ISSA Proceedings 2014 – Ubiquity, Ambiguity, And Metarationality: Searching For The Fallacy Of Composition

Abstract: "Ubiquity" is the hypothesis that fallacies of composition are ubiquitous; "ambiguity" the hypothesis that "fallacy of composition" has at least three distinct meanings, often confused; and "metarationality" the hypothesis that the best places to search for fallacies of composition are meta-arguments whose conclusions attribute this fallacy to ground-level arguments. While testing these working hypotheses, I have found some historically important cases, for example, a step in the theological argument from design, as critiqued by Hume.

Keywords: argument of composition, composition, compositional argument, design argument, fallacy of composition, Hume, meta-argumentation, metarationality, parts vs. whole

1. *Introduction*

There are both theoretical and practical motivations for wanting to study the fallacy of composition.

From a theoretical point of view, such a study is a special case of a key and well-established branch of logic and argumentation theory. In fact, with some slight but not much exaggeration, one could reconstruct the past fifty years of this field largely as a series of footnotes to Hamblin's *Fallacies* (1970), and/or as a series of developments that culminate organically with Woods's *Errors of Reasoning* (2013). And, as we shall see, the fallacy of composition is special not only in the sense of being a specific case of fallacies, but also in the sense of being especially important.

On a practical level, getting clear about the fallacy of composition seems crucial if one wants to react intelligently to two of the greatest problems in the world today: global warming and the world-wide great recession. In fact, at least one philosopher has claimed that arguments for global warming typically involve an aggregation of temperatures from particular regions of the world, and "to group

and average in this way is to commit the fallacy of composition" (Haller, 2002, p. 50); thus, it would seem to be almost a civic duty for a professional in this field to try to ascertain whether he is right. And with regard to the on-going great recession, Nobel Prize economist Paul Krugman (2013a) has blamed its persistence on the austerity policies that have been adopted by most countries with developed economies, and he has suggested that austerity has been the result of thinking that one can apply to a national economy the same policies that work for its constituent parts, such as households and individual firms; and this manner of thinking is what logicians and argumentation theorists call the fallacy of composition, a label which he himself occasionally uses (Krugman, 2013b). If Krugman is right, then such scholars have a civic duty to contribute to a clarification of this topic.

2. *The ubiquity thesis*

The fallacy of composition seems to be unique among the fallacies, insofar as its frequency and importance have been widely claimed, perhaps more than for any other fallacy. For example, in 1826, in the Elements of Logic, Richard Whately explicitly named and discussed this fallacy, saying among other things:

… Fallacy of Composition. There is no Fallacy more common, or more likely to deceive, than the one now before us: the form in which it is usually employed, is, to establish some truth, separately, concerning each single member of a certain class, and thence to infer the same of the whole collectively. [Whately, 1826, pp. 174-75]

Moreover, at least since the epoch-making contributions of John Maynard Keynes (who died in 1946), economists tend to regard the fallacy of composition as the single worst pitfall in economic reasoning. They also consider the exposure of it to be the greatest accomplishment of the modern science of economics. They deem the avoidance of it the most important lesson one can learn from this science. And such claims are easily found in the writings of economists of both the left and right wings of the ideological spectrum, such as Paul Samuelson and Henry Hazlitt.**[i]**

However, despite such attention and such claims, scholars in logic and argumentation theory seem not to have done much work on the fallacy of composition, although textbooks tend to pay lip service to it.

Sometimes this scholarly neglect of the fallacy of composition is explained and partly justified in terms of its rarity or infrequency. For example, in the 1973 edition of his textbook *Logic and Philosophy*, Howard Kahane has a brief discussion of this fallacy together with its reverse twin, the fallacy of division. Here are his revealing words:

since non-trivial real life examples of these two fallacies … are unusual, textbook examples tend to be contrived or trivial. Thus one textbook writer gives as an example of the fallacy of composition the argument that '… since every part of a certain machine is light in weight, the machine as a whole is light in weight'. [Kahane, 1973, p. 244; cf. Copi, 1972, pp. 96-98]

Obviously, this explanation of the scholarly neglect conflicts with the ubiquity thesis reported earlier. Thus, the question arises whether the fallacy of composition is common and important, or uncommon and unimportant. This is largely an empirical question, to be resolved by following an empirical approach.

