Insufficient Fear of the "Super-flu"?The World Health Organization's Global Decision-Making for Health

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Poroi 10,1 (January 2014)

Keywords: internet democracy, science policy, rhetoric of science, public understanding of science, H5N1, super-flu, bio-safety, WHO, *pathos*, *logos*, bio-containment, flu policy, health policy, World Health Organization

Should scientists be permitted—even paid—to create new strains of flu virus that combine higher transmissibility with higher lethality than existing strains? The World Health Organization has already placed its imprimatur on the decision that they should. Should these new strains be widely shared around the globe among other interested scientists? The World Health Organization has already urged that they should. Does work with these strains require the highest level of bio-containment available? Not at all, insist those who work with the virus. Trust us, they say.

The flu is miserable even in its ordinary versions. The flu can also kill. In some times and places, some strains of flu have killed millions of people (Ansart et al., 2009; US Department of Health and Human Services, n.d.). These scientists are thus asking us to trust them with our lives. A broad literature in science and health studies has already suggested many ways in which trust in the processes of public policy decision-making by scientific experts may not always be merited or sufficient (Koerber, 2013; Muhlberger et al., 2011; Paroske, 2012; Scott, 2002; Solomon, 2007), although there have also been thoughtful defenses of expert authority (Warren, 1996). This essay builds on these research strands by analyzing the role of facts and emotions in one globally important decision process. To do so, it offers a model of the relationship of *logos* and *pathos* as mentally-based, deliberative practices essential to public decision making.

As a consequence of the conclusion of that analysis, the essay follows the dictates of an Isocratean theory of rhetoric to suggest an alternative process for global health decisions. It proposes that the internet now provides a tool for improving decision processes for global health concerns. It also provides guidelines for such an on-line deliberation process derived from notes of caution offered by the existing research literature on public engagement with science policy.

Because there are no public transcripts of the decision-making conference about the creation of the so-called “super-flu,” the analysis employs the published consensus texts and press conference for the WHO decision, published articles and statements by the lead scientists, and comments of National Science Advisory Board for Biosecurity personnel as evidence regarding the affective dimensions of the decision-making processes.

HOW THE WORLD DECIDED ABOUT THE "SUPER-FLU"

In 2011, teams of researchers from the US and the Netherlands, with funding from the US's National Institutes of Health, succeeded in creating a version of the H5N1 virus that could be transmitted among their test species (ferrets) through the air. The naturally occurring virus (formerly known as the "bird flu") had exhibited an alarmingly high fatality rate among those persons who were recorded as contracting it, but it had required direct contact for transmission. The media dubbed the new strains "super-flu" because the high potential fatality rate and enhanced transmissibility portended that their release would produce a pandemic with large numbers of fatalities. The US biosecurity board (National Science Advisory Board for Biosecurity; NSABB) put a hold on the publication of the articles proposed for *Nature* and *Science*, which contained the methods for creating this new strain and details about it. The journals and authors agreed to comply, at least temporarily.

Due to concerns about appropriate bio-containment and bioterrorism, in February 2012, the World Health Organization held a meeting to discuss the issue of data release, as well as the impact of this research on WHO's framework for disseminating research materials and vaccines globally. The WHO meeting to address this potentially threatening development included only 22 invited participants, primarily authors and journal editors for the scientific research papers and select flu bioscientists or administrators of national flu research efforts. These narrowly

interested and expertised parties concluded that it was desirable to publish this research *and* to circulate the strains globally to enable more scientists around the world to do similar research. They conceded that someone should think about the bio-containment and bioterrorism issues and that the putatively inappropriate fears of the public should be calmed. The apparatus of classical rhetorical theory—with some updating—indicates that the bases that they offered for their decision rested in emotion as much as in facts or calculative reason.

PATHOS AND LOGOS

Aristotle initiated what is now a long line of inquiry into the empirical and normative questions surrounding the processes of public decision-making. His *Rhetoric* argued that human policy decisions are influenced by three types of "proofs": *ethos* (character), *pathos* (emotion), and *logos* (rational inference). He offered little overt guidance about *ethos*, but he provided an empirically-based didactic discussion of the use of *pathos*, and he catalyzed the examination of *logos* that has been a signature focus of the Western academy for centuries.

