

# Toward the Development of More Robust Policy Models

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**Abstract:** The current state of the world suggests we have some difficulty in developing effective policy. This paper demonstrates two methods for the objective analysis of *logic models* within policy documents. By comparing policy models, we will be better able to compare policies and so determine which policy is best.

Our ability to develop effective policy is reflected across the social sciences where our ability to create effective theoretical models is being called into question. The broad scope of this issue suggests a source as deep as our unconscious ways of thinking. Specifically, our reliance on modern and postmodern thinking has limited our ability to develop more effective policy, and more particularly, logic models.

The move in some quarters toward “integral” thinking may provide insights that support the creation of more useful policy models. However, some versions of that thinking seem to be unwittingly mired in modern and postmodern thinking. This paper identifies how integral thought may be clarified, allowing us to advance beyond postmodern thinking. Usefully, this “neo-integral” form of thinking supports the creation of more mature policy models by encompassing greater complexity and a careful understanding of interrelationships that may be identified within the logic models that are commonly found in policy analyses.

Neo-integral thinking is related to more complex forms of systems thinking and both are found in recent conversations within the nascent field of metatheory. And, to some extent, a logic model within a policy operates as a kind of theoretical model because both may be used to inform understanding and decision-making. Therefore, it seems reasonable to apply neo-integral thinking and metatheoretical methodologies to conduct critical comparisons of logic models.

In the present paper, these methodologies are applied to critically compare two logic models. The structure of each model is analyzed to objectively determine its complexity and formal robustness. The complexity is determined by quantifying the concepts and connections within each model. The robustness of a model is a measure of its internal integrity, based on the ratio between the total number of aspects and the number of concatenated aspects. In this analysis, one policy model is found to have a robustness of 0.08, while another is found to have a robustness of 0.67. The more robust policy is expected to be much more effective in application. Implications for policy development and policy application are discussed.

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This approach will enable the more conscious advancement of policy through the development of improved logic models and it opens the door for more effective impact of such policies in a political context. From an integral perspective, this paper implies that we should avoid engaging in loosely defined integral thinking that lead to pronouncements about what people “should” do. Instead, this paper shows how to apply a more precise and objective form of neo-integral thinking to empower individuals and organizations to accomplish their most noble goals.

**Keywords:** Drug use, logic model, metapolicy, metatheory, neo-integral, policy, robustness, Scottish Parliament, theory of theory

*Thus traditional political theories, just like current strategic games, gravely overvalue the pacificatory role of rational knowledge: this miscalculation constitutes the self-publicity of these disciplines. Reason always lurks around proportion and dominance.*

Michel Serres in “The Troubadour of Knowledge” (1997, p. 135)

## Introduction

In his well-known critique of the modern policy process, Sabatier (1999) calls for better theories to improve the process of policy creation. This paper answers that call by providing new insights into the evaluation of *logic models*. A logic model is common in many policy documents and serves as a concise, diagrammatic representation of the policy, how it will be implemented, and how the results of that program will be measured. In the policy literature, discussions on the logic model commonly include suggestions on how the model might be analyzed by stakeholders, politicians, and experts. The literature does not provide any advice on how to evaluate such models in any objective way.

That gap in the policy literature is addressed here by introducing new methodologies from the field of metatheoretical analysis. Using these methods to compare and improve policy models is expected to engender significant advances in the field of policy analysis. Public policy is political, by definition. Because public policy at all scales has direct impacts and structural influences at all scales of politics and the political, the development of more robust policy contributes to the development of politics and the political, the theme of this special issue.

In this paper, I note the ongoing controversy in the field of policy, and how that controversy relates to the failure to construct effective policy. Next, I identify the logic model as an overlooked lynchpin of the development of policy. I indicate how the logic model shares important conceptual similarities with social theory. Then, I discuss recent innovations in the field of social theory validation and identify how those new techniques are applied to the analysis of a logic model. Finally, I apply those methods to two logic models to identify which model is more likely to result in more effective results.

## Effective Policy?

There is an ongoing concern about the effectiveness of policy and the related theory. The US Congress began to take an interest in program evaluation in the early sixties. However, by the late seventies, “Program evaluation has not led to successful policies or programs” (Schmidt, Scanlon, & Bell, 1979, p. 1). It is reasonable to assume that our failure to evaluate or improve our policies relates directly to our ability to understand them – despite the continued efforts of brilliant scholars in the field of policy.

In a review of the current state of public policy theory, John (2003) pays tribute to the classic works of policy (including models developed by Baumgartner, Jones, Kingdon, Sabatier, and Jenkins-Smith) and speculatively asks if “this particular kind of thinking about public policy has come to the end of its line of development” (John, 2003, p. 482). John notes in this discussion that the central debates in public policy theory are still along the lines of the above authors.

So, despite the diligent work of brilliant scholars, our ability to understand and improve policy does not seem to be improving. By the end of the 20<sup>th</sup> Century, we were still calling for better theory so that we can better understand policy so that we may develop more effective policy (Sabatier, 1999). And, at the start of the 21<sup>st</sup> Century, the state of world affairs suggests that we still do not have a more effective way to make policy. Even deLeon (1999), who criticizes Sabatier’s work, agrees that our present understandings of policy suffer from weaknesses, including the “lack of predictive capabilities” (deLeon, 1999, p. 26).

DeLeon (1999) suggests that a systems approach might be a useful way to better understand policy. Thus, it appears that “the time is ripe for a systematic evaluation of our metatheoretical assumptions” (Lamborn, 1997, p. 212). Or, more plainly, we need to develop a better understanding of how we develop policy if we are to develop better policy. And, while the present paper does not presume to complete Lamborn’s entire task, it answers his call at least in part by providing a new, systems-based, metatheoretical approach to the analysis of logic models.

## Policy and Program Evaluation

Policy and program evaluation are important for developing successful programs for achieving goals and alleviating social ills. Broadly, some approaches to policy analysis might be considered “metapolicy.” That term has been used to refer to a “policy about policies” (Kerr, 1976, p. 351), or an explanation of the social context within which policy is developed, for example, Jacobs’ (1995) description of the differences in policy-making between Canadian and American health care systems. It has also been used to describe policy analysis that results from the collaboration of various groups, such as members of the public, and/or other combinations of experts, scholars, and laypersons (Walters, Aydelotte, & Miller, 2000). Finally, metapolicy has been used to refer to “policy networks” (Detomasi, 2007, p. 321) representing a network of policy stakeholders, or a “structure” of policy problems (Hoppe, 2002).

Within the general area of metapolicy, we have policy analysis. A brief, yet useful, overview of policy analysis is provided by Dror (1970) who lists five issues: (a) The basic *modus operandi*

of policy making systems; (b) Main components of policy making (organizations and personnel); (c) Information inputs into policy making; (d) Main policy making methods (techniques of analysis); (e) Main megapolicies (what to analyze, operational goals, degrees of innovation, level of risk, time preferences). A similar list is presented for policy-like process of “social design” suggests that designers consider: (a) Bounded rationality; (b) Data for planning; (c) Identifying the client; (d) Organizations in social design; (e) Time and space horizons; (f) Designing without final goals (Simon, 1996, p. 166).

