivial matters. So, according to this interpretation of these key words, the saying becomes extremely unlikely. As you can see, the probability of this saying will vary according to the way we define "bend" and "open". I'm wondering whether this saying is a reflection of stereotypical thinking about the elderly.

(27) We **cannot** be sure that we have something worth living for **unless** we are ready to die for it. (Eric Hoffer)
(a) Any proposition of the form, "No A unless B" (e.g., There is no fire unless there is oxygen.) is a concealed conditional proposition: IF A, THEN B. The form, "No A unless B" is used to accentuate the necessity of B for A. The proposition,

"We are ready to die for something" is put forth as a necessary condition for "We can be sure that we have something worth living for".

Equivalently, in standard conditional form: IF we can be sure that we have something worth living for (*antecedent*), THEN we are ready to die for it (*consequent*).

(**b**) Despite the vagueness of the meaning of "have something worth living for", and of the degree of worth intended in the antecedent, we can easily think of examples that would confirm this saying: consider all the people who cannot imagine living without their religion or political activities, and thus would be willing to die for them. If Hoffer intended this extreme form of having something worth living for, then it becomes very difficult to imagine cases where the antecedent is true and the consequent false, and so the saying appears to be very probable.

However, it does not appear so probable if "have something worth living for" is interpreted according to its common usage. For we can be sure that many things or activities give worth to our lives, that impassion us for life, that are fundamental goals, even if we are *not* ready to die for them, e.g., loving relations, and creativity in the arts and sciences. Many people would justifiably choose not to die for such meaningful activities, for instance, when they have other obligations, or when they could choose some other creative outlet, or when view their own life as inherently more important than the activity that gives worth to their lives. Relative to the typical use of the expression, "have something worth living for", these many counterexamples prove that being ready to die for X is not a necessary condition for being sure that X a reason for which it is worth living. Since this counterexample is true for the great majority of people, the saying is not only false, but also very unlikely. In conclusion, relative to first interpretation, the saying is extremely probable, if not true, but relative to the second one, it is false and very unlikely. The first interpretation is thus the most charitable one. However, note that seems to become trivially true: simply true by (the extreme) definition.

(**28**) Smart people speak from experience.

(**a**) The concept "smart people" is proposed as being sufficient for the concept "speak from experience".

Equivalently, in standard conditional form: IF a person is smart, THEN s/he speaks from experience.

(**b**) Is being a smart person sufficient for speaking from experience? What is the intended meaning of the saying:

   (i) Smart people always speak from experience.
   (ii) Smart people generally speak from experience.
   (iii) In general, smart people speak from experience when it is relevant.

If we bear in mind the fact that most of what we know, or believe to know, is second, third, etc, hand information that comes from other people's experience, reports, writings, videos, movies, etc., and that much of our personal experience is not easily generalizable, because our personal experiences are not clearly representative of the world, then interpretation (i) and (ii) are false. Interpretation (iii), or something equivalent to it, is the most charitable interpretation. The qualifier, "in general" is added in order to take into consideration all the times smart people make mistakes (i.e., all the cases when smart people speak from irrelevant experience). With this qualifier and the subordinate clause, "when it is relevant", the saying becomes true by definition.

(**29**) Smarter people, from experience, don't speak.

This sentence actually expresses an explanation: Due to their experience, smarter people don't speak, which should *not* be confused with the entirely different proposition, "Smarter people don't speak from experience".

(**a**) Experience is proposed as being sufficient to cause smarter people not to speak.

This saying is a humorous way of hinting at the problems with saying (28).

(**b**) If we were to take this saying literally, and overlook its intended humorous function, we would refute it by the innumerable cases of smart people with experience who do (and generally should) speak up.

(**30**) The extravagance of today is tomorrow's necessity.

(**a**) The concept, "the extravagance of today", is advanced as a sufficient condition for the concept, "tomorrow's necessity".

Equivalently: IF something is an extravagance today (*antecedent*), THEN tomorrow it will be a necessity (*consequent*).

(**b**) There are many cases that confirm this saying: cars, shoes, underwear, toilets, computers, medical insurance, three meal a day, etc., were an extravagance at some point in the past, but for many people today, they *seem* necessary, but *relative to* our unwillingness to return to a stone age way of living. But we can easily imagine some examples where the

antecedent is true and the consequent false, even if interpret "tomorrow" as meaning "somewhere in the endless future": jewelry, or luxury cars, or luxury homes, luxury submarines, luxury helicopters, etc. Since these counterexamples are together extremely likely, the saying is extremely improbable. An easy way to avoid these kinds of counterexamples, while still retaining the saying's interesting sociological and historical point, is simply to rephrase it as: Many of today's extravagances are tomorrow's necessities (relative to our unwillingness to revert to a stone age quality of life).