Explorations of Aristotle's precise understanding of the concepts of *logos* and *pathos* remain contentious (e.g., Abizadeh, 2002; Fortenbaugh, 1975/2002; Garsten, 2006; Garver, 1994; Gross, 2006; Gross & Dascal, 2001; Konstan, 2006; Koziak, 2000; Rorty, 1984, 1996; Sokolon, 2006; Wisse, 1989). Moreover, the development of these concepts throughout the Western tradition has not been uniform or simple. In the contemporary period, there are at least two ways of treating logos, both of which have merit, and a variety of ways of treating *pathos*, most of which are studiously incomplete. A re-arrangement of the relationship of these two concepts is warranted by what we have learned about the human mind and about collective decision processes in the past few decades.

Since Aristotle, the concept of logos has been developed in at least two separate flows. The first stream can be called calculative reason, the second argumentative deliberation. Calculative reason has been the touchstone of the sciences (natural and social) and of some branches of philosophy. Mathematics is one obvious component of the development of the *technê* of calculative reason. Aristotle's elaboration of the syllogism was the first effort to develop such a technology for ordinary language. Symbolic logic evolved from this effort. Computer programming is a further elaboration of this version of a technology for *logos*. The two key features of

calculative reason are linearity and the stability of variables. That the stability of the variables is crucial to a syllogism is enshrined in Aristotle's famous dictum: "B" is either "A" or "not A" but not both. Likewise, the underlying assumption of a mathematical equation is that a particular formula repeatedly gives a particular set of outcomes for each particular variable value. Although both syllogisms and mathematical equations are abstractions that are to be "filled in" by different values, the functioning of the reason-format is dependent both on the fixity that the format provides per value and on the assumption that the variables do not change their value as the format is executed. This stipulation is tied to the second assumption, that the equations are "linear" in the sense that they do not require repeated re-adjustment of component parts to each other. Once each component has been executed, it is not revisited; it simply contributes its output to the next stage (as in a sorites or a serial computer program or as parentheses specify the necessary order for processing the component parts of a mathematical equation). This set of assumptions enables calculative reason to offer the pleasing reassurance of certainty and universality (because it offers absolute repeatability, where non-repeatability can be assigned to error).

These guarantees of certainty and universality are highly desired for decision- making. Unfortunately, this kind of reasoning is not of use in any pragmatic application where the variables and relationships among variables are not stable or definitively categorizable. In the realm of policy-making, contention often arises and endures at least in part because these conditions are not met. Consequently, in the late twentieth century, studies in argumentation led by scholars such as Chaim Perelman, Stephen Toulmin, and Douglas Ehninger sought to develop an approach to public policy that retained as much of the core traits of calculative reason as possible but with loosened parameters that might fit the nature of the variables and changeable relationships that occur in much real public decision-making.

The wide-spread application of Toulmin's Claim-Ground-Warrant formulations in courses dedicated to practical argumentation illustrates well the line of approach toward what is sometimes called “informal reasoning” or informal logic and its appeal and potential applications. There remains, nonetheless, a clear disjunction between these approaches and calculative reason. The formulas employed in mathematics and syllogistic reasoning are rigorously deduced and universal. One need only plug in variables, and the formulas dictate the outcomes (by a circular definition, as Toulmin noted). In contrast, the *technê* of

argumentative deliberation provides a vocabulary and an abstracting template for reifying and assessing the reasoning in arguments, but it does not dictate outcomes; novel work that is not fixed by the formulas must still be done by the human agents making the assessments. This form of *logos* not only cannot offer universal certainty, but it also cannot offer a pre-determined endpoint. It is obvious when a calculation is complete—all the prescribed operations of the program or sorites or equation have been done (once, in the proper order). In contrast, an argumentative deliberation is complete only when its engagers agree that it is, or when they give up on the possibility of agreement.