However, such an empirical investigation cannot be conducted with a tabula rasa, for we need to be clear about what we mean by fallacy of composition, and also we need to examine real or realistic material which typically does not come with the label 'fallacy of composition' attached to it. In other words, we need to be mindful of the fact that observation is theory-laden, and that the examination of this material must be guided by some idea of what this fallacy means, and by some idea of what to do with the material under examination so as to test it for the occurrence of this fallacy. A brief elaboration of some of these ideas is thus in order.

3. *The ambiguity of 'fallacy of composition*'

To begin with, it is obvious that we need some understanding of what is meant by fallacy of composition. Unfortunately, historical and contemporary writings on the topic contain three notions that are prima facie distinct, but tend to be confused with each other.

First, there is reasoning from premises using a term distributively to a conclusion using the same term collectively; for example, "because a bus uses more gasoline than an automobile, therefore all buses use more gasoline than all automobiles" (Copi, 1968, p. 81). Second, there is reasoning from some property of the parts to the same property for the whole; for instance, "since every part of a certain

machine is light in weight, the machine 'as a whole' is light in weight" (Copi, 1968, p. 80). And thirdly, there is reasoning from some property of the members of a group to the same property for the entire group; the so-called tragedy of the commons can illustrate this notion, that is, "if one farmer grazes his cattle on the commons, that will be beneficial for him; therefore if all the farmers graze their cattle on the commons, that will be beneficial for all" (Govier, 2009, p. 95).

Now, the association of the second and third notions with each other is very common. On the other hand, the association of all three is relatively rare, but does occur. One example may be found in the following textbook definition:

The fallacy of composition consists in treating a distributed characteristic as if it were collective. It occurs when one makes the mistake of attributing to a group (or a whole) some characteristic that is true only of its individual members (or its parts), and then makes inferences based on that mistake. [Halverson, 1984, p. 73]

4. *The metarationality hypothesis*

Besides this three-fold distinction and the ubiquity thesis, there is a third guiding idea that needs to be at least mentioned and tentatively stated before we proceed. In a previous work, I criticized textbook accounts of fallacies, and on its basis I formulated a problem and advanced an hypothesis. The problem was formulated in terms of the following questions: "do people actually commit fallacies as usually understood? That is, do fallacies exist in practice? Or do they exist only in the mind of the interpreter who is claiming that a fallacy is being committed?" (Finocchiaro, 1980, p. 334; 1981, p. 15; 2005, p. 113).

Although these were not meant to be rhetorical questions, but rather open questions that required further investigation, it is perhaps unsurprising that some readers (e.g., Govier, 1982) did view them as rhetorical questions. Moreover, I did express "the suspicion that logically incorrect arguments are not that common in practice, that their existence may be largely restricted to logic textbook examples and exercises" (Finocchiaro, 1980, p. 333; 1981, p. 14; 2005, p. 111). Thus, some readers thought that I was claiming that fallacies are merely figments of critics' imagination, and "are in fact an illusion" (Jason, 1986, p. 92; cf. Govier, 1982).

Later, I tried to be more explicit and constructive about this issue when I elaborated a general approach to the study of fallacies. One element of that approach was connected to, and extracted from, Strawson's *Introduction to*

Logical Theory and his notion of "the logician's second-order vocabulary" (Strawson, 1952, p. 15); that notion was extended to include 'fallacy' terminology, "since it ordinarily occurs when someone wants to comment about some logical feature of a first-order expression of reasoning. This means that the best place to begin with in the study of fallacies, or at least a crucial phenomenon to examine, is allegations that fallacies are being committed" (Finocchiaro, 1987, p. 264; 2005, p. 130).

In this vein, some elaborated the idea that fallacies are more like theoretical entities such as quarks in physics, rather than like concrete objects such as buttercups in everyday life (Grootendorst, 1987; Woods, 1988). This elaboration was a constructive suggestion and critical appreciation, and I am far from denying its viability.

However, I now believe that the project can be articulated more clearly, incisively, and constructively in light of the notion of meta-argumentation (cf. Finocchiaro, 2013b; 2013c). That is, I distinguish a meta-argument from a ground-level argument, and define the former as an argument about one or more arguments, or about argumentation in general. Then a ground-level argument can be defined as one about such things as natural phenomena, historical events, human actions, mathematical numbers, or metaphysical entities. A prototypical case of meta-argumentation is argument analysis, in which one advances and justifies an interpretive or evaluative claim about a ground-level argument.

