**Our Trouble with Conditionals –**

**How Logical Illusion Can Disable Our Thinking on Vital Matters**

Whether we have studied it formally or not, many of us recognize the importance of the academic study of logic and its relevance to human knowledge and thought. But we tend to underestimate the toll logical illusion takes on our own thinking and the decisions we make.

What I refer to here as ‘logical illusion’ is not simply sloppy or lax thinking, but errant, even fallacious thought carried out under the guise of logical rigor.

Logical illusion festers in areas of ambiguous interpretation of logical connectives. One famous case is the notorious confusion of exclusive with inclusive disjunction. The bulk of the mess we make for ourselves is with the misuse of the conditional. Here I aim both to explain our confusion are by an analysis of several examples, before moving on to my main case in point: our horrid mis-framing of the issue of economic management resulting in the fruitless centuries-long polemic between capitalist theory and socialist theory.

The case of ambiguity with respect to disjunction is easy enough to explain. It is that we utilize two disjunctive connectives with different truth conditions: exclusive-or and inclusive-or. As long as we are reflectively cognizant of this fact, it does not harm us. To be sure, formal logical system must decide which to consider primary, and do. Modern propositional logic considers inclusive disjunction to be primary and expresses exclusive-or in its terms as follows: p exclusive-or q is equivalent to (p inclusive-or q) and not-(p and q). Conversely, Boolean logic chooses exclusive-or to be its basic disjunctive operator and thus translates inclusive-or in its terms as: (p exclusive-or q) exclusive-or (p and q).

The main trouble that arises is that in spoken language we typically express disjunction ambiguously. Unlike in Latin, in which punctilious authors made sure to use ‘aut’ for exclusive-or and ‘vel’ for inclusive, most modern languages don’t have such convenient resources typically at hand. So it is left up to us to determine by context which sense of disjunction is intended.

For example, when mom tells us we can have the pie or the brownie for dessert, we can count on the intended sense to be exclusive. Just try to take both and see what happens! Conversely, if, as a child I don’t know what to do on a rainy day, it can be suggested to me that I can read a book or play piano, I shouldn’t expect flak for doing both, but might well get some for moping around doing neither.

The trouble here doesn’t seem to be much, and most of that which we might have is covered by correct interpretation of context. But the conditional is another matter.

My daughter Teresa and I have had this ongoing query about a pair of related scriptural quotes. It all started when I once remarked that I was relieved by Jesus saying that (NAF) whoever is not against him is for him (Luke 9:50; Mark 9:40), since it appears to offer an easy standard of belonging. Teresa, however, ruffled my feathers by pointing out that Jesus had also said that (NFA) whoever is not for him is against him (Matthew 12:30), which appears on its face to suggest a rather more rigid standard of membership. Others have noted this apparent conflict, some even suggesting it amounts to a contradiction. In fact and quite surprisingly - it amounts to no difference at all according to standard logical analysis.

NAF and NFA are universal categorical claims of the general forms All non-A are B and All non-B are A. These, in turn, are interpreted as conditionals: If not-A, then B and if not-B then A. According to propositional logic, any claim of the form if p then q is equivalent to if not-q then not-p as its contrapositive. . Applying this to our case, we see that each of the two scriptural claims is the contrapositive of the other, thus not differing in meaning!

The psychology is involved with why this comes as a surprise to us lies in the fact that we tend tacitly to assume that the antecedent of a conditional is the observable condition to judge whether the consequent obtains. So, for example, when sorting socks, I may abide by the rule: if the sock is white, is goes in the red basket. In this example, clearly the expectation is that of a one-way relation between an antecedent observation and consequent action or result. In such a situation, where both temporality and empirical judgment figure heavily, the contrapositive is almost not worth reflecting on: if a sock is not in the red basket, it is not white. This is because I don’t need a mediated criterion of judgment for whether a sock is white or not; I can just check directly for myself. Nonetheless, if I have sorted the socks correctly, the contrapositive should come out true whenever the beginning claim does.