The utility of argumentative deliberation as a *technê* of *logos* is simultaneously a taken-for-granted of much democratic theory and also is widely suspect. Its strongest support comes from the observation that, taken on the whole, deliberation engages the possibility of incorporating the maximal range and numbers of factors and perspectives into any decision. Suspicion arises precisely because it is not identical to calculative reason. Although particular human characteristics ("pooling of biases" Lu et al., 2012) and situational factors (exclusion of relevant parties) mean that this form of deliberation doesn't always produce a better decision than instinctual responses, its potential to do so warrants the study of this kind of *logos* in an effort to maximize the potential embedded in the technology of argumentative deliberation.

PATHOS

After Aristotle, the championing of the possibilities and vision of calculative reason led to a variety of placements of *pathos*. Sometimes emotion was designated as something that needed to be repressed in order to allow *logos* to exercise its sway. Sometimes it was subordinated to *logos*, as in George Campbell's formula: "Logic therefore forges the arms which eloquence teacheth us to wield; we must first have recourse to the former" (*Philosophy of Rhetoric*, 56). It was also often relegated to the fine arts (wherein academic sensibilities transmuted and tamed it by sublimating it within terms such as "taste" or "aesthetics" or "imagination"). In the last thirty years, however, social scientific, neuroscientific, and humanistic work on emotion has demonstrated that emotion is not the opposite of reason (see e.g., Allen et al., 2011; Decety, Echols, & Correll, 2009; Grossberg, 1997; Nussbaum, 2001). Strikingly, most human decision—making turns out to require emotion (Damasio, 2006). Although computers can spit out desirable answers without emotions, the evidence indicates that the human mind is largely

incapable of doing so with regard to situated pragmatic decisions. Emotion has evolved because it enabled good human decision-making. It is a brain-based process, just as calculation and argumentative deliberation are. As with our nascent capacities for logos, therefore, it should be possible to develop technologies for improving upon these nascent capacities.

In order to understand the most promising lines for such development, it is useful to understand how *logos* and *pathos* differ as mental processes.[1] The ideal of calculative reason is linear, totalistic, and fixed. Emotion is non-linear, probabilistic, and iterative. This is well-illustrated and supported by the frame-and-experiment created by Melissa Finucane et al. (2000). Their work builds on research into the processing of risks and benefits in human decision-making, which has identified a substantial series of species- typical variations from a strict calculative approach that guide human judgments. Humans, for example, are subject to anchoring effects and imaginability effects. We prefer a surer bet over a less likely one even where this would produce a substantial net loss over repeated trials. If one operates from the perspective of calculative models of *logos*, these processes must be viewed as "biases" or as "skewed" from the ideal. To see them as something other than a deviation from the *logos*-based ideal, it helps to have an alternative ideal.

Finucane and colleagues offer such an alternative. They argue that affect-based decision-making occurs through a process of constant re-adjustment of the values of all input variables to each other via an intermediary global variable (which they label affect). To establish the plausibility of their model, they performed an experiment in which they altered the information people had about risks or benefits and then measured the change in the participants' evaluation of the risks *and* of the benefits. Specifically, they gave participants information indicating that a technology was either high in benefit, low in benefit, high in risk, or low in risk.

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[1] I would prefer to say “cognitive processes” but the field of neuro-psychology has become accustomed to assigning the term “cognition” to a specific set of brain circuits. The assignment was probably originally based on the claim that emotion is an involuntary process whereas cognition is voluntary (e.g., Allen et al., 2011; Dolcos et al., 2011). Given the extensive studies in emotion regulation and the fact that the functions of cognition for most people are not actually executed in a voluntary way, this seems like a faulty basis for distinction. However, for now these categories reign.

They posited that "If people consult their overall affective evaluation of an item (say, nuclear power) when judging its risk and benefit, then raising or lowering the favorability of the affective impression should alter both the risk and benefit judgments derived from that impression." In contrast, given a logos-based model, changing the risk judgment should not change the benefit judgment and changing the benefit judgment should not change the risk judgment, as these should be two independent variables. The experiment is therefore an excellent test of the model.