What I am proposing is that we search for fallacies of composition primarily in meta-argumentation rather than ground-level argumentation. However, this is not meant in the sense that we should be looking for meta-arguments that commit the fallacy of composition, but rather that we try to find meta-arguments advancing explicit conclusions that some fallacy of composition has been committed, i.e., that some ground-level argument embodies or commits a fallacy of composition. The working hypothesis is then that, at least as a first approximation, the fallacy of composition is primarily a concept of meta-argumentation, useful in the context of understanding and/or assessing ground-level argumentation.

5. *Hume's critique of a step in the design argument*

Let us now begin our empirical search for real or realistic material pertaining to the fallacy of composition. A memorable example of the fallacy of composition occurs in the design argument for the existence of God, at least according to the

critique advanced in Hume's Dialogues Concerning Natural Religion. This charge is only one objection in the complex and multi-faceted criticism which Hume formulates; and correspondingly, it affects only one particular step of the design argument. Thus, even if cogent, this Humean meta-argument is not the end of the story; nevertheless, it is a crucial element of the over-all evaluation of the design argument.

It should be noted that Hume interprets the design argument primarily as inductive and empirical. In so doing, he is trying to abide by the principle of charity, for if one were to reconstruct the design argument as deductive and *a priori*, then according to Hume it could not even get off the ground, since it would be trying to prove a factual matter – that God exists and created the universe – from *a priori* considerations; and this for Hume is an inherently impossible task.

One version of the design argument is this: the universe was created by an intelligent designer (called God), because the universe is like a machine, and machines are made by (human) intelligent designers. This is, of course, an argument from analogy. Now Hume questions the analogical premise. How could one show that the universe is like a machine? Well, in Hume's own memorable words, spoken through the character Cleanthes, the answer is this:

Look round the world, contemplate the whole and every part of it: you will find it to be nothing but one great machine, subdivided into an infinite number of lesser machines, which again admit of subdivisions to a degree beyond what human senses and faculties can trace and explain. All these various machines, and even their most minute parts, are adjusted to each other with an accuracy which ravishes into admiration all men who have ever contemplated them. The curious adapting of means to ends, throughout all nature, resembles exactly, though it much exceeds, the productions of human contrivance – of human design, thought, wisdom, and intelligence. [Hume, 1947, p. 143]

This does seem to provide empirical, observational support for the claim that the universe is like a machine. However, there are problems with this reasoning. In Hume's words, spoken through the character Philo:

But can you think, Cleanthes, that your usual phlegm and philosophy have been preserved in so wide a step as you have taken, when you compared to the universe houses, ships, furniture, machines, and, from their similarity in some

circumstances, inferred a similarity in their causes? Thought, design, intelligence, such as we discover in men and other animals, is no more than one of the springs and principles of the universe, as well as heat or cold, attraction or repulsion, and a hundred others, which fall under daily observation. It is an active cause, by which some particular parts of nature, we find, produce alterations on other parts. But can a conclusion, with any propriety, be transferred from parts to the whole? Does not the great disproportion bar all comparison and inference? From observing the growth of a hair, can we learn anything concerning the generation of a man? Would the manner of a leaf's blowing, even though perfectly known, afford us any instruction concerning the vegetation of a tree? [Hume, 1947, p. 147]

Here, Hume is finding two things wrong with the subargument supporting the claim that the universe is like a machine. One problem is that although many parts of the universe are like machines, produced by intelligent design, many other parts (even when orderly arranged) are produced by natural causes such as attraction and heat. That is, Hume is charging that the subargument is a hasty generalization. But this is not the only problem; for even if all parts of the universe were machine-like, we could not be sure that the same would apply to the universe as a whole. In this second criticism, Hume is charging a fallacy of composition.

Hume's criticism of this subargument of the design argument is a meta-argument, and as such it is open to analysis, interpretation, and evaluation. Note, for example, that Hume's critical conclusion is based partly on an interpretation of the subargument in question, partly on a definition of the fallacy of composition, and partly on some evaluative principle. The interpretive claim is a reconstruction of this step of the design argument as transferring to the whole universe the same property which it claims to be able to observe in all (or many) of its parts; the property is that of being caused by some intelligent design. The evaluative principle is that it is illegitimate to transfer any such property from parts to whole in this case. Hume seems to give two reasons for this evaluative principle: first, the disproportion between such parts and whole is too great, presumably because the universe is infinite or indefinitely large; second, the transference from parts to the whole universe would be like reasoning from what happens to a human hair to what happens to a whole human body, or from what happens to a leaf to what happens to a whole tree. And this second reason amounts to a meta-argument

from analogy, in which Hume argues that this subargument of the design argument is illegitimate because the subargument is an argument from analogy and is as illegitimate as the analogies from hair to human body or from leaf to tree.**[ii]**

