The Principle of Identity

I. Lesson

"It will not be possible for the same thing to be and not to be."
-Aristotle, *Metaphysics* (W.D. Ross, 1984)

Not to be confused with Shakespeare's famous lines ("To be, or not to be, that is the question"), Aristotle's statement above is known as the ***Principle of Identity.*** This principle tells us that each thing has all the same characteristics as itself (if treated at the same time and in the same fashion).

Why is this principle so crucial to logic? To start, it allows us to determine when two terms refer to equivalent categories. By this, we mean when the *referents* of the terms – the objects/categories which a term picks out– have all the same characteristics. In addition, the identity principle allows us to determine when two terms are not equivalent–i.e. when the referents of the terms do *not* have all the same characteristics.

Knowing whether terms are equivalent or not is, in turn, crucial to building up a system of formal logic (which will become clear, should you choose to take more advanced courses in logic) . Furthermore, the use of the same term in non-equivalent ways within a given argument is what leads to the fallacy of equivocation (discussed in a previous lesson).

- **Principle of Identity**: terms whose *referents* share the same fundamental characteristics are equivalent.

II. Examples

1. "Paris" is equivalent to "the capital of France."

The referent of the term "Paris" has a fundamental set of characteristics that are the same as those of the referent of the phrase "the capital of France." Applying the knowledge that two terms are equivalent when their referents have all the same characteristics, we can conclude that "Paris" and "the capital of France" must be equivalent.

2. "Cat" is not equivalent to "dog."

The fundamental characteristics of the category "cat" are different from those of the category "dog." Cats meow whereas dogs bark; cats arch their backs whereas dogs bare their teeth, etc. Applying the knowledge that two terms are not equivalent when their referents don't have all the same characteristics, we can conclude that "cat" and "dog" must be non-equivalent terms.

3. 1+1 = 2

This example illustrates more precisely what is meant by equivalence. As you will have learned in your math classes, 1 added with itself equals 2. In any equation, we could substitute "2" with "1+1" or vice versa. For example:
2+2 = 4 **or** (1+1)+2 =4
Similarly, in any sentence in which "Paris" occurs, we can replace it with "the capital of France" by the principle of identity.

[Activity]: Come up with your own example of a pair of equivalent terms, as well as a pair of non-equivalent terms. Use the identity principle to explain why these terms are/aren't equivalent. When you're done, share your examples with a classmate so that you can check over each other's work.

III. Exercises

Exercise 1

Briefly explain the two important pieces of information that we can gather from the identity principle.

Exercise 2

For statements i-iv, explain how the identity principle comes into play.

eg. "Soda" and "pop" are equivalent terms.
Answer: The referents of the terms "soda" and "pop" share all the same characteristics. By the identity principle, we know that two terms whose referents have all the same characteristics must be equivalent.

i. "Bike" and "scooter" are not equivalent terms.
ii. "Tennis shoes" means the same thing as "sneakers."
iii. A lawyer is someone who has the authority to interpret the law.
iv. One should not compare apples and oranges.

Exercise 3

Draw a line to match each term in the left column with a term in the right column that satisfies the identity principle.

eg. traffic circle ----------roundabout

i. Lightning bug	v. Faucet
ii. Garage sale	vi. Couch
iii. Sofa	vii. Firefly
iv. Spigot	viii. Yard Sale

Exercise 4

For phrases i-v, come up with a term that satisfies the identity principle (i.e. come up with a term whose referent satisfies all the criteria of the given phrase).

eg. A device used to make calls
Answer: phone

i. The star closest to Earth
ii. The fourth planet from the Sun
iii. The first president of the United States
iv. The largest country in the world
v. Plato's most famous student (hint: he founded the type of logic you're learning)

Exercise 5

Challenge! Consider the example of equivocation below. Can you explain how it violates the identity principle? (hint: focus on the term in the asterisks)
Angela is *hip.*
Hips don't lie!
Therefore, Angela doesn't lie.

IV. Conclusion

In order for anything we say to have meaning, the identity of the thing we're talking about has to remain constant. It is because of this that the identity principle can be seen as the fundamental building block of logic. Understanding how this principle works and how it can be violated is thus crucial towards understanding what's at the heart of our communication.

V. Lesson Goals

By the end of this lesson, students will be able to:

- Provide a working definition of the identity principle
- Explain how the identity principle can be used to determine when two terms are equivalent
- Contextualize the fallacy of equivocation with respect to a breach of the identity principle

Answer Key:

Exercise 1

Two important pieces of information that we can gather from the identity principle are (1) when a pair of terms are equivalent (i.e. when their referents share all the same characteristics), and (2) when a pair of terms are not equivalent (i.e. when their referents don't share all the same characteristics).

Exercise 2

i. "Bike" and "scooter" are not equivalent terms.

The characteristics of the referents of the terms "bike" and "scooter" are different. Bikes have pedals, scooters don't; bikes are ridden sitting down, scooters are ridden standing up, etc. By the identity principle, we know that two terms whose referents have different characteristics cannot be equivalent.

ii. "Tennis shoes" means the same thing as "sneakers."

The fundamental characteristics of the referents of the terms "tennis shoes" and "sneakers" are the same. They have laces and rubber soles, can be used for sports, etc. By the identity principle, we know that two terms whose referents have all the same characteristics must be equivalent.

iii. A lawyer is someone who has the authority to interpret the law.

We know that the phrase "someone who has the authority to interpret the law" is the definition of the term "lawyer" Therefore, we can conclude that the referent of the phrase "someone who has the authority to interpret the law" and the referent of the term "lawyer" have all the same characteristics. Given the identity principle, this means that the phrase and the term must be equivalent.

iv. One should not compare apples and oranges.

The fundamental characteristics of apples and those of oranges are different. Apples are smooth whereas oranges are textured; apples have a core whereas oranges have pulp; apples have thinner skins than oranges, et. By the identity principle, we know that things with different characteristics are different. It's because apples and oranges are different that we shouldn't compare them.

Exercise 3

Exercise 4

i. "The Sun" satisfies the identity principle for the phrase "the star closest to Earth."
ii. "Mars" satisfies the identity principle for the phrase "the fourth planet from the Sun."
iii. "George Washington" satisfies the identity principle for the phrase "the first president of the United States."
iv. "Russia" satisfies the identity principle for the phrase "the largest country in the world."
v. "Aristotle" satisfies the identity principle for the phrase "Plato's most famous student."

Exercise 5

Angela is *hip.*
Hips don't lie!
Therefore, Angela doesn't lie.

This syllogism violates the identity principle because the term "hip" is used in the first premise to denote being cool, whereas it is used in the second premise to denote a body part. Although the argument purports to use "hip" consistently across the two premises, it is actually conflating two different referents. Therefore, the same identity is not being maintained.