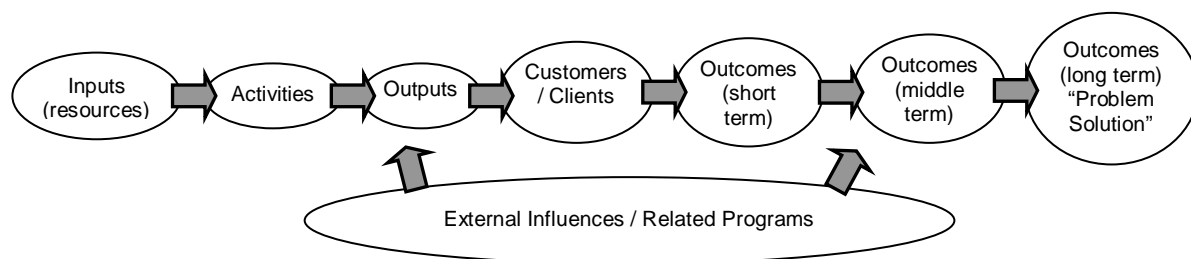
The difficulty of policy analysis might be based on the complexity of policy creation. The process of creating a policy is inherently messy. The garbage can model was commonly applied to understand this process until it was superseded by Kingdon’s model of multiple streams that reveal a window of opportunity (Kingdon, 1997).

In this section, I have provided a brief overview of policy creation and analysis. It should be noted that these approaches investigate policy as a whole. However, this approach does not seem to have led to the creation of better theory of policy or better policy. Therefore, in the present paper I investigate a “micro” approach, with a close focus on the logic model.

## Logic Model

The many streams of problem emergence, political wangling, and policy analysis result in the creation of a policy document – an explicit written report that presents the shared understanding of what the problem is and how it might be addressed within a limited window of opportunity (Kingdon, 1997). Within this policy document, the logic model serves as a lynchpin by clearly and explicitly identifying how the research, analysis, actors, and anticipated results may be measured to test the efficacy of the policy.

According to McLaughlin & Jordan (1999), There are several ways to present the logic model; although, it is usually presented as a diagram with inputs and resources on the left, connected by one-way arrows to major activities in the middle and one-way arrows to expected outcomes on the right. This diagrammatic representation provides, “a picture of how something works as they provide a link to outcomes (both short – and long-term) from program variables and processes” (Bruder et al., 2005, p. 187, citing the W. K. Kellogg Foundation). “Evaluators have found the logic model process useful for at least twenty years” (McLaughlin & Jordan, 1999, p. 66). A typical example is presented in figure 1.



**Figure 1. Example of Logic Model – derived from (McLaughlin & Jordan, 1999, p. 67)**

As widely as it is used, the logic model has also been criticized recently on a number of fronts. First, despite the logical appearance of this model, “it still only represents stakeholders’ best guess or theory for what will be most effective” (Hernandez & Hodges, 2001, p. 10). Although “best guess” might sound a little harsh, such a level of understanding seems commensurate with the level of success we have found with the implementation of policies and programs. Indeed, the rule of practice appears to be, “If it looks reasonably logical, it is an acceptable model.”

This, however, should be seen as a weak standard. It is like preparing to buy a car and asking the salesperson, “Does this car have good batteries?” The answer is always “yes.” The better question would be “How many miles will I get on a single charge of these batteries?” That is the state of our policy analysis process. Certainly a logic model will be analyzed and (at some point in the process) approved as being a “good” model. A more useful question would be, “How good is it?”

Another important criticism of logic models is put forward by Sabatier (1999) in his call for better theories of public policy making. Instead of a neat linear series of boxes, the policy process involves hundreds of actors, specialized scientific and technical knowledge, over many years of time, with each participant attempting to push a different “spin” on the process (Sabatier, 1999, p. 4). The complexity hidden within the apparent simplicity is noted by McLaughlin and Jordan who state:

Although the example shows one-to-one relationships among program elements, this is not always the case. It may be that one output leads to one or more different outcomes, all of which are of interest to stakeholders and are part of describing the value of the program. (McLaughlin & Jordan, 1999, p. 69)

In seeking to improve the process of policy evaluation, many approaches have been suggested. These include quality control, more effective evaluator training and selection, higher standards and ethics, and encouraging more evaluation overall (Hatry, Newcomer, & Wholey, 1994). Unfortunately, “The criteria for comparing frameworks are not well developed” (Schlager, 1999, p. 252).

Importantly, if we cannot objectively compare policy models, we cannot effectively decide if one model is better than another. Instead, we are forced to resort to so-called common sense and political wrangling. And those are the techniques that got us here in the first place. Should we then throw out the logic model? Or, is there another possible approach?

I adopt the stance that the logic model is indeed a useful tool. However, it is a tool that has not been understood or applied to its full potential. We have not understood the logic model completely because the literature around the logic model has focused on the relationship between the model and the “real world,” rather than focusing at the logical relationships between the propositions within the model, itself.

Therefore, we have only understood half of the “equation.” This partial understanding is like trying to play the violin with one hand. We are able to make noise, but not much music.

## Evaluating Logic Models

Rather than revisit the overall process (which has been more effectively explored by more qualified scholars than I), my approach in this paper will be to look at that “missing link” of the explicitly written policy document. Specifically, I will focus on the logic model that is a common part of most policy documents because that logic model is a critical lynch-pin of the entire policy – representing all of the research, the political relationships between the actors, their shared understanding of the situation, and a representation of their plan for improving the situation.

When most authors discuss the “logic” of the logic model, they are referring to the relationship between the model and the real world (through data collection, analysis, and program results). In contrast, the literature does not much address the logic inherent within the logic model, itself. My focus will be on that structure. As Figure 1 indicates, the logic model is an essentially linear representation. Typically, “the logic model is usually set forth as a diagram with columns and rows, with the abbreviated text put in a box and linkages shown with connecting one-way arrows” (McLaughlin & Jordan, 1999, p. 69). When examining such a model, an observer may be led to believe that the project will begin, move through a series of steps, and successfully reach the desired end state. In which case, the reader could easily assume that such a model appears reasonable or intuitively correct.

Yet, we must be cautious of common sense. Because what seems to make sense in the creation of a policy might not work so well in application. Such a situation arose recently when:

The intuitive common sense of these policies – in the extent to which they promoted a “master plan” for Massachusetts’s public higher education – helped build the faith of policymakers in the system and its leadership. But it also helped to obscure the costs of the BHE agenda, and to make it difficult for those problems to be addressed in the future. (Bastedo, 2005, p. 38)

After all, if common sense were so effective, we might not have needed a formal analysis and policy in the first place. Everyone would have agreed on a course of action because it simply made sense. Or, the problem would have never arisen in the first place, because everyone would have used their common sense to choose actions that would not lead to such problems. Yet, the problems arise, and reasonable people disagree about the causes and solutions. Thus it seems common sense is not a sufficient tool for determining the logic (or potential effectiveness) or logic models.

