Fostering Theoretical Thinking in Undergraduate Classes

Mark Souva, *Florida State University*

How should educators teach students to make better theoretical arguments, that is, an argument that is logical and fruitful? Logical thinking is about making valid deductions from a set of premises and avoiding fallacies. Fruitful thinking involves making an argument that fits reality. Theoretical thinking, then, emphasizes *building* a sound argument with relevant and interesting empirical implications. In this way, theoretical thinking complements the more common educational mantra of teaching students to think critically, which tends to focus on the detection of fallacies or other flaws in an argument. Emphasizing detection instead of construction, however, limits the development of analytical and independent thinking. To better teach the range of thinking skills most educators want their students to acquire calls for a focus on the understanding and construction of theoretical arguments, and this calls for greater emphasis on learning at least a basic system of logic.

A focus on theory building instead of the detection of fallacies improves thinking in four ways. First, emphasizing theory enables students to build better arguments. Arguments are unpersuasive when they make illogical connections or are underdeveloped. Whereas learning logic can help reduce invalid deductions, acquiring a fuller understanding of the parts of an argument can help students put some flesh on their often skeletal initial arguments. Second, focusing on theory enables students to better analyze an argument. Fallacy identification exercises are useful, but arguments may go astray in other ways, such as having inaccurate premises or a mismatch between concepts and indicators. Third, calling attention to the importance of theory facilitates empirical investigation. Empirical evidence is needed to answer many political questions, but the appropriate empirical evidence to marshal and assess depends on the theory or competing theories at issue. Fourth, a focus on theory promotes intellectual humility and caution. Theories are never proven, only tentatively confirmed, and understanding the role of theory in identifying causal mechanisms helps students appreciate the danger of drawing inferences beyond a theory's domain.

To begin building their own theory, students must start at the beginning: What is theory, and why are theories important? Although theory building is more of an art, a process of discovery, than a science, if we keep certain ideas in mind, we can help students build more fruitful theories.[1] I offer some suggestions that instructors can use to guide class discussions and create a variety of theory building or theory analysis exercises. I also provide some examples of class assignments at the end of the article.

What is a Theory?

A theory is a set of interconnected assumptions that illuminates a causal mechanism regulating variation in a phenomenon. From the theory, we derive one or more hypotheses.[2] A hypothesis expresses a relationship between two concepts, a cause and an effect, while a theory explains *why* that relationship exists; that is, a theory explains the logic behind a hypothesis. In other words, "theories indicate what is connected with what and how the connection is made" (Waltz 1979, 12). In addressing a why question and elucidating how concepts are connected, a theory generates hypotheses. Theories, then, address a puzzle and include assumptions, concepts, and hypotheses.

In many cases, we can think of a hypothesis as a policy prescription, that is, a hypothesis says that we can at least partially achieve what we want by increasing (or decreasing) variable *x*. For example, one way to increase collective action is to offer selective incentives. Given that any policy prescription flows out of a theory, to increase the likelihood of successfully addressing various social problems, it is important to understand the mechanics behind these theories.

Theory Building Guidelines

1. What is the puzzle?

Although instructors sometimes suggest that students should begin a research paper with a question, I echo Zinnes (1980) and suggest that it is often more useful for them to begin with a puzzle. A puzzle involves two or more cases that we expect to have similar outcomes but do not, or different outcomes but a similar outcome occurs. Unlike beginning with a general question, such as "what causes war?", starting with a puzzle requires some knowledge of events or, if it is a philosophical study, some knowledge of different arguments. "This would seem to be the major difference between a puzzle and a simple question. To be truly puzzled, we must already know something. We can be extremely uninformed and yet ask a question" (Zinnes 1980, 338). As Zinnes (1980) observes, focusing on a puzzle is useful for two reasons. First, a puzzle helps anchor the theorizing in concrete cases. No one values a theory that applies to nothing. Second, "puzzles seem to make us think like detectives, and thinking like detectives makes us look for the not necessarily obvious or even visible operating principles" (Zinnes 1980, 318).

2. What are the microfoundations? Who are the actors and what motivates them?

With a puzzle in hand, we then want to look for clues to fit the pieces together, to solve the puzzle. What kind of process might lead to the type of event

Mark Souva *is assistant professor at Florida State University. His research examines foreign policy decision-making and the causes of conflict and cooperation in world politics. He has forthcoming articles on democratic peace, economic sanctions, and interstate trade.*

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we are trying to explain? In thinking about the process that produces the outcomes, we are likely to ask some or all of the following questions. Who are the primary actors? What are their goals? What are the constraints affecting their decisions? In answering these questions we will be providing microfoundations for the argument.