(31) A person's character is his/her fate.
(a) The concept of a person's character is proposed as being sufficient for that person's fate.
Equivalently, in standard conditional form: IF something is a person's character, THEN it is the person's fate.
(b) The truth of this claim depends on how we define "character" and "fate", and on our beliefs of human nature. One's character arises from one's *core* values, beliefs, and habits, all of which have a very strong influence on our choices. Since these core aspects of a person do not change easily, then their influence on our daily choices does not change easily. It is from that generally unchanging influence that the concept of fate comes in. Fate implies a future over which we have no control, a future that is determined, destined according to one's core values, beliefs, and habits. One crucial assumption here is that we have no control whatsoever over our character. Though we may have all kinds of dispositions, innate or learned, we certainly can change some of those core beliefs, values, or habits, thereby preventing some aspects of our character from destining us to some future actions or mental states. If "fate" is used to refer to everything in our future, then counterexamples against the truth of the saying would involve the many cases where people do change some aspect of their character that they do not like or do not want. Think of the irritable people who learn to be calm, the jealous ones who learn to become more trustful, the impatient ones who learn to become patient, the many different kinds of addicts who free themselves of their addiction, etc. If "fate" is used to refer to only some aspects of our future, then the saying can avoid the preceding counterexamples. But in such a case the truth of the saying would depend of identifying those aspects, and doing the proper observations to verify the saying. However, if one believes that any aspect of our character can eventually be changed, then one would still find this weakened version of the saying to be false, but I'm not sure whether we have such a capacity to change. This is where the debate would focus on the justifications for our different views of human nature.

A proponent of the saying could always resort to the following move: if you do decide to change some character trait, that choice will simply arise from a deeper core value, so the influence of your deeper character is inescapable, just as fate is by definition inescapable. The problem with this sort of defense is that the saying becomes irrefutable because of the way "character" is defined, and not because facts about human nature: any counterexamples will be interpreted as arising from a deeper or more real character. If this is the line of reasoning, then the proponent has no longer given us a descriptive (factual) claim, that can be supported or refuted according to the facts, but has simply defined "character" in such a way that facts about human nature become irrelevant. The issue then becomes a purely verbal one, and not a factual one.

If we take the saying as simply meaning that character is difficult to change, and has a very strong influence on our decisions, then it is true. If the saying is to be interpreted literally, then it faces the problems mentioned in the preceding paragraphs.

(32) When a community puts its identity for sale, as it does in tourism, it becomes what the tourists want.
(a) The proposition, "A community puts its identify for sale", is advanced as being sufficient for the proposition, "The community becomes what the tourists want".
Equivalently, in standard conditional form: IF a community puts its identity for sale, THEN it becomes what the tourists want.
(b) The truth of this claim depends on how we interpret "identity", "sale", and "what the tourists want". Since the claim is expressed universally (i.e., it is referring to all communities), we can easily imagine counterexamples against its truth. Think of any case where the tourists' demands are considered excessive or immoral by a community that wants to sell its identity (i.e., commercialize itself), and chooses not to comply with those demands. Therefore the saying is false. However, how probable are such counterexamples? Since economic benefits are the motivating factor, and most tourists will generally not have excessive demands, communities will usually comply with the demands in order to reap the economic benefits. The counterexamples against the truth of the claim are together unlikely, so the claim is likely.

(33) Whoever is happy will make others happy.
(a) The concept of someone being happy is put forth as being sufficient for the concept of making other people happy. Equivalently, in standard conditional form: IF someone is happy, THEN s/he will make other people happy.
(b) The obvious counterexamples against the truth of the saying suggest a charitable way of interpreting it. For someone could be happy in Paris but make no one happy on Akimiski Island (in the James Bay). The saying is very likely intended to mean: whoever is happy will make others in his/her presence happy. Though this formulation is more reasonable, because it is not vulnerable to so many counterexamples, it is still refuted by all the cases where the others in one's presence are not in the proper state of mind (e.g., they are going through a crisis, or are too preoccupied by something else). There are also the counterexamples consisting of the happy idiots whose presence does not make exactly us happy. The truth of this saying also depends on how we define "happy". If one's happiness is a result of many years of mental or spiritual exercises, one's mere presence will not give to others that kind of happiness, even though they might feel good in one's presence. However, if "happiness" just stands for some degree of passing joy or enthusiasm, it can more easily "rub off" on someone else in our presence, but not necessarily so, for someone might not be in a proper receptive state of mind to one's joy or enthusiasm. So, even with a charitable reformulation of the saying, it is susceptible to a many counterexamples. How likely are all the counterexamples together? They seem slightly probable. Consequently, the saying is slightly <u>im</u>probable.