6. *Concluding remarks*

My empirical and theory-laden search has found other important historical cases, which cannot be elaborated here, but which deserve a brief mention. One of these other examples is Aristotle's geocentric argument from natural motion: that the natural motion of terrestrial bodies is straight toward the center; and therefore the natural motion of the whole earth is straight toward the center. Galileo objected by arguing that if 'center' means center of the universe, Aristotle's argument begs the question; but if 'center' means center of the earth, the premise is empirically true, but the conclusion is inherently false. And the latter is a memorable counterexample that deserves further logical analysis, because it seems to undermine the formal validity of not only Aristotle's particular argument, but also of any argument from parts to whole (Aristotle, *On the Heavens*, 296b7-297a1; Galilei, 1997, pp. 83-84; cf. Finocchiaro, [1980, pp. 353-56; 2014b, pp. 59-63]).

A third case involves Robert Michels's argument for the so-called "iron law of oligarchy": that political parties inevitably become oligarchic even if they claim to have democratic aims; and therefore, a democratic society inevitably becomes oligarchic. Political scientist Robert Dahl objected that such reasoning fails because there is a crucial disanalogy between such parts and such a whole: a democratic society allows competition among its parts, but a particular party does not. Similarly, sociologist Seymour Martin Lipset objected that there is another crucial difference: a democratic society has an anti-tyrannical system of checks and balances in its written or unwritten constitution, but political parties and labor unions do not (Michels, 1962; Dahl, 1989; Lipset, 1962; cf. Finocchiaro, 2013b).

Such examples are certainly real and realistic. They are obviously also historically important. The ground-level arguments are clearly compositional; i.e., they are arguments of composition, if I may be allowed to introduce an obvious term for a type of argument that leaves open the question whether it is incorrect or fallacious; that is, an argument from premises with distributive terms or about parts or members to a conclusion with collective terms or about the whole or

class. And the ground-level arguments are more or less inferentially incorrect: incontrovertibly and memorably so in the case of Aristotle's geocentric argument from natural motion; arguably and cogently so in the case of the compositional step of the theological argument from design; and arguably and plausibly so in the case of Michels's support for the iron law of oligarchy.

However, some qualifications are in order. First, even if we take these claims as acceptable, one important conceptual qualification needs to be kept in mind about such examples of the fallacy of composition. For these claims amount to saying that we have found important historical examples of arguments of composition that are inferentially incorrect. However, as John Woods (2013; cf. Finocchiaro, 2014a) has recently stressed, the traditional concept of fallacy is that a fallacy is a common type of reasoning that appears to be correct but is actually incorrect. This conception contains five elements: frequency, generality, reasoning, apparent correctness, and actual incorrectness. Now, in my three examples, the ground-level arguments obviously meet the condition of being reasoning; they also meet the generality condition since they are arguments from parts to whole; and they possess apparent correctness, since the exposure of the flaws of the ground-level arguments required meta-argumentation by thinkers such as Galileo, Hume, Dahl, and Lipset. But I am not sure about their common occurrence and their actual incorrectness. In fact, the same features that make these examples historically important may suggest that they are relatively uncommon; and their actual incorrectness could perhaps be questioned by questioning the critical meta-arguments of Galileo, Hume, Dahl, and Lipset. On the other hand, while such considerations would show that we have not found three examples of fallacies of compositions, they do not undermine the claim that we have found three important historical examples of seductive (i.e., apparently correct) arguments of composition. This problem required further reflection.

Another problem for future investigation concerns an issue which has received some discussion, with some promising and insightful results. The issue is that of the evaluation of the correctness of compositional arguments, and the formulation of useful evaluative principles. A key principle which I gather from this literature (e.g., Ritola, 2009) is that the evaluation of compositional arguments should not be limited to deductive evaluation, but should include inductive evaluation; for even when compositional arguments are deductively invalid, they often possess some plausibility, cogency, or inductive strength. Another principle, advanced by

van Eemeren and Grootendorst (1992, p. 177; 1999), urges us to distinguish between absolute and relative properties (e.g., square vs. heavy) and between structured or heterogeneous and unstructured or homogenous wholes or aggregates; and it claims that properties are transferable from parts to whole (or vice versa) only if the properties are absolute and the wholes are unstructured. However, the 'only if' in this formulation should be taken literally and strictly, as not including the 'if', that is, the principle at best states necessary but not sufficient conditions for transferability; thus, more work is needed to find and formulate sufficient conditions.