The experimental results supported the predictions of the affect model, albeit adding additional complexity:2 the participants tended to adjust their estimate of risks when given information about benefits and vice versa. The model has also been supported by a rapid accumulation of other psychological and, more recently, behavioral economic, and political science research (e.g., Alford and Hibbing, 2004; Haidt, 2012; Lerner et al., 2003; Westen, 2007). Gradually, the black box that Finucane et al. dubbed "affect" is being filled in by the specification of the particular ways in which different regions and "circuits" of the brain operate in processing that is not simply linear calculation (e.g., Decety, Echols, & Correll, 2009; Leuthold et al., 2012; Vytal and Hamann, 2009). It is clear that this kind of model predicts how humans typically "think" or "decide" far better than does the older model of calculative reason.

There are detailed arguments that one can make as to why this kind of decision- making is superior to merely calculative reason for many important uses; Alford and Hibbing (2004) have called it "more than rational" processing. Rather than repeating their argument, I believe it more useful to develop the concrete case and practical proposal. Suffice it to say that affective reasoning 1) allows the rapid inter-adjustment of social, value, and empirical components to decisions, and 2) was at least "good enough" to allow humans to survive for millenia before what we think of as the *technê* of calculative reason began to be rigorously developed. Affective processing, therefore, should hardly be dismissed as "irrational" and undesirable. We might nonetheless seek to improve

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[2] These complexities included 1) the difficulty of changing the target sense of benefit/risk; 2) differences among the four conditions of high/low benefit, and high/low risk in their level of impact, and 3) interactions with the particularities of a given topic (e.g., nuclear power vs. natural gas vs. food preservatives). These complexities, although not explicitly predicted by Finucane et al., are consistent with the affect-based model and inconsistent with a *logos*-based model.

upon it by developing technologies for extending its capacities and avoiding those features that might give it a penchant for certain kinds of errors. Such a trajectory seems more desirable than an ever-widening split between a social media where emotions run rife without any deliberation and a technical sphere that suppresses signs of emotion on the mistaken assumption that doing so enables calculative reason to provide answers to non-calculable problems.

In seeking a route for developing a theory of *pathos* as a component of public decision-making, the parallels between affective processing as an individual-level phenomenon and argumentative deliberation as a public process are instructive. Both feature iteration, parallel activity, and on-going adjustments of inputs. This suggests that a possibly fruitful line of development lies in specifying affective processing as a component of public deliberation. If the analogy with argumentative deliberation is taken prescriptively, this would mean that an ideal for public deliberation would include at least two components: active reflection on the emotive components of deliberations and inclusion of the maximal possible range of relevant affective weightings and inputs.3 Such a line of development would need to attend to and compensate for the proclivity of emotion to be short-term, partisan, and relational in order to formulate specific didactic theories and prescriptions. For present purposes, however, the above description provides a sufficient apparatus for exploring the bases of the decision to propagate a super-flu. The public texts by the interested parties who were empowered to make those decisions show 1) that the scientists themselves utilized affective processing in their risk estimations, and 2) that they actively excluded the emotions of others from the decision- making process.

1st Proof: Affective-style Processing by the Flu-Creating Scientists

One key difference between affective-style mental processing (addressed in *pathos*) and calculative processing (addressed in *logos*) is the context-dependence of the former and the stipulated universality of the latter. Because calculative reasoning presumes stability of variables and linearity of processing, it is context-independent. Because affective reasoning produces different outputs (in this case, judgments) depending on the mutual

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[3] The inclusion of the possibilities for reflection on facts and calculative bases of decisions and the inclusion of all the (available) relevant facts and calculations seem to be the least controversial and minimal conditions of argumentative deliberative ideals, though there are other proposed factors such as sincerity or particular content or relational components.

sensitivity of variables to each others' values, it is context sensitive. Both the public statements by key scientists involved in creating the new flu virus and the evidence we have about the papers the scientists wrote display the shifting of the value of input variables in different contexts that is the hallmark of affective processing. These shifts cannot be attributed to changes in measured variables (the only possibility in the case of calculative reason). In fact, none of the data regarding the new flu or bio-safety factors changed during the time that these changes in statements were made. What changed was the context. As discussions proceeded in different venues, it became more or less advantageous to have a higher or lower intuitive estimate of the transmissibility or fatality rate of the flu. This adjustment of variable values to contextual variables is, by the definition offered above, affective-style processing.