On a slightly deeper level, McLaughlin and Jordan (1999) suggest checking the logic model as a set of hypotheses, logical statements, or propositions. However, they do not go much beyond this recommendation. So, the present paper represents an extension of their excellent work. Insights from other branches of social theory can also be applied to continue their line of inquiry. For example, Dubin (1978) suggests how increasing levels of structure within a theory will make a theory more effective. Wallis (2008a) provides an objective methodology for analyzing the structure of theories to advance them along this path.

This structural approach is of some importance based on recent developments in metatheoretical analysis. Specifically, it has been shown that the formal robustness of a theory is a good indicator of that theory's efficacy in application, and, further, that a theory must have a formal robustness of 1.0 before it can be considered revolutionary, in the Kuhnian sense (Wallis, 2009c). Thus, by advancing a theory (or, here, a logic model) towards higher robustness, scholars and practitioners will advance purposefully towards true paradigmatic revolution.

Thus, it seems reasonable to suggest that this method could be applied to effectively and objectively analyze a logic model within a policy to determine how effective that policy might prove in application. Such a method would be extremely useful for the evaluation of any policy and, more particularly, those policies that involve high levels of risk and expense – such as a policy for national health care.

Again, here I am not looking at the broad level of policy elements (actors, analysis, implementation, measurement) or the relationships among them. Instead, I take a micro-approach to address a gap in the literature – the analysis of the logic model, itself. In this, I will use the term “policy” to refer to the explicit report, or written policy – specifically as exemplified in the logic model, or model. First, I examine policy's related and underlying context, that of social theory.

## **Failure of Social Theory and the Failure of Policy**

In parallel with the limitations of policy analysis, it has become increasingly clear that the social sciences do not provide effective tools for understanding or guiding human activity. This limitation is reflected in the spotty success of economics (Dubin, 1978, citing Rapoport), the failure of social change theory (Appelbaum, 1970; Boudon, 1986), high failure rates in the application of Total Quality Management (MacIntosh & MacLean, 1999), frequent failure of organization development culture change (M. E. Smith, 2003), failure of organizational theory (Burrell, 1997), and theories of bureaucracy (Bernier & Hafsi, 2007). As with the failure of other branches of social science, the inability to develop effective public policy models has left the promise of the social sciences “largely unfulfilled” (Spicer, 1998). The failure of policy should lead to a critical examination of how policy is created, structured, and applied.

This focus of study is especially important because the need for effective policy has not diminished. Today, “The complex and difficult global environment has overwhelmed, exasperated and saddened many observers” (Dennard, Richardson, & Morçöl, 2008, p. 17). For example, our current economic issues may be understood as resulting from a failure of policy. The lack of policy seems to have led politicians to enact a series of ad hoc interventions, where, instead, “the time has come to begin thinking about a systematic approach,” according to House Financial Services Committee Chairman Barney Frank (Graham, 2008, p. 1). Similarly, the International Monetary Fund (IMF) blames those failures on “policy shortcomings” (Wroughton & Kaiser, 2008).

The failure of policy is not the failure of any one group to achieve their goals (although that is a related issue). Rather, it appears to be a failure of all groups to understand the problem at hand – and render that understanding into a policy document with an attendant logic model that will be

more likely to ensure their success. The biggest problem that we face is that we think we have the answer. We seek direct answers, forgetting how, "for every problem there is a solution which is simple, clean and wrong" (Menken, 2009, p. 1). The need for better policy, including budget restrictions and competing constituencies, propels agencies into a "metapolicy environment" where they, "... must consider policy making from several perspectives" (Boschken, 1994, p. 308).

Similar approaches to policy have been suggested in the study of complexity theory. For example, "triangulation" is suggested as a way to coordinate multiple methods of analysis (Roe, 1998). "Full spectrum analysis" suggests the need to carefully analyze a wide range of information (Mathieson, 2004). Complexity theory has also suggested other, more general, approaches (Elliott & Kiel, 1999); but they have not yet been proven effective. Whatever the process of policy analysis that process must result in the creation of some written policy. And, importantly for this paper, that explicitly written policy will have a logic model with a measurable structure.

Below, I will present an innovative understanding of integral thinking that seems useful for understanding the structure of logic models of policy. This neo-integral approach to developing more effective policy models does not espouse any specific goal outside of the structure of the model. In this analysis, I will draw on innovative metatheoretical methodologies that reflect neo-integral thinking to analyze two versions of policy drawn from efforts of the Scottish Parliament to reduce drug abuse.

Broadly, this investigation is a form of "design science," or "policy science," or "evaluation research" (Van de Ven, 2007, p. 278). Van de Ven suggests that an important difficulty in such research is essentially a question of politics, pose, and ethics. From an ethical stance, researchers should not impose their views on an organization. From a stance of politics and power, it remains an open question as to whose view should be used. As far as he goes, Van de Ven is quite correct; there is great benefit to be found through collaborative evaluations. However, there are more issues to consider.

In addition to the basic issues of investigative scholarship, there is Popper's call to evaluate theory (and therefore, to some extent, policy) primarily through "falsification" (Popper, 2002). Briefly, Popper states that the test of proving that a theory is correct or works is insufficient. For example, a theory might claim that undetectable fairies make time move forward. Such a theory might be perfectly acceptable as an explanation for some individual. And, that person might claim to have proved the theory is true because time does appear to be moving forward (thus proving the existence of otherwise undetectable fairies).

However, there is no way to prove that theory is incorrect (in this example, there is no way to independently test for the existence of fairies). Further, and more importantly, if there is no test to challenge the theory, there is no way to improve the theory.

In contrast, Popper calls for theories that can be proven wrong. For an abstract example, consider a theory claiming that A and B must both be increasing to cause an increase in C. If an observer sees an increase in C with an increase in only A or B (or neither), that theory has been



falsified. This kind of critical test encourages the theorist to develop a new and better theory – thus improving the science.

For policy, however, there is no way to determine its efficacy until after it has been applied. This, of course, is a very expensive proposition as global affairs (e.g., war in Iraq and world economic problems). Another difficulty is that a program that is perceived to be successful might not be successful. For example, a socio-economic “rain dance” might be perceived as successful, though there is actually no causal relationship between the dance and the subsequent changes.

Clearly, if we are to understand this issue, we will need a larger perspective. That perspective is a form of “metapolicy analysis.” In the past, metapolicy has referred to a study of the source of policy, or the application of policy. One of the simplest, and perhaps the weakest form of policy analysis might be seen in a simple checklist; where a policy is evaluated to see if it meets the goals of an agency (FSAT, 2009). This approach is considered weak because it does not address the effectiveness or quality of the policy, itself (as reflected in the logic model) – only the relevance of the policy to the organization.

Seeking self-beneficial results is not unusual; indeed, “normally, policy evaluation consists of attempting to find indicators of either impact or the tangible deliverables and outputs of an initiative.” (Ramsey & Bond, 2006, p. 1). However, such outputs are not available before the implementation of the policy. Hence, the need to understand policy from a metapolicy perspective to optimize a policy before its implementation.