NOTES

i. See, for example, Hazlitt, 1979; Nelson, 1999; Samuelson, 1955, pp. 9-10, 237, 273, 350, 374, 505, 550, 693; Samuelson & Nordhaus 1989, pp. 7-8, 183-84, 399-404, 666-67, 972, 993; and Wray, 2009. Cf. Woods, Irvine & Walton, 2000, pp. 262-83; Finocchiaro, 2013a. For a revealing and emblematic piece of evidence, which in the present context may also acquire aspects of so-called cultural tourism, one may view a sculpture labeled "The Fallacy of Composition": it adorns an outside wall of the building of the Faculty of Economics at the University of Groningen, and it was created in 1988 to commemorate the 50th anniversary of the foundation of that Faculty and to celebrate Keynes's epoch-making contributions to the science of economics; cf. http://www.rug.nl/science-and-society/sculpture-project/sculpture1998?lang=en, consulted on July 24, 2012; I owe my first information about this sculpture to Govier (2007; 2009).

ii. There is much more to be said on this aspect of the Dialogues, namely Hume's employment of meta-arguments from analogy to criticize or strengthen various ground-level arguments from analogy. See Barker, 1989; and Finocchiaro, 2013c, pp. 201-203.

References

Barker, S. F. (1989). Reasoning by analogy in Hume's Dialogues. *Informal Logic*, 11, 173-84.

Copi, I. M. (1968). *Introduction to logic*. 3rd edn. New York: MacMillan.

Copi, I. M. (1972). *Introduction to logic*. 4th edn. New York: MacMillan.

Dahl, R. A. (1989). *Democracy and its critics*. New Haven: Yale University Press.

Eemeren, F. H. van, & R. Grootendorst (1992). *Argumentation, communication, and fallacies*. Hillsdale: Lawrence Erlbaum Associates.

Eemeren, F. H. van, & R. Grootendorst (1999). The fallacies of composition and division. In J. Gerbrandy, M. Marx, M. de Rijke & Y. Venema (Eds.), *JFAK: Essays Dedicated to Johan van Benthem on the Occasion of His 50th Birthday.* Amsterdam: University of Amsterdam, Institute for Logic, Language, and Computation. At <www.illc.uva.nl/j50/>, consulted on 18 June 2013.
Finocchiaro, M. A. (1980). *Galileo and the art of reasoning: Rhetorical foundations of logic and scientific Method*. (Boston Studies in the Philosophy of Science, vol. 61.) Dordrecht: Reidel [now Springer].
Finocchiaro, M. A. (1981). Fallacies and the evaluation of reasoning. *American Philosophical Quarterly,* 18, 13-22. Reprinted in Finocchiaro, 2005, pp. 109-27.
Finocchiaro, M. A. (1987). Six types of fallaciousness: Toward a realistic theory of logical criticism. *Argumentation*, 1, 263-82. Reprinted in Finocchiaro, 2005, pp. 128-47.
Finocchiaro, M. A. (2005). *Arguments about arguments: Systematic, critical, and historical essays in logical theory*. New York: Cambridge University Press.
Finocchiaro, M. A. (2013a). Debts, oligarchies, and holisms: Deconstructing the fallacy of composition. *Informal Logic,* 33, 143-74.
Finocchiaro, M. A. (2013b). The fallacy of composition and meta-argumentation. In D. Mohammed & M. Lewiński (Eds.), *Virtues of Argumentation: Proceedings of the 10th International Conference of the Ontario Society for the Study of Argumentation* (OSSA), 22-26 May 2013 (pp. 1-8). Windsor, ON: Ontario Society for the Study of Argumentation. ISBN: 978-0-920233-66-5.
Finocchiaro, M. A. (2013c). *Meta-argumentation: An approach to logic and argumentation theory*. (Studies in Logic, vol. 42.) London: College Publications.
Finocchiaro, M. A. (2014a). Essay-review of J. Woods's Errors of reasoning: Naturalizing the logic of inference. *Argumentation*, 28, 231-39.
Finocchiaro, M. A. (2014b). *The Routledge guidebook to Galileo's Dialogue*. London: Routledge.
Galilei, Galileo. (1997). *Galileo on the world systems: A new abridged translation and guide.* Trans. and ed. M. A. Finocchiaro. Berkeley: University of California Press.
Govier, T. (1982). Who says there are no fallacies? *Informal Logic Newsletter,* vol. v, no. i, pp. 2-10.
Govier, T. (2007. Duets, cartoons, and tragedies: Struggles with the fallacy of composition. In F. H. van Eemeren, J. A. Blair, C. A. Willard & B. Garssen (Eds.), *Proceedings of the Sixth Conference of the International Society for the Study of Argumentation* (pp. 505-11). Amsterdam: Sic Sat.