Ron Fouchier was a lead researcher in the Netherlands-based laboratory that participated in the creation of the new flu and was the most active spokesperson for the laboratories involved. A reporter for *Science* first identified changes in Fouchier's expressed judgments about the riskiness of the new flu (Cohen, 9 March 2012*)*. Jon Cohen reported that in November of 2011, before the controversy arose, Fouchier called the mutated virus, "Probably one of the most dangerous viruses you can make." Cohen also noted that Fouchier was quoted in *The Influenza Times* as having said that, "This is very bad news, indeed," and having claimed that the virus was as transmissible as the seasonal virus. In contrast, once a high level of risk had become a block to the publication of the research rather than a rationale for its importance and future funding, the *Science* reporter noted that Fouchier reduced his estimate of the risks. Cohen reported that "Fouchier criticized press accounts that suggested, as he put it, that 'this virus would spread like wildfire if it would come out of our facility'"(1555), and further that, "'We have to conclude that this virus does not spread yet like a pandemic or seasonal influenza virus,' Fouchier said, in contrast to what he reportedly said in Malta. He did not respond to *Science*'s request to discuss this discrepancy" (1155-1156).

Fouchier's statements display input variable sensitivity even within a narrower time frame. In one context he emphasized the surprising nature of the results. A *New York Times* story recounted the moment of the discovery of the capacities of the newly created virus. A junior scientist in Fouchier's lab reportedly had gone to Fouchier saying, "'You are not going to believe this one....I think we have an airborne H5N1 virus." Fouchier explained that, "We both needed a beer to recover from the shock" (Grady & McNeil, 26 December 2011). In another interview, however, Fouchier portrayed

the creation of the virus not as a surprise, but as the planned result of a carefully designed project: “This experiment was not designed overnight. We started planning for these experiments 10 years ago, consulting with experts nationally and internationally about how to do this safely. We built special facilities to protect people against the virus and the virus against the people" (Carvajal, 21 December 2011).

Fouchier's judgments of whether the flu is highly threatening or a less serious risk, a surprising development or a predictable outcome of planned manipulations, were evidently dependent on the values of other variables (which depended in turn on contexts). Although we can't know these other unstated variables with certainty, the contexts indicate that the relevant variables are the publicity advantages for Fouchier's alliance. When it is advantageous for the risks to appear high—because high risk justifies funding or publication in high-profile journals—then the risks are estimated as high and the discovery portrayed as shocking. When the public concern about the experiments makes it disadvantageous for the risks to be high or the scientists to portray themselves as surprised by developments, the risks are judged to be lower and more predictable.

One might portray Fouchier simply as a loose canon, but the available evidence indicates that the same pattern was true of the scientific papers themselves. The original papers have not to date been released, but the members of the NSABB who read both versions of the papers—the versions submitted before the public controversy and the revised versions submitted after the controversy—testify that the papers changed the portrayals of the risks. Cohen and Malakoff quote NSABB member Lynn Enquist as saying, ‘The original papers were typical *Science* and *Nature* papers: very brief, short on detailed discussion, little to no information on biosafety/biosecurity/mitigation, and perhaps even a little sensational,’ says NSABB member Lynn Enquist.” They also quote NSABB member Michael Imperiale, who uses the "rational not emotional" formula when he concludes, “All parties agree that the longer, revised paper presented last week was clearer. It presents the data ‘in a more rational manner'" (Cohen & Malakoff, 6 April 2012). The scientists displayed adjustment of key input variables to other variables; the shift demonstrates that the key judgments of risk were based on affective, not calculative processes.

As a secondary proof of the emotionality of the scientists one might turn to the intensity of the statements. More traditional accounts of emotion as well as some post- structural ones treat intensity as either a sign of emotion or as its core feature (e.g.

Massumi,, 2002). The scientists displayed such intensity, for example, when they wrote that "As we compare the current threat posed by bioterrorism and our past experience with the threat of influenza, we would argue that nature itself should be considered the prime bioterrorist" (Fouchier, Herfst, & Osterhaus, 10 February 2012, p. 663).