Because this paper presents an innovative approach, some disambiguation is indicated. First, I use the term “metapolicy analysis” in reference to the study of a set of explicit policy documents, regardless of their formulation or application. Specifically, for the preset metapolicy analysis, I will focus specifically on the structure of the policy, as that structure is understood as the set of relationships between the causal propositions that are found within the logic model. As I will describe in the next section, this rigorous focus on interrelationships has evolved from our history of modern and postmodern thinking.

## **Structure of Logic Models**

As noted in the introduction to this paper, the focus here is not on the grand whole of policy from creation through application. Rather, the focus here is on the explicit written policy – as exemplified in the logic model.

Given the benefits of human interaction (which results in direct and synergistic benefits), it seems reasonable to suggest that we might understand the propositions within a policy as having benefits from similar interrelationships. The main benefit is improved clarity of understanding for those using the model. By obtaining a better understanding of the complexity and interrelatedness of our policy models, we may expect to develop a better understanding of policy, in general.

A policy model is a mental model, a schema, a theory, or, more colloquially, a lens or point of view. The policy model acts as a computer program, metaphor, filter, or sense-making device.

Starting with all the available information, the data go into the model. The “output” is our understanding of the present situation. That understanding implies that we might be able to predict the future results of our actions (to the extent that anything is considered to be predictable).

For example, if a nation has a policy model that represents immigrants as invaders, that nation might take action to fight back against those immigrants, and act to ensure that future immigration is limited or eliminated. In contrast, holding a different lens of policy, a nation that sees immigrants as useful contributors to society would welcome immigrants with open arms. For each approach, there will be some outcomes that are somewhat predictable, and some results that are less so.

These lenses, or models, may be tacit (as in our unconscious assumptions), or they may be explicit (as in a diagram or flow-chart). Either way, these models serve to guide our decisions and impel us to action (or non-action). There are a few basic paths to describe how these models are created. One way is for them to be developed unconsciously, as in Argyris’ “ladder of inference” (Senge, Kleiner, Roberts, Ross, & Smith, 1994). Yet, when those models remain tacit, we lose some opportunity for communication because tacit information is more difficult to communicate (Kakabadse, Kouzim, & Kakabadse, 2001).

Another way to develop a policy model is to follow the dictates of some authority. While, this kind of explicit direction is more easily communicated, it is not necessarily more accurate or more useful than a tacit mental model. Indeed, there are issues of conceptual colonization and domination (L. T. Smith, 1999). Another approach to developing a policy model is to consciously and critically analyze the available information. This process is seen in the development of academic theory – essentially, the process of scholarship.

More collaborative methods are also available. We may follow, for example, a collaborative process such as the Future Search process (Weisbord & Janoff, 2000). There, a facilitated process of collaboration and communication among at least some stakeholder combine to develop a mind map (which is essentially a shared mental model) that is more complete because it draws on more contributors; a reasonable approach because, “the public always knows more than any of the “experts” (Churchman, 1968, p. 232).

Comparing the dictatorial to the collaborative approaches, it should be noted that dictates (such as “do this” or “go there”) are understood as relatively simple compared with a wall-sized mind map full of information (and potential contradictions). The more complex understandings found in a large mind-map seem to support the efforts of each individual as they find their own path and goal from a complex range of choices. In short, dictatorship is simple while free collaboration is complex. That is to say, a free person must face a multitude of complex choices, while a slave has those choices dictated.

While all these methods are used to create policy models, and some of those models are used to guide policy decision-making, there is no guide outside of application to determine whether one model might work more effectively than any other. In short, the literature has not deeply explored the “internal validity” of the decision making model; where that validity is separate

from the actual application of the model. Of course, there is the tradition of academic validation. However, that approach is limited to the process of citing experts and logical arguments. As noted above, this level of internal validation does not seem to have been as effective in the creation of effective policy. In a reframing of Popper's "three worlds" of validity, Wallis (2008c) suggests that the social sciences are insufficiently developed to apply Popper's test of falsification through empirical testing.

This is an important concern, because policy creation, comparison, and change is often "hopelessly confusing" because of the clash of belief systems between the actors (Schlager, 1999, pp. 252-253). And, as a result, some may suggest that the best way to evaluate a Logical Model and the associated policy is to empirically measure the results of the program.

And, indeed, that is an ongoing trend in program evaluation (Hatry et al., 1994). However useful this is for existing programs, the empirical approach cannot be applied to the development and implementation of new policy and new programs. There is simply no way to evaluate the success of a program before it is implemented.

Instead of a single approach to evaluation, Wallis recommends multiple tests – a sort of triangulation – to examine the validity of the model through a combination of tests (internal validity of the structure, external testing in application, and the meaning it makes for the user).

Within the nascent field of metatheory, there are emerging views that may lead to more effective methods of validation. For example, a more effective model might be understood to be one that is more mature. In *Growing the Field: The Institutional, Theoretical, and Conceptual Maturation of 'Public Participation'* Ross & Glock-Grueneich (2008) develop innovative and useful insights into the structure of theoretical models. They accomplish this by drawing a parallel between the less-understood development of models and the better-understood development of individuals, organizations, and cultures. In each area, the system that is understood as more evolved is the system that is more complex. In their maturation model of theory, based on hierarchical complexity theory (Commons, Trudeau, Stein, Richards, & Krause, 1998) the stages are:

1. Abstract Stage (stories become cases, events are abstracted to data).
2. Formal Stage (two or more Abstract Stage variables are related).
3. Systematic Stage (developing simple hypotheses from Formal Stage relationships).
4. Metasystematic Stage (creating models that account for all relevant relationships).

Importantly, in this maturation model, the systematic stage is one where there is a formal description of how variables interact in relation to one another. This stage requires "multiple input variables" and may suggest multiple outputs as well. This view stands in contrast to less complex (and so less mature) models that suggest simple, linear, causality. Creating a parallel between complexity and some sense of maturity seems to have validity – and is reflected across a broad section of literature.

For a few examples, the process of evolution (a continual process of variation and selection) leads to increasing complexity of our ecological and social environments (Holland, 1995) and the

same insight applies to our economy (Friedman, 1997) where the creation of new products and the selection of the consumer leads to the generation of ever-increasingly complex selection of consumer goods. Indeed, we may adopt the perspective that “the inanimate world, life, and human existence are envisioned as systems of increasing complexity representing physical biological and sociopolitical realities” (Herrmann, 1998, p. ix). This, in turn, suggests that that individuals and organizations, existing in more complex interrelationships, are better able to detect and adapt to the complexities of the market in complex and creative ways (Stacey, 1996).

This idea might be broadly understood as, “More complex models are more effective.” And, as such, this may appear to violate the so-called “rule” of parsimony – which suggests that the better theory is the one that is more concise. The general idea of parsimony dates back at least as far as Ockham’s razor. However, investigations by Meehl (2002) suggest that the claim of parsimony for theory validity is over-used, misunderstood, and is of questionable validity.

Meehl suggests, “no ontological metaproof exists that the world must be ‘simple,’ or that ‘simpler’ theories are, as a class, more likely to be correct. The most impressive theories of mature sciences are hardly ever ‘simple,’ either conceptually or in the formalism” (Meehl, 1992, p. 423). For example, multiple theories (or multiple views) of an organization provide a richer, more useful understanding of that organization (Bolman & Deal, 1991; Edwards & Volkmann, 2008).