(34) **In order to** know someone, examine carefully what s/he has done in a great variety of challenging situations.
(35) **In order to** do *x*, do *y*.
Proposition (35) expresses the logical form of proposition (34). Both express two distinct sufficient conditions. I will describe them is (A) and (B).
  (A) (a) The proposition, "You want to know someone", is advanced as a sufficient condition for the command/advice, "Examine carefully what s/he has done in a great variety of challenging situations". The latter proposition could be expressed as prescriptive proposition: "You should examine carefully what s/he has done in a variety of challenging situations".
Equivalently, in standard conditional propositions: IF you want to know someone (*antecedent*), THEN you should examine carefully what s/he has done in a variety of challenging situations (*consequent*).
Equivalently, for the logical form: IF you want to do x, THEN you should do y.
    (b) Can you imagine a situation where the alleged sufficient condition is satisfied, but the consequent is false? Think of all the cases where we are just interested in getting to know someone superficially. This proves that the saying is false. But how likely are all these counterexamples. Since the great majority of humans just want to know most others on a shallow level, or the great majority just don't have the time or energy to examine carefully what others have done in a variety of challenging situations, then the counterexamples are very probable. Therefore, the saying is very <u>im</u>probable. This obvious weakness suggests that the saying is probably intended to mean: IF you want to know someone <u>well</u> (*antecedent*), THEN you should examine carefully what s/he has done in a variety of challenging situations (*consequent*). The inclusion of "well" eliminates all those counterexamples. Now we must ask ourselves whether it is possible to know someone well without examining carefully what s/he has done in a great variety of challenging situations. Here are some counterexamples: imagine someone who has very recently gone through some deep transformation (e.g., a profound conversion). In some those cases one's examination of past actions would not inform us about who the person has become, and so in those cases one should *not* examine those past actions in challenging situations. Here is another kind of counterexample: what if you suddenly know someone in some supernatural way, without having to examine their past actions. These counterexamples refute the charitably reformulated saying, but how likely are these counterexamples? Relative to my limited understanding of human nature, I would say that they are extremely unlikely. Therefore, relative to my limited understanding of human nature, and my current limited ability to imagine the antecedent true and the consequent false, the reformulated saying is extremely likely.
The same evaluation applies to "IF you want to do x, THEN you should do y".
  (B) (a) The proposition, "You examine carefully what someone has done in a great variety of challenging situations" is presented as being sufficient for the proposition, "You know well that person".
Equivalently in standard conditional propositions: IF you examine carefully what someone has done in a great variety of challenging situations (*antecedent*), THEN you know well that person (*consequent*).
Equivalently, for (35): IF you do x, THEN y.

(b) Can the alleged sufficient condition be satisfied and the consequent false? It is possible for someone to have recently gone through an extremely deep transformation (e.g., profound spiritual conversion, insanity, later stages of Alzheimer's disease, severe deep brain washing), such that his/her past behavior no longer reflects his/her current core values and habits, and that one's careful examination of that person's past actions done in a great variety of challenging situations does *not* make one know that person well. These counterexamples refute the proposition, but how likely are they? Since they are extremely unlikely, then relative to my limited knowledge of human nature, and my current abilities to imagine counterexamples, the proposition is extremely probable.

The same evaluation applies to "IF you want to do x, THEN you should do y".

(36)In order to know someone, examine carefully what s/he has done in a great variety of challenging situations.

(37) In order to do *x*, you **must** do *y*.

The main difference between (34) & (35) and (36) & (37) is that the latter's use of "must" in this context is a way of emphasizing that the proposition, "You examine carefully what a person has done in a great variety of challenging situations", is a *necessary* condition for the proposition, "You want to know someone". So, the comments regarding interpretation (A) of (34) & (35) apply also to (36) & (37).

However, according to my linguistic intuitions, it seems that anyone genuinely asserting (36) or (37) would not be necessarily implying that that the proposition, "You examine carefully what a person has done in a great variety of challenging situations", is a sufficient condition for the proposition, "You want to know someone". Consequently, relative to my interpretation, the comments regarding interpretation (B) of (34) & (35) do not apply to (36) & (37).