The extra running room for the logical illusion in this case may come from the fact that we typically consider there to be a middle ground between being for or against something, such that not being against something would not imply being for it. The underlying meaning of either NAF and NFA has not, then, to do with how hard or easy the criterion membership in the group is, but that there is no middle ground between being for or against; there is no free-standing neutral ground to occupy.

Until I finally figured this out, I was so daunted by the apparent difference in meaning between the delightfully generous NAF and the apparently severe NFA that for a time I unreflectively put off further investigation of the matter, accepting the probability that this was just another scriptural paradox.

What we call the Golden Rule is another case in which the conditional causes trouble for us and is most often employed in association with negation. Here the trouble is not that of an apparent difference that is not actual, but of an apparent sameness of meaning that may be different.

The Golden Rule appears in all the great spiritual traditions of humankind. In most cases it appears in the negative, something like: Do not do unto others what you would not have them do unto you. The affirmative form, attested both in ancient Greek wisdom and in the Gospels, both traditions that also expressed the rule in the negative form, goes something like: Do unto others as you would have them do unto you. Setting aside the criticism by some that this rule in either of its forms is difficult to apply in a way that would make it morally appropriate, given the fact that my conception of what you might or might not want may be inaccurate, my interest here is with the question of whether the negative and affirmative formulations are really the same rule, or two separate rules.

When we formalize the two into logic, we get something like this, stripped down to declarative meanings:

GRN: If I do not wish A done to me, then I shall not do A to others.

GRA: If I wish A done to me, then I shall do A to others.

If we make p = I wish A done to me and q = I shall do A to others, we can see their logical forms as follows:

1. **If not-p, then not-q** and

2. **p then q.**

Now plainly, these two forms are not equivalent and have different truth conditions.

1 is true except when p is false and q is true, while 2 is true except when p is true and q is false.

This is quite a difference in meaning! So then, why does it seem like they express the same rule?

The answer is quite simple. Just as when we express a disjunctive statement, we sometimes intend inclusive and sometimes exclusive disjunction, when we express conditionals, we sometimes intend a conditional proper and sometimes the **biconditional**. The biconditional is a two-way conditional, i.e. **(if p then q) and (if q then p)**. In this case, it should be clear enough that rewriting GRA as follows would unite both the affirmative and negative meanings into the same rule: p if and only if q, or:

GRAB: I wish A done to me if and only if I shall do A to others; or the converse:

 I shall do A to others if and only if I wish it done to me.

As awkward as this may sound – and this may explain why authors though the ages have avoided it – it expressed both the weaker negative and affirmative versions above. It is now the case that the golden rule is only violated when the p side and the q side have differing truth values. If p and q are both false, that satisfies the negative reading; if they are both true, that satisfies the affirmative reading.

Another way of understanding the biconditional is as the negation of exclusive disjunction. Whereas the latter is true whenever the truth values of its constituent propositions differ, a biconditional is true exactly when the truth-values of its constituent propositions are the same.

So, in short, the lessons we can glean from our conversation so far are that

1. we should be on the lookout to avoid confusing inclusive or with exclusive-or;

2. we should be careful not to read the conditional as a clinical criterion in non-empirical

 situations, thereby obtaining criteria that are either excessively broad or excessively narrow

3. we should read the conditional as the biconditional where the context demands it, avoiding

 unnecessary disputes.

Let me here for the sake of our upcoming case-in point discuss a fourth lesson:

4. that in one way or another we should subject our conditional and disjunctive arguments to

 logical analysis to avoid fallacious reasoning especially that of employing conditional

 reasoning to create false choice scenarios by treating contraries as contradictories, or by

 making compatible alternatives appear to be contraries.

I was brought up in a culture in which the criticism of capitalism was likened to socialism. Even as a young professor, I felt any criticism I made had to be couched in the qualifier: “I’m no socialist, but…”. Along the way, some of my friends and colleagues would decide to take the bait and “go socialist” thus giving victory to those who only sought to stoke the fires of ideological war. At some point, I began feeling it necessary as well to couch my criticisms of socialism in some circles with the qualifier, “I’m no *laissez-faire* capitalist, but…”. I could never feel comfortable on either side of this polemic because I could never feel comfortable with the *polemic*. The fact is, I could never see myself as either anti-capitalist or anti-socialist, and never thought it necessary to make a choice. I never could see how the tactics of one were necessarily incompatible with the tactics of the other, much less that the two were contrary or even contradictory opposites.