The maturity model might be seen as suggesting that a policy model that is relatively simple is one that is less mature; for example, if a policy states, “Our only goal is to make more money.” The enactment of such an immature policy might be expected to cause many unanticipated and unpleasant consequences. A more mature structure of policy would have more aspects. For example, seeking benefits in three areas (e.g., financial, ecological, and human) would be more complex and so more mature than seeking fewer (e.g., only financial). A more mature policy would also identify more linkages between aspects, and those linkages would be better described. A useful tool would be the ability to identify “how mature” a policy might be. Such ability would allow stakeholders to easily identify which policy might be most effectively applied in a situation.

Similarly, theories containing a higher level of structure are also more efficient. The most highly structured theories, “expresses the rate of change in the values of one variable and the associated rate of change in the values of another variable” (Dubin, 1978, p. 110). Such an expression would necessarily be more complex than, for example, stating, “A is true.”

Another tool for understanding the internal validation through an understanding of the structure of theory is found in Wallis (2008a) who presents a method for analyzing academic theories. Usefully, the method of propositional analysis provides an objective indicator of the internal integrity of the theory. Wallis describes this as a measure of the “robustness” of a theory and suggests that theories that are more “robust” (like those of physics and mathematics) will prove more effective in practice, while less robust theories (such as those commonly found in the social sciences) will prove less effective in practice (Wallis, 2009c).

My use of *robust* differs from other meanings. It does not mean, “insensitive to uncertainty about the future” (Lempert & Schlesinger, 2000, p. 391). Nor is robustness used in the more colloquial sense of “strong,” “widely scattered,” or “unchanging.” In short, robustness is a specific and objective measure of the relatedness between propositions within the theory.

In order to objectively determine the robustness of a theory, I suggested investigating relationships between the propositions of the theory to identify the co-causal connections between the propositions. Theories with connections that are more completely interrelated are held to be more effective. For example, a proposition such as, “A is true” would not be of much value because it is essentially an unsupported claim. A proposition such as “B is true because of C” or, similarly, “Changes in B cause changes in C” is more valid because there are more connections between the conceptual components (it is also more complex).

Readers with an interest in the advancement from modernity through postmodern ways of thinking may recognize the first proposition as atomistic/dualistic (because it suggests that A has an absolute value) and the second as contextual (because B has validity only in the context of C). The contextual proposition may also be understood as being linear because change in one is said to cause change in the other.

Adding more aspects to atomistic propositions does not enhance the validity of the theory; for example, “A is true, and B is true, and C is true” is likely to engender more arguments about the truth of each statement (instead of fewer arguments about the truth of fewer truth claims).

Similarly, adding more aspects to a proposition that is essentially contextual, or linear, does not add to the validity of the proposition. For example, “A causes B causes C” is a linear proposition where the aspect of B is redundant (Stinchcombe, 1987) and so adds nothing to the proposition. One might just as well say, “A causes C.” The validity of the aspect has not changed so much as its context has been altered like unpacking a series of nesting dolls.

Rather than these modern or postmodern approaches, it is more beneficial to develop propositions that contain more aspects *and* have the relationship between multiple aspects carefully explicated: for example, “Changes in A and B cause changes in C,” or to explain those changes more carefully, “More A and more B cause more C.” These kinds of propositions are *concatenated*. That is to say, there are multiple causes that are evidenced in the resultant effects (Kaplan, 1964; Van de Ven, 2007).

This perspective is in keeping with the idea that more complex theories are more mature and so are expected to “induce more sophisticated practice, data collection, analyses, model testing, and thus further research and model building” (Ross & Glock-Grueneich, 2008, p. 11). In contrast, a simpler theory (containing fewer aspects) means that its sensemaking ability will “catch” fewer areas of knowledge and understanding. Thus, as the theory sees less, it will miss more: “easily unperceived effects” (François, 2008).

Another way of understanding a concatenated relationship between ideas is to think of it as a kind of Hegelian dialectic (e.g. Appelbaum, 1988), where two aspects called thesis and antithesis can lead to the emergence (or change) of a third dimension called synthesis.

This is conceptually similar to the process developed by Bateson (1979), who describes “double description,” where multiple streams of information are combined to suggest a new, third form, of information that is more useful than the previous two. Another example of double description is binocular vision (where the extra sense of depth is added). Bateson shows how these double descriptions create an extra dimension of understanding that is of a different logical type.

There is a parallel between the structure of Bateson’s approach and the structure of theory. As described above, a concatenated aspect of theory is evident in a proposition describing how aspect A and aspect B combine to understand aspect C. This understanding of aspect C through the understanding of aspects A and B suggests a greater level of understanding that, in turn, may be used for more effective policy decision. These concatenated relationships add to the construct validity of the theory (or policy) (Van de Ven, 2007, p. 189).

According to Wallis (2009a), the method for determining the formal robustness of a model follows five simple steps:

1. Identify a specific body of theory
2. Search the literature for concise definitions
3. Identify causal propositions
4. Link casual propositions according to related concepts (where one aspect is influenced by two or more others)
5. Identify the total number of propositions and compare to the number of co-causal propositions (creating a ratio between zero and one).

For an abstract example, let us say we have a theory consisting of the following propositions: A is true; B is true; A causes C; Changes in B cause changes in D; Changes in D and changes in C cause changes in E. There are five aspects (A, B, C, D, and E). Of those five, only E is concatenated (D and C cause E). This allows us to easily find a ratio of well-integrated aspects to poorly integrated aspects of 0.20 (the result of one concatenated aspect divided by five total aspects). Importantly, the validity of each proposition is determined only by the other propositions within the theory.

Theories of physics (e.g. Ohm’s law of electricity) tend to be robust to the 1.0 level. It seems to be the robustness of Ohm’s theoretical model that enabled its effective testing which, in turn, enabled its elevation to the status of “law” and the subsequent revolutions in power distribution, communication, electronics, computers, and more. In contrast, theories of the social sciences tend to have a very low level of robustness—typically between 0.2 and 0.5—on a scale of zero to one (e.g. Wallis, 2009b). And, along with those low levels of robustness, social theories have not proved very effective in application.

In the next section, I analyze two policy models to determine and explain their levels of robustness and thus suggest their potential efficacy in application. In these analyses, the search for formal robustness is much simplified. Using the models provided for analysis advances us through step three above. Within those models, the causal propositions are already identified by the graphic representations of the logic models. Thus, we need only look at the models to follow

step five above – and identify the total number of propositions and compare then to the number of co-causal propositions within each model.

## An Analysis of Two Policy Models

Because theories are used to make sense of data, predict the future, and support decision-making, they are conceptually similar to mindsets, organizational schema, or logical models of policy. In this section, I use the insights and methodology presented above to analyze the relationships between propositions found in two policy models that were developed by the Scottish Parliament for a project on reducing damage from drug use (Scotland's Futures Forum *Approaches to Alcohol and Drugs in Scotland: A question of Architecture*, 2008).