To provide microfoundations for an argument is to provide an account of how *individuals* choose and act. What motivates an agent in this context? Are people in this situation likely to be self-interested or altruistic? Microfoundations, then, are the behavioral characteristics of individual actors. In the social world, events are caused by actors operating under particular constraints, that is, "the mechanisms through which social causation is mediated turn on the structured circumstances of choice of intentional agents, and nothing else" (Little 1998, 203).[3]

To argue that a complete and coherent theory of social phenomena requires clear microfoundations does not mean structural factors are irrelevant. On the contrary, a focus on individuals naturally leads to examination of institutions because "institutions have effects on individual behavior (incentives, constraints, indoctrination, preference formation), which in turn produce aggregate social outcomes" (Little 1998, 204). It is little surprise that institutionalists tend to emphasize methodological individualism.

After answering these microfoundation questions, we will have identified actors, their goals, constraints, and at least some ways in which the cases are similar and some in which they are different. To more fully develop the argument, more clearly identify the scope of the theory, and make the theory more fruitful, we need to understand the role of assumptions.

3. What assumptions inform the theory?

All theories contain assumptions. In the natural sciences and in philosophy, these building blocks are referred to as axioms and premises. There is no significant difference between an assumption in a theory and a premise in a philosophical argument. Both have to be justified. In explaining social phenomena, we typically make assumptions about the identity of the primary actors, their goals, and constraints. For example, to understand world politics, we might assume that the primary actor is the nation-state, that the goal of the nation-state is the goal of the leader of the state, which is usually to retain office, and that specific domestic or international constraints, such as the balance of power, influence the attainment of this goal.

In making assumptions, we begin to engage in generalization and simplification. With simplification the goal is "to try to find the central tendency among a confusion of tendencies, to single out the propelling principle even though other principles operate, to seek the essential factors where innumerable factors are present" (Waltz 1979, 10). In American politics, for example, we often assume that the primary goal of a politician is to be elected or re-elected. Most politicians also have specific policy goals, but more than anything else what unites the set of politicians is the office imperative, making it a useful assumption and simplification of reality.

Next, I encourage students to write out formally (mathematically) or informally (in prose) the assumptions in their argument. This practice helps students understand where hypotheses come from, that is, a hypothesis links a causal concept with an effect, and the assumptions explain why the hypothesis is logically sound. We typically see a hypothesis written as: if X, then Y. But all hypotheses depend on a set of assumptions, and given the lack of attention paid to assumptions, it may be better to write: given this set of assumptions (A), if X, then Y: "If the specified axioms are true for a given case, then the model [or hypothesis] should apply" (Most and Starr 1984, 398).

Generalize nouns and verbs

To make an argument more simple and more general, we should make the nouns and verbs more general (Lave and March 1975, 63).[4] In doing this, the concepts will apply to a larger set of phenomena. Lave and March (1975, 63) offer the following example.

a. Little *men* often start an argument in the presence of big *men*.
b. Little *people* often start an argument in the presence of big *people*.
c. Little people often are *verbally aggressive* in the presence of big people.
d. People who are *physically disadvantaged* often are verbally aggressive in the presence of *physically advantaged* people.
e. Among people, *inequalities* in one domain lead to aggression in another.

To return to our earlier American politics example, we might observe that President George W. Bush wanted to be re-elected in 2004. With a little more thought and knowledge of history, we might generalize and say that all sitting presidents want to be re-elected. With a little more thought, we might generalize even further and say that all politicians desire to be re-elected. After beginning with a specific example, by making the nouns more general we reach a general premise that produces a fruitful theory.

Does making the nouns more general lead to poor thinking by conflating groups that should be distinguished? For instance, maybe only little men start fights in the presence of big men, instead of the more general little people and big people. Little women may act differently. We may call this the conflation issue. Of course, we should only substitute a more general noun (or verb) when the *common characteristics* between the two nouns are more accurate for the issue under investigation than the differences between them. Ultimately, the research question and theoretical assumptions guide the appropriate level of generality. For instance, if we want to know whether members of the House of Representatives are likely to run for higher office, then we focus the argument and research design around members of the House, but it may be that members of the Senate act in a similar way. If another researcher wants to generalize an argument further, that can be done in another paper. In addition, we should conduct appropriate empirical tests to determine if any *boundary conditions* are present.[5] Do all members of the House desire higher office or only some members?