The conclusion that the scientists were engaged in affective processing should not automatically be interpreted as a condemnation. The synthetic position on *logos* and *pathos* being offered here insists that pragmatic human decisions, especially complex ones, will typically be made through such affective processing. Scientists would not be human if they made decisions otherwise. The evidence only highlights that it is naïve to imagine that scientists could make decisions based solely on a calculation of the facts in such cases. This conclusion mandates, instead, assigning a greater importance to ensuring that the emotional processing that occurs in public decision-making incorporate the sensitivities and feelings of all affected and knowledgeable parties, not merely a narrowly weighted slice. Once one understands affective processing as (in part) the mutual adjustment of a maximal number of relevant variables to each other, then the criterion of maximum participation becomes not merely a desired quality on extrinsic grounds, but an operational requirement for optimal decisions as a matter of fact.

2nd PROOF: EXCLUDING FEAR FROM THE DELIBERATIVE PROCESS As a matter of course, those empowered to make policy routinely presume the superiority of their own decision processes over others. In this case, that superiority was explicitly promoted through the denigration of the emotions of others, which presumably served to deny their legitimate inclusion in the decision-making processes. The available texts on the decision processes include statements by the scientists and official statements of the World Health Organization. These repeatedly portray the emotions of others (especially the public, but also those with different expertise) as an impediment to be overcome rather than as resources that should be included to broaden the deliberation. Fear was a particular target for exclusion.

If one takes seriously the utility of the experience of fear as a component of decision-making processes, excluding fear is bound to produce bad judgment. Fear is not per se irrational. If one doesn't experience fear in the face of a serious threat, then one is less likely to act appropriately. Empirical research on fear shows that it consists of a two- phase process. In the first phase, which is dedicated to assessment, one's attention becomes tightly focused on

the potentially threatening stimulus. Priority is given to the gathering and assessment of relevant information. If the assessment confirms a threat rather than a false alarm and if it confirms that the threat can't be addressed efficaciously by attack (in which case anger may be triggered instead), then a set of physiological responses is generally launched that enhance rapid execution of a particular range of action plans (e.g., withdrawal or flight (Moons et al., 2010), displays of social submission (Ohman, 2009), or probability neglect (Nielsen & Shapiro, 2009)).

Fear thus plays a crucial role in any decision regarding threat assessment, but it plays that role in conjunction with other emotions. A classic analysis of decision-making based in fear is the example of a deer approaching a water pond. As it approaches, the deer constantly assesses potential threats, experiencing early phase fear responses. As long as these remain low-level, the beneficial appeal of the water is strong enough to keep the deer moving forward. When the threat becomes too great, the deer freezes or flees. In contrast to such basic physiological response patterns, human rhetorical processes enable deliberation upon threats and benefits and these can be weighed against each other in an extended time and space. This also enables conscious option creation and selection. To exclude fear processing from public deliberation would therefore be to exclude consideration of what might be valid threats to well-being and the broadest possible range of action options. Additionally, at the public level, benefits and risks are distributed differently to different groups. The career and curiosity benefits to lab scientists creating flus is additional to whatever health benefits they might share in common with others, and those benefits are much more certain and proximal (which is crucial to emotional intensity). Likewise with the benefits of publication for journal editors. The best public decision requires therefore that the emotional weighting processes of the widest possible range of those affected be included in the decision process.

In contrast, seeking to narrow the inputs, the pro-flu-creation alliance routinely portrayed their judgments as solid and factual and the emotions of others as extraneous— a regrettable impediment to be managed. For example, a letter by the scientists published in *Nature* explained their agreement to go along with the publication moratorium imposed by the NSABB in this way: "Despite the positive public-health benefits these studies sought to provide, a *perceived fear* that the ferret-transmissible H5 HA viruses may escape from the laboratories has generated intense public debate in the media on the benefits and potential harm of this type of research..." (Fouchier et al., "Pause," 27 January 2012,

400; my emphasis). This quotation takes for granted that the research has positive public-health benefits (or that having such intents is sufficient to counter risks and that this justifies the creation of the risks) and that the risks on the other side are *only* emotionally based (mis)perceptions. By treating their own judgments of benefit as fact and the judgments of others as merely emotions ("perceived fears"), they actively preclude the need to deliberate the matter with others. Notice how this formula depends on the idea that emotions are irrational and inutile, whereas facts and reason are the sole component necessary for decision-making. The errant theory of emotion and reason upon which we have been operating for several centuries is therein deployed rhetorically and is consequential.