These models are maps for understanding the present and emerging situation. As such, they are representative of policy, including data gathering, analysis, and as guides for the actions of decision-makers. While these models might not represent the complete policy, they are used here as concise representations of the policy.

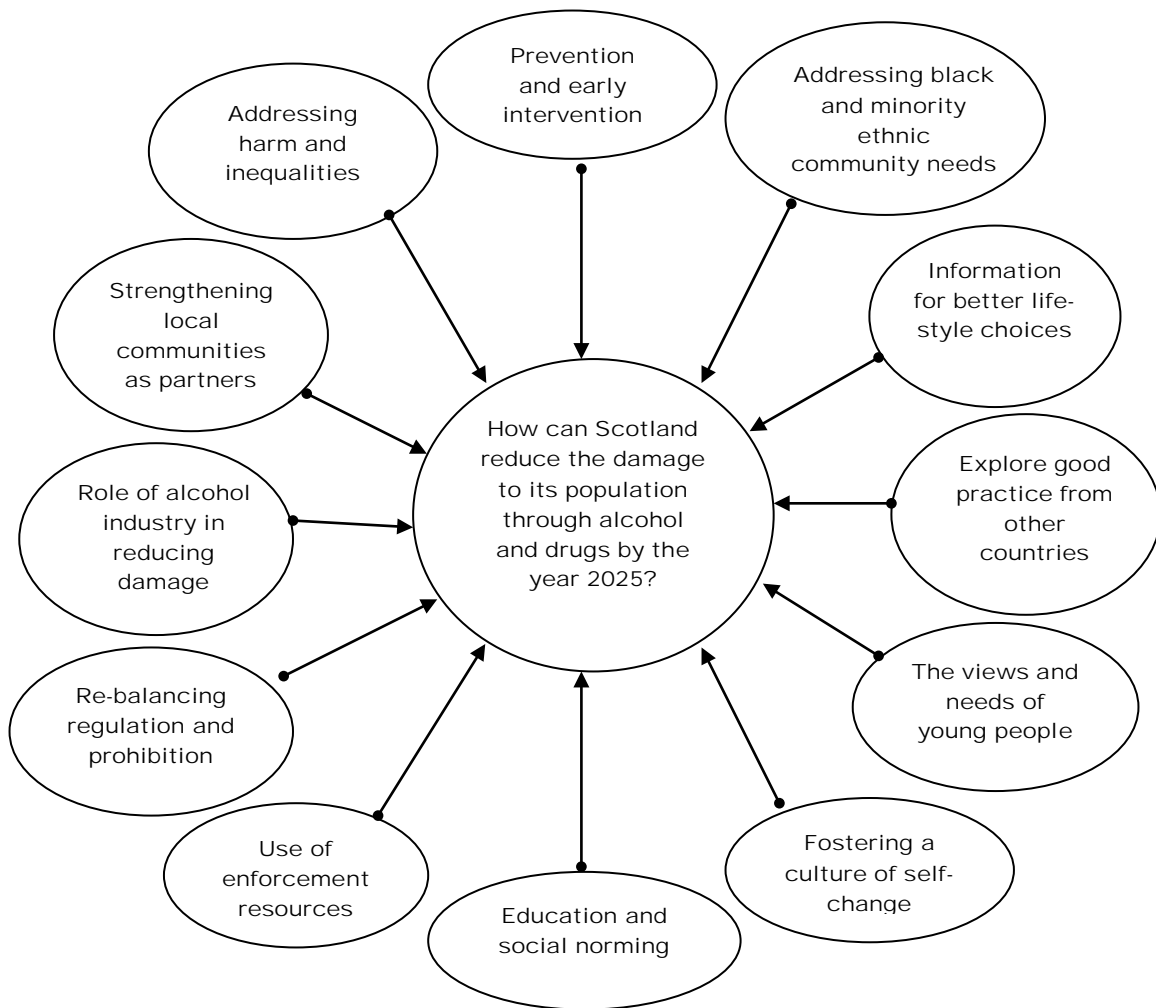
Usefully, for this analysis, the Scottish report portrays two diagrams representing the same overall policy. Importantly, although both diagrams include very similar aspects, the structure of those diagrams is very different. One arranges the aspects of the policy in a “daisy” pattern, while the other diagram presents the aspects in a pattern of flows and co-causal relationships. In short, the two diagrams present two models of the same policy – with very different potentials for successful implementation.

In Figure 2, there are 12 causal dimensions (or aspects), and one resulting aspect (the goal of reduced damage from alcohol & drugs). The resulting aspect (How can Scotland reduce the damage to its population) is a concatenated aspect because it results from more than one causal aspect. Based on Wallis' method of propositional analysis, the robustness of this model is 0.08 (the result of one concatenated aspect divided by 13 total aspects). Therefore, by itself, this does not seem to be a very useful model for application.

As a thought experiment, one might imagine disparate stakeholder groups arguing over which aspect is most useful, and where funds should be allocated. Additionally, each group in Figure 2 seems to be conceptually isolated from the others – trapped in its own “silo” of limited understanding. One group sees prevention as the cure, while another sees enforcement as the tool of choice.

Similarly, each group might blame the other for lack of overall success of the program. Additionally, we might expect that special-interest groups might struggle to alter and control the meaning of the model over time. The number of petals in the daisy might expand or contract depending on what groups get funded. In short, if Figure 2 were the only guide, this worthy effort toward collaboration might lead, instead, to conflict.

