Generalizing FROM Samples [premises] TO Populations [Conclusions]

(1) Each member of a population Z was **randomly** selected for the sample: each member of the population had an equal chance of being selected for the sample.  (2) The sample was sufficiently large for a certain level of confidence.

**SUPPORT:** Never valid, but can provide very strong support.

(3) The sample of population Z is **representative** of population Z: the variety/diversity in the sample corresponds in varying degrees to the variety/diversity in the population.  (4) \( x \% \) of the members of the sample have property \( P \).

**SUPPORT:** Never valid, but can provide very strong support.

\( x \% \) of population Z have property \( P \).

**BASIC EVALUATIVE QUESTIONS:**

1. **Was the sample randomly selected?** (Fallacy: biased sample, though it is more precise simply to say that the sample was not randomly selected: not every member of the population had an equal chance of being selected)

2. **Was the sample randomly selected from the right population?** (Fallacy: the sample was not selected from the right population)

3. **Was the sample sufficiently large for the intended degree of confidence?** (Fallacy: sometimes called hasty generalization, but it is more precise simply to say that the sample was not sufficiently large.) The closer a random sample selected from the right population approaches 1200, the stronger the support. Beyond 1200 the strength of the support increases only marginally. However, such a large size is not always required. (a) The more uniform a population, the less the need for a large sample, and the less sure we need to be about the random selection of the sample. But note that when our conclusion rests on the assumed uniformity of the population, that assumption can often be contested. (b) When the population to which the generalization is intended to apply is itself small, the sample size can be small, but it should still be randomly selected from the population (unless the population is uniform). For example, if a sample size is 500, but it is used to generalize to a population of only 2000, the sample includes 1/4 of the population. So this is definitely large enough. However, do NOT assume that 1/4 of a population is always sufficiently large, for instance, if the population is extremely diverse, and the sample is not obviously randomly selected, then 1/4 might not be large enough.

1. 1200 adults were randomly selected among the Las Vegas residents.

\[ 95 \% \text{ of the people in the sample favor gambling.} \]

Rank the strength of the **SUPPORT** for each one of the following conclusions:

(a) Hence, 95% of the residents of the world favor gambling.
(b) Therefore, 95% of the residents of the U.S. favor gambling.
(c) Thus, 95% of the residents of Nevada favor gambling.
(d) Consequently, 95% of the residents of Las Vegas favor the gambling.

This example illustrates the importance of **BASIC** evaluative question (2). Once you identify a conclusion, identify **precisely** the population to which the generalization is intended to apply, and then determine whether the sample is in fact randomly selected from that whole population.
2. You are taking a philosophy course from Gratton. Drop it immediately!!!! I know two students who had him for that course, and they both failed.
(a) What is the population in the conclusion?
(b) Is the sample selected from the correct population?
(c) What is the size of the sample?
(d) Is the sample randomly selected?
(e) Should you accept the conclusion? Why?
(f) What could explain the evidence?

3. I bought a packet of seeds from the Happy Hemp Co., but only half of the seeds germinated. All the seeds were planted under identical and ideal conditions. I suspect that most customers get about only half of the expected crops.
(a) What is the population in the conclusion?
(b) Is the sample selected from the correct population?
(c) What is the size of the sample?
(d) Is the sample randomly selected?
(e) Should you accept the conclusion? Why?
(f) What could explain the evidence?

4. I have driven my Ford truck for over 150,000 miles on my ranch, and to town. If you want a reliable truck, buy Ford.
(a) What is the population in the conclusion?
(b) Is the sample selected from the correct population?
(c) What is the size of the sample?
(d) Is the sample randomly selected?
(e) Should you accept the conclusion? Why?
(f) What could explain the evidence?

5. I have just bought my first compact disc. It can hold an incredible amount of information.
   (i) So, all CD’s can hold an incredible amount of information.
   (ii) I can infer that all CD’s (except for the defective ones) from the same manufacturer can hold an incredible amount of information.
(a) What is the population in each conclusion?
(b) Is the sample selected from the correct population for each conclusion?
(c) What is the size of the sample for each conclusion?
(d) Is the sample randomly selected in each case?
(e) Should you accept the conclusions? Why?

6. Four players of the professional football team $X$ in the U.S. used illegal drugs.
   (i) So, the illegal use of drugs is widespread among professional athletes in the world.
   (ii) Hence, the illegal use of drugs is widespread among professional athletes in the U.S.
   (iii) It follows that the illegal use of drugs is widespread among U.S. professional football players.
   (iv) Thus, the illegal use of drugs is widespread among the players of team $X$.
(a) What is the population in each conclusion?
(b) Is the sample selected from the correct population for each conclusion?
(c) What is the size of the sample for each conclusion?
(d) Is the sample randomly selected from each population?
(e) Should you accept the conclusions? Why?
7. I have observed over 1200 incidences of violence in the national news over the last twenty years! It follows that we are living in a dangerous (i) world, (ii) country, (iii) state, (iv) city. 
(a) What is the population in each conclusion?  
(b) Is the sample selected from the correct population in each conclusion?  
(c) What is the size of the sample in each case?  
(d) Is the sample randomly selected?  
(e) Should you accept the conclusion? Why?  
(f) What could explain the evidence? 