Govier, T. (2009). Duets, cartoons, and tragedies: Struggles with the fallacy of composition.” In F. H. van Eemeren & B. Garssen (Eds.)*, Pondering on Problems of Argumentation* (pp. 91-104). Dordrecht: Springer.
Grootendorst, R. (1987). Some fallacies about fallacies. In F. H. van Eemeren, R. Grootendorst, J. A. Blair & C. A. Willard (Eds.), *Argumentation Across the Lines of Discipline: Proceedings of the Conference on Argumentation 1986* (pp. 331-42). Dordrecht: Foris Publications.
Haller, S. A. (2002). *Apocalypse soon? Wagering on warnings of global warming*. Montreal: McGill-Queens University Press.
Halverson, W. H. (1984). *Concise logic.* New York: Random House.
Hamblin, C. L. (1970)*. Fallacies*. London: Methuen. Rpt., Newport News: Vale Press, 1986.
Hazlitt, H. (1979). *Economics in one lesson*. New Rochelle: Arlington House Publishers. 1st edn., 1946.
Hume, D. (1947). *Dialogues concerning natural religion*. Ed. N. K. Smith. Indianapolis: Bobbs-Merrill.
Jason, G. (1986). Are fallacies common?” *Informal Logic,* 8, 81-92.
Kahane, H. (1973). *Logic and philosophy.* 2nd edn. Belmont: Wadsworth.
Krugman, P. (2013a). Austerity wrought pain, no gain. *Las Vegas Sun,* January 8, p. 3.
Krugman, P. (2013b). The punishment cure. *The New York Times*, 8 December.
Lipset, S. M. (1962). *Introduction to Michels,* 1962, 15-39.
Michels, R. (1962). *Political parties: A sociological study of the oligarchical tendencies of modern democracy.* Trans. E. Paul and C. Paul. New York: Collier.
Nelson, A. (1999). Keynes. In R. Audi (Ed.), *Cambridge dictionary of philosophy, 2*nd edn. (pp. 467-68). New York: Cambridge University Press.
Ritola, J. (2009). Commentary on James E. Gough and Mano Daniel’s ‘The fallacy of composition.’. In J. Ritola (Ed.), *Argument Cultures: Proceedings of the 8th Biennial Conference of the Ontario Society for the Study of Argumentation* (OSSA, 2009). Windsor, ON: Ontario Society for the Study of Argumentation. ISBN 978-0-920233-51-1.
Samuelson, P. A. (1955). *Economics: An introductory analysis.* 3rd edn. New York: McGraw-Hill.
Samuelson, P. A., & W. D. Nordhaus. (1989). *Economics. 13th edn*. New York: McGraw-Hill.
Strawson, P. F. (1952). *Introduction to logical theory*. London: Methuen.
Whately, R. (1826)*. Elements of logic.* London: J. Mawman. Rpt., Bologna, Italy:

Editrice CLUEB, 1988.
Woods, J. (1988). Buttercups, GNP's, and quarks: Are fallacies theoretical entities? *Informal Logic*, 10, 67-76. Reprinted in Woods, 2004, pp. 161-70.
Woods, J. (2004). *The death of argument: Fallacies in agent-based reasoning*. Dordrecht: Kluwer.
Woods, J. (2013). *Errors of reasoning: Naturalizing the logic of inference*. London: College Publications.
Woods, J., A. Irvine, & D. Walton. (2000). *Argument: Critical thinking, logic, and the fallacies*. Toronto: Prentice-Hall.
Wray, L. R. (2009). Teaching the fallacy of composition: The federal budget deficit." At the website: http://neweconomicperspectives.org/2009/08/teaching-fallacy-of-composition-federal.html. Consulted on October 19, 2012.