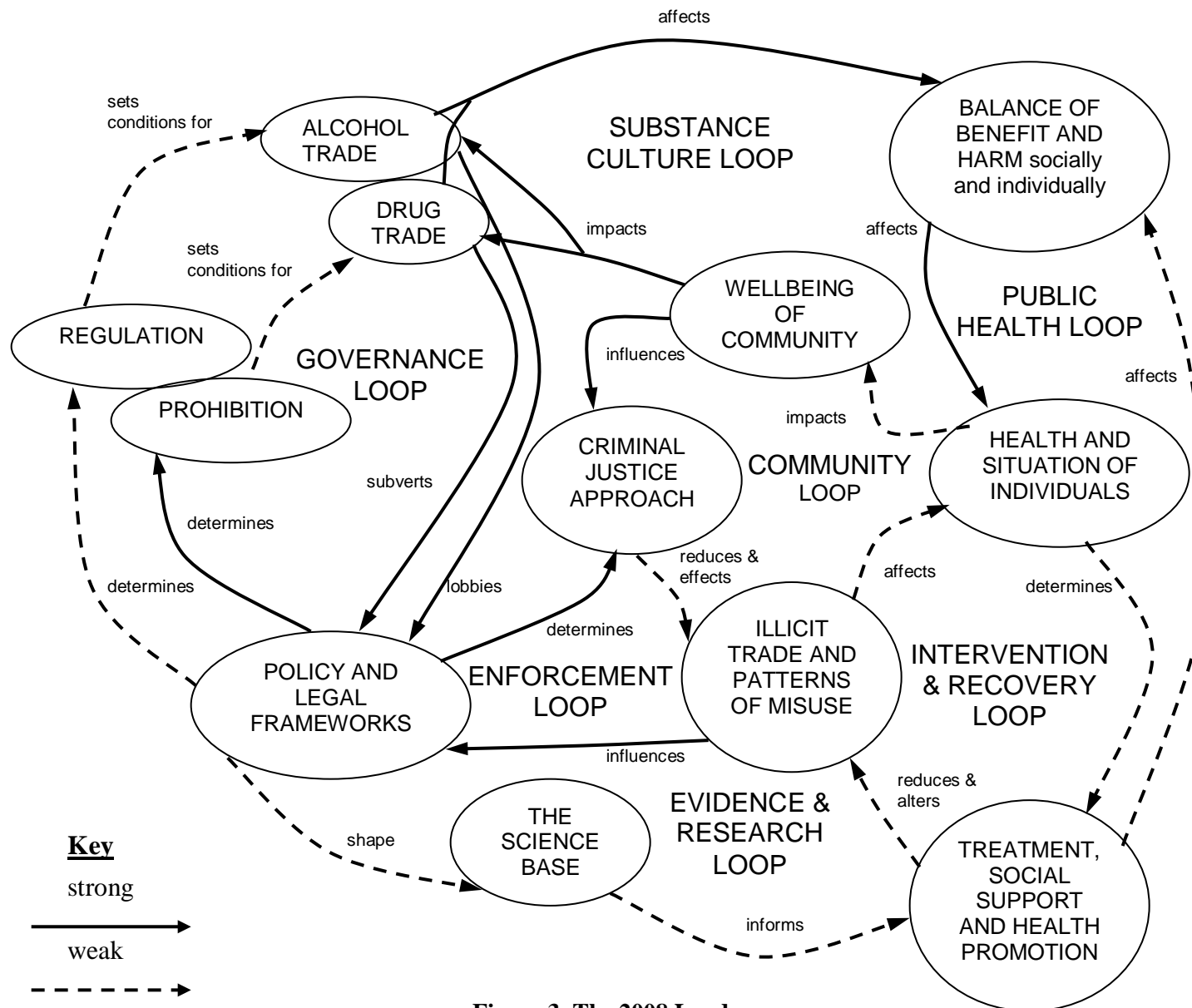
Fortunately, the policy analysis did not stop at this point. Admirably, the project combined expert analysis and input from stakeholders to develop the model shown in Figure 3.



**Figure 2. Dimensions of the problem**

*(Approaches to Alcohol and Drugs in Scotland: A question of Architecture, 2008, p. 9; public domain)*





**Figure 3. The 2008 Landscape**

*(Approaches to Alcohol and Drugs in Scotland: A question of Architecture, 2008, p. 62; public domain)*

Figure 3 includes many of the same aspects as Figure 2. There are, however, key differences between the two models. First, in Figure 2, the goal of reducing damage from drugs is explicit, while in Figure 3 that goal is tacit. In the same way that most people do not need to be reminded that a useful goal is to achieve a better life, the goal is seen as superfluous when included in the model. Individuals who are seeking a better life do not need to be reminded of that goal: they need useful policy to help them get them there. Second, Figure 3 presents a model that is more complex than the model presented in Figure 1. Although Figure 3 depicts one aspect less than Figure 2, Figure 3 depicts 22 causal relationships, compared to the 12 causal relationships depicted in Figure 1. This increase in complexity suggests more maturity (Ross & Glock-Grueneich, 2008) in the policy model.

Importantly, Figure 3 depicts eight aspects that might be considered concatenated (affected by two or more other aspects). The exceptions are: the science base, wellbeing of community, regulation, and prohibition. Therefore, based on the above-mentioned methodology, the robustness of this model is a respectable 0.67 (the result of 8 concatenated aspects divided by 12 total aspects).

By way of a thought experiment, Figure 3 seems to suggest a more effective model for change, primarily because the actions of each group are expected to produce relevant results for other groups. While the actions of law enforcement may not be evident to public health workers and vice versa, the actions of both are likely to be visible to the broader community.

For example, enforcement may believe that they are taking effective action through their criminal justice approach. Similarly, the evidence and research scholars and the intervention and recovery professionals may believe that they are taking effective action through changes to the science base and the treatment, social support, and health promotion (respectively). Yet, if changes in those areas do not show up as changes in illicit trade and patterns of misuse (visible to the community), either those efforts are not being effective or the model is not an accurate representation of the situation.

We may speculate how stakeholders using a more robust model may be less inclined to argue around the measurable results because each indicator is linked to multiple other indicators. This allows for more direct feedback for more rapid learning so the stakeholders can more easily change their approaches if needed.

Of course, the formal model is based on assumptions that have been made explicit. For example, Figure 3 depicts the treatment (including social support and health promotion) as influencing the balance of benefit and harm as well as the illicit trade. This suggests that the opinions around the effectiveness of treatment must be determined by the view from “downstream.”

If those monitoring the balance of benefit and those engaged in illicit trade agree, than it would appear that treatment is doing a good job. If they disagree, it points to the need for a more effective understanding of the situation. And, that understanding may change as the project

advances and new information suggests adjustments to the model. Those changes should be agreed to through a collaborative process.

While the model in Figure 3 seems to have a fairly high level of robustness, it is far from perfect. There are several opportunities to improve the model. For example, in Figure 3 drug trade and alcohol trade are shown as “affecting” the balance of benefit and harm. It is unclear from the model exactly what those effects are.

Does more alcohol trade cause more social harm? Or, are the potential negative effects of the alcohol trade ameliorated by the benefits of treatment? Other uses of vague language include words like: impacts, influences, determines, subverts, inform, shape, and others. More effective language would be “increases” or “decreases.” With experience, analysis, and expertise, the quantitative relationships of those qualitative aspects might also be more accurately developed.

Another opportunity to clarify the model is seen in the aspects of regulation, prohibition, alcohol trade, and drug trade in the upper left hand corner of the model. There, prohibition and regulation are in a linear relationship between policy and legal frameworks on one side, and alcohol trade and drug trade on the other. Abstractly, this is represented as A causes B causes C. In such linear relationships, the intermediate term (B) is redundant (Stinchcombe, 1987) – it adds nothing to the robustness of the model.

Similarly, the aspects of regulation and prohibition are in “parallel” with one another. That is to say, every causal relationship that affects one aspect also affects the other. Therefore, it could be said that regulation and prohibition are effectively the “same thing.” The same is said of the aspects of alcohol trade and drug trade. Parallel aspects do not add to the robustness of the model, and, like linear aspects, should be removed (or revised) in increase the robustness of the model.

I contend that the important difference between the two logic models compared in this section is not simply a matter of complexity, nor is it a matter of the relationship between the model and the analysis and/or implementation of the policy. Instead, the important difference between these models is best seen in their formal robustness (0.08 in the first and 0.67 in the second).