4. Is the form of the argument valid? How are the hypotheses connected to the theory?

In contemporary political science, the most common way to ensure our conclusions follow from our assumptions is to use game theory. Game theory places an emphasis on specifying microfoundations and relevant social constraints, states (most) assumptions explicitly, and is formalized, thereby ensuring that the propositions flow from the premises (provided the mathematical operations are correct). Game theory is a formalized system of logic, but it is not the only system of logic, and other systems of logic may even be better at disciplining student thinking and facilitating their ability to make theoretical arguments.

Logic means right reasoning and analyzes whether the *form* of an argument is valid, that is, whether the stated premises entail the stated conclusion. A basic

system of logic is syllogistic logic, which focuses on arguments that contain all, no, or some.[6] Although limited in scope, understanding syllogistic logic highlights two important points about building a theory, namely the importance of sound premises and valid connections between premises for producing an accurate, or from the scientific perspective, empirically testable, conclusion. For example, consider the following syllogism:

> All politicians want to be re-elected.
> Jane is a politician.
> Therefore, Jane wants to be re-elected.

Is the conclusion valid? Does Jane want to be re-elected? In this case, intuition should tell us the answer: Jane wants to be re-elected. Drawing conclusions, however, is not always straightforward. Leblanc (1998, 81) offers the following example.

> Some students do not study.
> No one who studies fails a test.
> Therefore, some students fail tests.

Is this conclusion valid? We all know that the conclusion is true, some students do indeed fail tests. But, is the conclusion valid? Does it follow from the premises? No, it is not valid. The conclusion does not contain a distributed term (a term that makes a claim about *all* members of a class). The premises of the argument focus on students who do or do not study, but the conclusion does not say anything about studying. Learning syllogistic logic, then, provides practice in working with assumptions and combining thoughts in a logical manner, thereby improving our ability to think carefully and theoretically. Finally, learning syllogistic logic makes it much easier to learn other systems of logic, especially propositional and quantificational logic, that better address how a decision-maker deals with trade-offs.

Another way to think of the premises in a syllogism is as the mechanism that gives causal capacity to the independent variable, the first concept, in the conclusion statement. Causal capacity means a concept has the "capacity to produce a certain kind of outcome in the presence of appropriate antecedent conditions" (Little 1998, 205). In other words, under conditions A, X, the causal concept, has the capacity to produce the outcome Y.

For example, the informational theory of the democratic peace assumes (1) that military conflict happens because of bargaining failures, the chief cause of which is uncertainty about resolve and escalatory strategies that causes leaders to become locked-in to a course of action, (2) that democratic leaders are more accountable than non-democratic leaders, (3) that accountability increases audience costs, (4) that as audience costs increase uncertainty about resolve decreases, and (5) that as uncertainty about resolve decreases, states adopt less escalatory strategies.[7] This combination of assumptions leads to the conclusion that pairs of democracies are less likely to experience military conflict than other regime pairs. More importantly, connecting the assumptions of an argument addresses the process behind the hypothesis and generates an answer to a why question. Why are democracies less likely to fight each other than other regime pairs? Because democracies are better able to convey their true preferences and when dealing with other democracies, they are less likely to take steps that heighten tension. In other words, democratic institutions have the causal capacity to reduce uncertainty about resolve under the conditions of accountability and audience costs.

It is common to note that a syllogism is only as sound as its premises, that is, a valid syllogism does not guarantee a sound conclusion. For a conclusion to be sound, the premises need to be true. The need for true premises requires us to justify our premises. For example, for the information theory of the democratic peace to be accurate it is important to justify why democratic leaders can generate higher audience costs. Moreover, to the extent that democratic leaders are not able to generate higher audience costs, the expectations of this theory will not hold. In the social sciences, our premises will never hold all of the time because people have free will and there is enough situational variation that we can only identify central tendencies; as a result, the assumptions of a theory delimit the domain of that theory.