8. A randomly selected sample of 1200 people from the polluted city X was surveyed. 87% of those surveyed said that pollution should be a central political issue. Then 87% of the people in the state believe that pollution should be a central political issue.  
(a) What is the population in the conclusion?  
(b) Is the sample selected from the correct population?  
(c) What is the size of the sample?  
(d) Is the sample randomly selected?  
(e) Should you accept the conclusion? Why?  
(f) What could explain the conclusion? 

9. Unemployment is not a serious problem (i) in this city, (ii) in this state, (iii) in this country, (iv) in the world. Look at all the jobs in the Help Wanted ads for this city in this local newspaper. 
(a) What is the population in each conclusion?  
(b) What precisely is the sample?  
(c) Is the sample selected from the correct population in each conclusion?  
(d) What is the size of the sample?  
(e) Is the sample randomly selected?  
(f) Should you accept each conclusion? Why? 

10. You should not worry about getting any skin cancer from extended unprotected exposure to sunlight. I worked year-round for forty years as a lifeguard in southern Florida, and I never got any skin cancer. I always wore only my bathing suit, and never used any of that skin protection stuff.  
(a) What is the population in the conclusion?  
(b) Is the sample selected from the correct population?  
(c) What is the size of the sample?  
(d) Is the sample randomly selected?  
(e) Should you accept the conclusion? Why?  
(f) What could explain the evidence? 

11. According to a randomly selected survey of 1300 prisoners from all the penitentiaries across the U.S., 93% of the atheists and agnostics consider themselves to be anarchists. This proves that the great majority of atheists and agnostics in our country are political wackos, dingbats, and bozos.  
(a) What is the population in the conclusion?  
(b) Is the sample selected from the correct population?  
(c) What is the size of the sample?  
(d) Is the sample randomly selected?  
(e) Should you accept the conclusion? Why?  
(f) What could explain the evidence?
12. A chief of police of city Z wanted to determine to what extent the adult citizens were satisfied with the city police. Fifty police officers were to spend fifteen minutes of their regular shifts interviewing any citizen they would randomly encounter. The officers were to choose the fifteen minutes that would be most convenient to them. This process went on until they had interviewed 1300 adult citizens of city Z. The chief of police was happy to find out that 84% of the city population was satisfied.

(a) What is the population in the conclusion?
(b) Is the sample selected from the correct population?
(c) What is the size of the sample?
(d) Is the sample randomly selected?
(e) Should you accept the conclusion? Why?
(f) What could explain the results?

13. Two commercial planes were hijacked and then deliberated crashed into buildings last week. It is therefore not safe to fly commercial planes in our country.

(a) What is the population in the conclusion?
(b) Is the sample selected from the correct population?
(c) What is the size of the sample?
(d) Is the sample randomly selected?
(e) Should you accept the conclusion? Why?
(f) What could explain the one’s disposition to accept the conclusion?

ANSWERS

1. (a) Astronomically weak support.
   (b) Extremely weak support.
   (c) At least moderate support.
   (d) Very strong support.

2. (a) Students who took Gratton’s course.
   (b) Yes.
   (c) 2 students
   (d) No.
   (e) NO, because the sample is too small and not randomly selected.
   (f) They could have been students who did not do the required work. The sample selection did not eliminate/control these causal factors.

3. (a) Customers who buy a packet of a certain kind of seed from the Happy Hemp Co.
   (b) Yes.
   (c) 1 customer.
   (d) NO.
   (e) NO, because the sample is too small and not randomly selected.
   (f) The packet of seeds I bought could have simply been an isolated/exceptional case. The sample selection did not eliminate/control these causal factors.

4. (a) Ford trucks.
   (b) Yes.
(c) 1 Ford truck.
(d) NO.
(e) NO, because the sample is too small and not randomly selected.
(f) I could have been undemanding driving, under ideal weather conditions, with continual ideal mechanical care. The sample selection did not eliminate/control these causal factors. Moreover, I could have been lucky and bought a good truck from a population of trucks that were generally not well built.