These same patterns manifest themselves in the documents produced by the WHO meeting February 16 & 17, 2012. In the press conference that presented and promoted the group's conclusions, the designated spokesperson described the problem as one of misplaced public emotion—unnecessary anxieties. Consequently, the appropriate policy approach would be to increase "awareness" on the part of the public of the positive benefits of the research (intensify one of the input variables) rather than to change any scientific funding or procedures:

> Well, they recognize that right now there is a lot of concern about the safety aspects of this kind of research and the safety aspects of these particular studies and the newly created lab modified viruses. So it was recognized that it was important that public awareness and awareness of other groups about the nature of the research, the importance of the research and the context of the research be understood and that this was the most important step for making sure that *anxieties* would not be *unnecessarily* increased (Fukuda, 17 February 2012).

Remarkably, in this statement safety "concerns" are not treated as part of the inputs for deciding on whether or not the research should be published and go forward. Instead, because the scientists themselves don't feel these concerns, they are treated as external to the decision process. Their stance is that the feelings of others do not have to be incorporated in the decision process; they just have to be managed outside the decision to gain support for it or enable it. Notably, the scientists indicate that this can be done by making others more aware of the benefits. In other words, the projected action is to increase the public's sense of one of the input variables with a positive valence for the scientists' preferred activities, rather

than to incorporate the negative input variable(s) into the decision process.

This statement echoed the official WHO Consensus Statement. The Consensus also declared that the decision had been made based on the benefits and relegated the risks to the realm of the "social" rather than to what it described as the realm of public health. If safety concerns existed, they should be applied to mitigate the risks once they were taken, they should not be incorporated into a decision about whether such risks should continue to be created:

> There is a preference, from a *public health perspective*, for full disclosure of the information in these papers. However, there are significant *social concerns* surrounding this research. Two critical issues that must be addressed before publication of the papers are: (1) a focused communications plan to increase public awareness and understanding of the significance of these studies and the rationale for their publication, and (2) a review of the essential biosafety and biosecurity aspects of the newly developed knowledge (WHO, Technical Consultation, 16-17 February, 2012).

During the press conference, Laurie Garrett (a journalist and Senior Fellow of the Council on Foreign Relations) challenged this representation, saying "If I understand right, basically the scientists all feel that what they are doing is safe and reasonable but they think that the public is hysterical so they want to delay everything until WHO and other unnamed agencies have calmed the public down and informed them so that the scientists can go forward. Is that correct?" The spokesperson denied that this was what was meant, saying that the safety questions are difficult ones, but he then returns to the same formula that sets the safety concerns as things others have and that are not legitimately part of the decision process. The decision remains unaffected by these risks but "rather than just plough ahead and ignore those concerns the group felt that one of the things that would be important to do would be to try to increase public awareness about these studies." "Concerns" are again simply the feelings of others that can be addressed by "greater awareness" of the benefits. He even offers the decision-makers as a model for how the public would respond to this greater awareness, recounting how having their awareness of the studies increased led to their decision in favor of furthering this work. Such a prediction is unreliable. Because the decision makers were so differently placed from most of the other humans in the global public in terms of the impact of potential benefits and the threat of potential risks

these people cannot serve as surrogate deliberators for the public. They are also limited in their expertise.

WHO/WHO DECIDED?

The 22 people invited to make this potentially momentous decision on behalf of the 7 billion people in the world included (according to the biographies published by the WHO) 2 journal editors from *Nature* and *Science*, 3 authors of the papers, 7 directors of WHO flu centers, 6 representatives of national governments (3 from the US, 2 from the Netherlands, 1 from Indonesia), 2 WHO representatives (from the PIP board, which had previously prioritized global dispersal of research opportunities), 1 other scientist, and 1 ethicist.