Many of those who hear me say these things are either stunned or convinced that I am a hopeless wimp. Whose side am I on? Some simply have interpreted this talk as crypto-socialist and others as crypto-capitalist.

The logical illusion that drives all this is to assume that once a choice has been made along a spectrum, any distinct second choice must be its opposite. It is like my choosing orange first, then characterizing your subsequent choice of yellow as anti-orange, creating a false dichotomy. To make matters worse, I may begin to characterize your “anti-orangeism” no longer as a contrary opposite – which of course it is not! – but no less than as a *contradictory* opposite. This is the end game of a polemic that brings us not only to ignore all the possible choices on the original spectrum now obliterated by my decision to deride yellow as anti-orange, but also to ignore any middle ground there may be between the remaining choices of orange and yellow.

This is how I see the history of the ideological struggle between capitalism and socialism. It is like a chess game whose first move is advocacy of an ideological position, say, capitalism, Then, once the second move has been made: the advocacy of a second position, say socialism, the third move is to deride socialism as anti-capitalism, according to the following sequence:

1. Capitalism and socialism are opposites.

2. If 1, then 2.a.if I am not capitalist, I am socialist.

3. If 2.a. then 3.a. socialism and capitalism are the only two choices.

4. If 1, and 3.a., then if I am socialist, then 4.a. I am anti-capitalist.

5. Capitalism is the American form of economy.

6. If 4.a. and 5, then if I am socialist, I am anti-American.

I would challenge this thought sequence by denying premises 1, 2 and 5, while noting that 3,4 and 6, are correct inferences from false premises.

I argue premise 1 to be false, since capitalism and socialism are not incompatible in the manner one would expect ideologically opposite terms to be. Assuming what is intended here is overall systems of management of the economy, there certainly is a great deal of middle ground between them, so they are not contradictory opposite, moreover, no imaginable versions of them as presently conceived would make them count as contrary opposites. For if socialism refers to economy insofar as it is run, managed, or regulated in the public sector while capitalism is private sector economy, there is no conceivable form of capitalism entirely bereft of a public sector. Even the black market, which one could consider capitalism in its most extreme form, cannot survive entirely without a public sector, since it is by nature parasitic, and parasites depend on the existence of a “living” host, which in this case would be a functioning economy with a public sector of some sort. But contrary opposites cannot be predicated truthfully of the same subject at the same time. So although we might be able to strain to imagine an economy that is completely public sector and therefore “socialist: or what is sometimes called a “command economy” it has no contrary opposite to match it on the other end of the spectrum.

In fact, it seems clear that the public sector, far from competing against the private sector, exists for the sake of enabling the private sector to flourish in a just an equitable manner that improves society as a whole.

In fact, any functioning economy would have to be some kind of mix of socialist or public-sector economy and capitalist or private-sector economy. The two have separate, non-competing, and collaborative directives.

I deny 2 because it is an inference based on the fallacious assumption that any opposition is a contradictory one. But it is clear that capitalism and socialism do not stand in such a relationship. Socialism does not mean the absence of capitalism, and capitalism does not simply mean non-socialism.

Similarly, I would deny premise 5 by simply pointing out all the socialist aspects of the U.S. economy.as we know it and have known it for some time: a public sector military, perhaps the largest single economic entity in the world; a body of laws all enacted by and enforced in the public sector; federal, state, and municipal police departments; public schools, parks, and libraries, etc. In light of all these major socialist aspects of our economy, it is untrue simply to say that our economy is capitalist in a manner that would imply the absence of socialism in it.

In light of these logical observations, I urge us all to back away from this pseudo-polemic when discussing economic matters, and rather focus on optimizing sound investment in both the public and private sectors.