5. (a) (i) CD’s. (ii) CD’s.
(b) (i) Yes. (ii) Yes.
(c) (i) 1 CD. (ii) 1 CD.
(d) (i) NO. (ii) NO.
(e) Conclusion (i) is at least moderately probable, assuming the premise is true.
Conclusion (ii) is probable, assuming the premise is true.
Because CD’s from the same manufacturer (e.g. (ii)) would typically be manufactured the same way, (ii) is a reasonable conclusion: there is a strong uniformity in the population. However, since there can be variations in the way a CD is manufactured among different manufacturers, conclusion (i) is less probable. NOTE how different this example is from the Ford truck example. Even if we grant that all Ford trucks are manufactured from the same assembly line (which is false), thereby granting some degree of uniformity, the many parts added on to constitute a truck provide additional possibilities of mistakes, such that there can be more defective models. There is no comparable complexity in the actual making of a CD.

6. (a) (i) Professional athletes of the world. (ii) Professional athletes in the U.S. (iii) Professional football players.
(iv) The players of team X.
(b) (i) NO. (ii) NO. (iii) NO. (iv) Yes.
(c) 4 professional football players.
(d) (i) NO. (ii) NO. (iii) NO. (iv) NO.
(e) (i) NO. (ii) NO. (iii) NO. All because in each case the sample is taken from the wrong population. (iv) At most moderately probable because the counterexample that only those four players used drugs is at least moderately improbable in today’s world.

7. (a) (i) People in the world, (ii) people in the country, (iii) people in the state, (iv) people in the city.
(b) Assuming, that the news were only and truly national: (i) NO, (ii) Yes. (iii) NO. (iv) NO.
(c) 1200.
(d) NO.
(e) NO for (i), (iii), and (iv), because the sample is not selected from the right population, and is not randomly selected. NO for (ii), because the sample was not randomly selected.
(f) News reports focus mainly on violence. I could be only interested in violent news.

8. People in a state.
(b) NO, its selected from a city in that state.
(c) 1200
(d) Yes.
(e) NO, because it’s not selected from the right population.
(f) It could have been an extremely polluted city, but we can’t generalize to the rest of the state because it could much less polluted in the rest of the state.

9. (a) The conclusions are not clearly stated. “Unemployment is not a serious problem” is probably intended to mean that there are not many unemployed people in (i) this city, (ii) this state, (iii) this country, (iv) the world.
(b) The number of jobs advertised in the local newspaper of a city.
(c) Is the sample selected from the correct population in each conclusion? (i) NO. (ii) NO. (iii) NO. (iv) NO. For the author generalizes from the number of job advertisements in a local newspaper to the number of unemployed people. S/he should have randomly selected an appropriate number of people from the city, state, country, and the world.
(d) Not stated, but it would be the number of jobs advertised in a local newspaper.
(e) NO, for not every available job in the city had an equal chance of being selected for the Help Wanted ads.
(f) (i) NO. (ii) NO. (iii) NO. (iv) NO, because for each conclusion the sample was not randomly selected, and especially because it was not taken from the right population.

There are serious weaknesses even if we do not criticize the argument as a generalization: even if there were lots of jobs in (i) this city, (ii) this state, (iii) this country, (iv) the world, there could still be high unemployment: what if the jobs require specialized knowledge that most potential workers do not have; what if the number of unemployed persons far outnumbers the many of jobs available. Another problem, CLARITY: there are “lots of” jobs, but compared to what?

10. Implicitly, the human population in general.
(b) Is the sample selected from the correct population? Yes.
(c) One cancerless individual who has been exposed to forty years of heavy sunlight.
(d) NO.
(e) NO. The sample is too small, and not randomly selected.
(f) I could have a body that is exceptionally resistant to skin cancer. I could have been taking medication or certain vitamins to fight the creation of (skin) cancer.

11. (a) The atheists and agnostics in this country.
(b) NO. It should have been selected from agnostics and atheists of this country.
(c) 1300, which is large.
(d) Yes.
(e) NO, because the sample was selected from the wrong population.
(f) The majority of prisoners would tend to be political “nonconformists”.

12. (a) Adult citizens of city Z.
(b) Yes.
(c) 1300, which is large.
(d) NO, because not every citizen of city Z had an equal chance of being
(e) NO. The sample was not randomly selected. There are other weaknesses that affect the support. See (f):
(f) What could explain the results? It’s not clear that everyone interviewed would be honest to the police. Since the results would be used to assess the police force, and the police were gathering those results, there is also a risk that not all negative results would have been included in the final calculation.
13. (a) Commercial airplanes in our country.
(b) Yes.
(c) Two commercial planes.
(d) NO.
(e) NO. The sample is too small, and not randomly selected.
(f) The intensity and gravity of the event makes us overlook the unlikelihood of the event.

The collective interpretation/belief that there was danger resulted in the collective emotion of fear and mistrust. Is this a case of thinking our way into fear and mistrust? Given our collective reaction to flying shortly after 9/11, what does this reflect of the level of rationality of the nation?