In addition to verifying the logic of an argument, outlining the core premises of an argument produces two other benefits. First, in stating a premise we see the importance of defining our concepts. Poorly defined or ambiguous concepts lead to inappropriate comparisons and contrasts as well as ambiguous conclusions. Second, a useful research strategy is to problematize an assumption in a popular theory. Assumptions, we noted, typically express a central tendency, which naturally leads to the question of when does an assumption hold and when does it not? In turn, an investigation of the assumption may suggest either an alternative concept that encompasses the previous one or an alternative model specification that significantly increases understanding of the topic.

5. Some theory building exercises

As is the case with most skills, the best way to improve is to practice, practice, practice. How can students cultivate theory building skills? Lave and March (1975, 19–20) recommend the following approach.[8] Start with a fact. Then, create an explanation that accounts for this fact. "Look at the facts as though they were the end result of some unknown process (model). Then speculate about processes that might have produced such a result" (20). They do not say anything about assumptions, but in speculating about the process generating the phenomena to be explained we need to identify a set of connected assumptions to account for the logic producing the hypothesis. (Recall that a hypothesis is the end point of theorizing; it is the conclusion of a chain of reasoning.) With a preliminary hypothesis in hand, ask: If this hypothesis is accurate, what outcomes should we observe and not observe? What type of information or events would falsify the hypothesis? If nothing will falsify the hypothesis, then the premises are internally inconsistent. To add a little complexity to this theory generation exercise, ask students to create a second explanation of the original phenomenon, and then identify a way in which to discriminate between the competing theories.[9]

For building on this basic theory generation exercise, Lave and March recommend specifying additional hypotheses. Presumably, the original argument produces a hypothesis that accounts for the original type of event. To develop confidence in the theory, however, we would like it to explain something else. Two strategies for developing additional testable implications are based on the development of a "logical tree" (Platt 1964). First, extend the logic of a theory by focusing on one branch, a particular assumption, and ask what other observable implications follow from it, in conjunction with other assumptions. For example, if democratic leaders experience higher audience costs than non-democratic leaders, then democratic leaders should be less likely to bluff; as a result, other states should be less likely to respond to challenges made by democracies, all else equal.[10] Second, problematize an assumption by asking why an assumption sometimes holds and sometimes does not. In other words, create a theory that makes this assumption the conclusion. In problematizing an assumption, we extend a research program and come to better understand the robustness of the original theory.

Another exercise for cultivating theory comprehension and construction skills is

the argument outline. Assign an article and ask students to outline its argument by listing the key premises and a hypothesis that follows from these premises. For example, we can summarize Huntington's (1993) clash of civilizations argument this way. Civilizational/cultural differences lead to different preferences over a variety of policy issues. Different preferences lead to conflict (policy disagreements). Cultural differences lead to conflict. With this exercise, students come to understand the concept of a theory as the logic behind a conclusion (hypothesis), understand that all arguments contain a set of premises and at least one conclusion (hypothesis), increase their ability to identify the key premises and hypothesis (or hypotheses) in an argument, and start to recognize that arguments rise or fall based on the soundness of their premises, the logical connections between the premises and conclusion, and the empirical accuracy of the conclusion. In Huntington's argument, for instance, the soundness of each premise is questionable, and the empirical record also does not seem to offer much support for the hypothesis that cultural differences lead to conflict. To increase the complexity of the exercise, ask students to include the justification given for each premise and to evaluate the logical validity of the argument.

Sometimes students are paralyzed at the thought of developing a new theory, but everything does not have to be completely new. One of the most common methods of theorizing is to take a theory from one field or on one subject and apply it to another. The creativity is in recognizing the application to the new subject. For this reason, Lave and March (1975) recommend learning some basic models,[11] which may be used as a jumping off point for developing other models.

Conclusion

As Aristotle observed long ago, theorizing begins with knowledge of particulars and abstracting from them. I tell students that they already theorize. Who has not, for example, constructed a theory about why the opposite sex behaves the way it does? Or, we might develop a theory about why some movies are better than others. Many theories, however, are not very good, meaning they are internally inconsistent or have lots of counter-examples. We can help students clarify their thinking by asking them to focus on a puzzle, address questions about the identity and motivation of central actors, write out a set of assumptions, and learn a system of logic to better assess the validity of their conclusions; that is, we can help students acquire critical thinking skills by teaching them how to build theories. In addition, a focus on theory building increases understanding of scientific, empirical investigation. Central to science is the idea of falsifiability (Popper 1968). Although falsifiability is directly concerned with empirical evidence, the concept flows out of the need for a valid theory, for without a valid theory there is nothing to falsify. Finally, students sometimes ask how we know which assumptions are most appropriate for a given type of problem? Here is where creativity enters. Although creativity can only be taught to a limited degree—telling a person to be creative does little to make a person creative—we can note that novel ideas often come from playing, from wondering about a phenomenon.[12] Thus, reading about a particular subject is especially helpful for building better theories. Through reading, we not only acquire knowledge of interesting puzzles, but also of concepts and ideas to spur on our thinking.