For an abstract example, consider how the model shown in Figure 3 might be made more complex by adding additional “petals” to the daisy – in the form of additional stakeholder groups. While that would add complexity to the model, all the previous concerns (e.g., conflict between stakeholders) would not be reduced. Indeed, they are more likely to increase. And, it is useful to note, that potential for conflict would reduce the chance for successful implementation of the logic model, and, not coincidentally, would reduce the robustness of the model. Therefore, we may conclude that we can increase the chance of policy success by increasing the robustness of the logic model within the explicit policy document.

The evaluation and discussion in this section suggests that it is indeed possible and useful to evaluate policies and programs by investigating the complexity and formal robustness of logic models, and that following these approaches will lead to policies that are more effective in application.

## Surprising Insights

An unexpected insight emerged during this study when I noted that a critical shift occurred between Figure 2 and Figure 3. Figure 2 is an axial theory of the sort suggested by grounded theory (Glaser, 2002). An axial theory may be characterized by having a number of causal influences – all leading to a common result.

In contrast, Figure 3 represents a theory used for achieving that shared goal where the goal itself is tacit to the model. This is important to the extent that having a goal is very different from having a theory that will enable one to reach that goal. This approach seems to be in line with the idea of “problem solving without a goal” (Simon, 1996, p. 106), where the goal is to find greater understanding.

For example, by way of analogy, let us say we have an engineer whose goal is to design a radio. The engineer will doubtless use Ohm’s law to design that radio, and, procedural errors aside, the radio will function effectively. Yet, it should be noted, Ohm’s law does not include “radio” as a word or concept.

This example stands in stark contrast to many theories and policy models where the goal is an explicit part of the theory. In the example of designing a radio, a goal-oriented theory might include the proposition, “More electricity, more radio waves, higher standards, more components, and more engineers will result in the design of more and better radios.” While this claim is undeniably useful, such a goal-oriented theory has a very low robustness. Further, no workable radios would be designed without the use of Ohm’s (robust) law.

Rescher (2005, p. 106) explores the difference between theory and goal suggesting, “... it is accordingly important to distinguish between the *ontological* systematicity (simplicity, coherence, regularity, uniformity) of the *objects* of our knowledge....” Or, metaphorically, the lens is different from the observer and different from the observed. Similarly, in his explorations into metatheory, Ritzer (2001, p. 161) suggests the idea of “decentering” where theorists should move away from identifying a goal and move toward developing metatheory that is understood as a “field of relationships.”

A “goal” is not the same thing as a task, concept, or relationship. The goal is more like a vision or an ideal. Therefore, having a goal (imaginative or creative ideal) as an integral aspect of a theoretical construct—which is better described as a representation of an existing perceptual-based system—is a violation of ontological systematicity, and specifically a violation of uniformity. It is an apple among oranges – out of character and out of its appropriate category. The distinction between the two seems to have been inadvertently glossed over by “...what rhetoricians call *chiasmus*, an exchange of properties that serves to blur the differences between the entities from which the properties are drawn” (Fuller, 2006, p. 22).

For a metaphorical example, if one enjoys viewing the color red, one may enjoy sitting in a room with red walls, or viewing red roses. One may even go so far as to wear red-tinted

spectacles. However, using red-colored glasses to view red roses will tend to obscure the roses. Similarly, a theory that explicitly includes the goal can, in some sense, obscure a deeper level of understanding. In short, the present analysis suggests that it is important that we do not confuse the goal with the policy understanding necessary for achieving the goal. Importantly, therefore, having the goal as a part of the model may be a distraction at best and a critical flaw at worst.

## Conclusion and Extensions

Our philosophies are moving away from modernist, through postmodernist and into more effective, neo-integral, ways of thinking. In this paper, methods based in neo-integral thinking have proved useful in identifying and comparing the complexity of policy models (Ross & Glock-Grueneich, 2008) and the degree to which those models are integrated (Wallis, 2008a, 2008b). This evolution in thinking seems to be reflected in our approaches to policy development.

In decades past, theories of policy development were relatively simple. It was found, however, that this approach did not result in effective policies and programs. Luminaries such as Kingdon advanced the field by offering more complex models. However, the current state of the world suggests that these new models have not resulted in the creation of more effective policy. This has led to a criticism of Kingdon's work by Sabatier who has provided alternative models to better understand the policy process. Despite, or because of, this conflict in the field of policy, there is no clear consensus about how to compare policy models in any objective way. This impedes our ability to choose between multiple competing policies or to identify the best way to improve a program.

A common feature in almost every policy is the logic model. Yet, the policy literature leaves tacit the idea of investigating the internal structure of a logic model. Before the contribution I offer in this paper, there was no way to conduct an objective comparison of policies – we were forced to rely on the “plausibility” of a model (e.g. Schmidt et al., 1979, p. 48). As such we are forced to rely on untested assumptions and, “relying on unspoken assumptions may lead to folly as easily as wisdom” (Wallis, 2009c). Based on the current state of the world, this certainly appears to represent our level of policy evaluation and comparison.

Because the logic model is an explicit representation of the policy document, it stands as an abstract representation of the policy - a lynchpin of the process. Critically, comparing logic models with a sense of objectivity allows us to reliably decide which policy to implement or how to advance a policy toward greater effectiveness. The present paper provides an important contribution to the policy literature by suggesting two methods for the objective analysis of Logic models.

In developing objective measures for logic models (to the extent that they represent the policy as a whole) this contribution answers multiple calls: first, for better theory (Sabatier, 1999), second, for more predictive theory (deLeon, 1999). These insights, in turn, suggest the opportunity for a research program to determine if there is a relationship between the robustness of the logic model and the successful implementation of the policy.

The metapolicy analyses reported above were a critical comparison of two logic models using a methodology originally developed for metatheoretical analysis. Results indicate that the highly robust ( $R = 0.67$ ) model in Figure 3 will be more effective in application than the low robust ( $R = 0.08$ ) model in Figure 2.

A limitation of this study is the difficulty of confirming the correlation between the robustness of a policy model and the effectiveness of that model in application. Similarly, this analysis does not address aspects of policy-making that are outside the formal model or “off the page,” such as the mood, health, superstitions, or prejudices that might alter the politician’s decision-making process. Additionally, this study is limited because it compares only two models. Future studies should compare more models, models from a wider range of policy areas, and compare policies with the results of their implementations.

Additionally, future studies should investigate the robustness of historical policy decisions to find what correlation exists between the robustness of the policy and the historical results of that policy’s implementation. In this form of study, it would also be useful to determine if the policy decisions actually followed the policy. It may be found that the stated policy had a high level of robustness while the implemented policy had a low level of robustness (or vice versa). For future policy development, I suggest that any policy analysis should include a study of the logic model itself, to determine the robustness of the policy.

Of course, a robust structure of policy theory is not the be-all, end-all of policy. As noted earlier, it is also important to consider other aspects of policy development (including data gathering, analysis, and how the policy is implemented). Improvements in each of these areas will add to the efficacy of policy. The ideas presented in this paper are intended to complement, not supplant, existing methods of policy analysis

Our understanding will always be limited, but that does not excuse us from expanding our understanding. By developing an understanding that is more complex and more carefully integrated, we may understand more clearly the richness and the limitations of our knowledge – and how we may improve the production and efficacy of policy models and policy with significant implications for improving the human condition.

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