Notes

*I thank Eric Hoffmann, Bob Jackson, Will Moore, Jeff Staton, and the reviewers for many helpful comments on earlier drafts. All remaining errors are my responsibility.

1. In her seminal essay on theory building, Zinnes (1980, 339) offers a similar observation: "The difference between great detectives and poor ones lies ultimately in the ability to make the creative leap from the evidence to the full picture." Similarly, Waltz (1979, 10) observes that "even by those who have authored them, the emergence of theories cannot be described in other than uncertain and impressionistic ways."

2. Bueno de Mesquita (2003, 53) defines theory as "statements about the expected relationships between variables." Shively (1998, 150) writes: "The purpose of a theory is to provide a simplified pattern to describe a complicated jumble of observations." Johnson and Joslyn (1995, 38) define theory as "a statement or series of statements that organize, explain, and predict knowledge." After criticizing existing definitions of theory as "cryptic," Van Evera (1997, 7–8) offers this: "Theories are general statements that describe and explain the causes or effects of classes of phenomena. They are composed of causal laws or hypotheses, explanations, and antecedent conditions. Explanations are also composed of causal laws or hypotheses, which are in turn composed of dependent and independent variables." The next two definitions of theory are the closest to what I offer. For Achen and Snidal (1989, 147), a theory is "a very general set of propositions from which others, including 'laws', are derived." King, Keohane, and Verba (1994, 99) define theory this way: "Causal theories are designed to show the causes of a phenomenon or set of phenomena" and include "an interrelated set of causal hypotheses. Each hypothesis specifies a posited relationship between variables."

3. In terms of specifying microfoundations, there are two general approaches: rational choice and psychological (see, e.g., Little 1991). March (1994) summarizes the rational choice approach as one that emphasizes preferences and consequences, while a psychological approach highlights particular roles. It is impossible to say if one view is better than the other, and each view believes it encompasses the other: "rational theorists of choice treat rules as the outcome of a higher-order rational process. They endogenize rules by rationalizing them. Students of rule following, on the other hand, tend to regard the rational model of choice … as simply one version of rule following associated with the identity of the decision maker. Rationality is a rule that requires decisions to be made consequentially" (March 1994, 59).

4. Looking for generality is Lave and March's (1975, 42) third rule for theory building. Their first rule is to "think process," which I discuss as my third guideline. Their second rule is to "develop interesting implications." While we certainly want our models to have interesting implications, it seems that an instruction that says "Be interesting" is of little practical help.

5. I thank Will Moore for bringing this argument to my attention. Assessing boundary conditions is a key form of sensitivity analysis. For a more robust defense of conducting extensive sensitivity analysis in empirical work, see Leamer (1983; 1985).

6. For a more extensive discussion of syllogistic logic, see Smith (2006); and Lagerlund (2004). Some other logical systems include propositional logic, which covers arguments employing 'if-then,' 'and,' 'or,' and 'not'; quantificational logic, which encompasses both syllogistic and propositional; modal logic, which analyzes arguments employing 'necessary' and 'possible'; and deontic logic, which examines arguments employing 'ought' and 'permissible.' For an excellent introduction to these general systems of logic, see Gensler (2001).

7. This is a simplified version of Fearon (1994).

8. Lave and March (1975) is the only text of which I am aware that makes an effort to teach *how to theorize*.

9. The creation of a second theory to account for the same phenomena is similar to Chamberlain's (1965) method of multiple working hypotheses.

10. This is essentially the argument of Schultz (1999).

11. Lave and March (1975) discuss four general models: the basic decision-making model of expected utility, a model of exchange, a model of adaptive behavior, and a model of diffusion.

12. For an entertaining and insightful article on the importance of play in research, see Loehle (1990).

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