Even within the old-fashioned paradigm in which *logos* alone suffices for decision-making, biosecurity experts should have been well represented at this conference. Fouchier himself had recognized that group as central contributors to the debate. In an interview he opined,

> The only people who want to hold back are the biosecurity experts. They show zero tolerance to risk. The public health specialists do not have this zero tolerance. I have not spoken to a single public health specialist who was against publication. So we are going to see an interesting debate over the next few weeks between biosecurity experts and public health experts who think this information should be in the public domain. (Carvajal, 21 December, 2011).

Paul Keim was the only individual whom the WHO-provided biography represents as a bio-safety or biosecurity expert, except for the representative of the Netherlands government, who had already publically proclaimed his support for the Dutch research team. If one were looking for a thorough discussion of the risks vs. benefits, this is not the group of people one would invite to such a deliberation.

Even the “public health specialists” who were invited did not represent the full range of relevant expertise or a balanced sample of relevant specialties. As Table 1 shows, and the debate in the public media further suggested, the relevant concerns for assessing risks and benefits would include experts in field research, statistical modelers of epidemics, medical resource specialists, and those scientists actively working on the “general” flu vaccine, which NIH had been funding and which was reportedly near clinical testing (Koebler, 13 January 2012). The overwhelming majority of participants had instead been trained as clinical or bench scientists,

though they also represented the perspectives of vaccine producers. For example, Nancy J. Cox was a Director of the Influenza Division at the US Centers for Disease Control and Prevention, and thus a public health expert. But her doctoral degree was in genetics and her unit was involved in "isolation of candidate seasonal vaccine viruses in eggs and from Novartis for analysis of viruses isolated in tissue cultures." Anne Kelsow was also a director of a WHO Center and thus describable as a "public health expert," but she had done research on T cell immunity and reported holding shares in a pharmaceutical company that produces influenza vaccines. Willem Luytjes was described as the "first to genetically modify influenza virus (published 1989)." Le Quynh Mai "played a key role in characterizing this influenza virus." On the clinical side, Professor Didier Houssin had impressive public health credentials, but he was described as a "liver surgery and transplant specialist."

*Table 1: Arguments For And Against Research to Create More Transmissible Flu Viruses in Informed Public Discussions**

	For the Research	Against the Research
Surveillance Uses	*We can identify mutations occurring in the field that may become problematic	*Surveillance is impractical in nations where flu presents highest risks
Bioterrorist Uses	*Lethality not certain *Terrorists couldn't make it *Other organisms are more weaponizable	*Recorded lethality is v. high *Terrorists have proven v. inventive/capable *Your planned research makes it more lethal
Bio-containment	*Our Bio-containment is good	*Historical pattern of escapes *Level 3 too low
Vaccines	*Will help create new vaccines *All research good!	*Vaccines not related to transmission mechanisms *Vaccine dissemination is the problem *Weak track record of products *Universal Vaccine Closer
Government Role	*Government censorship bad *Analogy to airline security	*Government should not/can not fund every possible research

See esp. "Sunday Dialogue" (2012)

The overwhelming majority of these participants were in some way likely to benefit directly from publication of this research and further funding of such research. The definition of "expertise" as

those who had the closest technical knowledge to the proposed publication of a piece of lab research is common in scientific communities. However, in public policy it is an inappropriate criterion because it excludes both those who have the full range of relevant technical knowledge and those who would weigh the factors involved through emotive processing set to substantially different valences for the relative risks and benefits.

Given the narrow representation in the decision process, there was virtually no chance that the affectively based judgments that the pro-research partisans carried into the meeting would be modulated by other affects and data. Thus, it is not surprising that a small and at least partially inappropriate set of affective preferences simply got certified as WHO official conclusions. Emotions, however, are never static. Assembling a group of people with shared affects often heightens the affects that they share in common. In this case, such sharing produced not only an unreliable “yes” or “no” decision but created additional courses of action that would increase the risks.

SHARING OUR BENEFITS/EXPANDING THEIR RISKS

The WHO was careful to insist that the February meeting should address only the issue of publication of the research results of the existing study, and that a larger meeting should later address the broader issues pertaining to the conduct of such research itself. This is not, however, what the meeting did. The first statement in the Consensus document explicitly endorsed the research itself and its continuation: "Research on these viruses, including on transmissibility and pathogenicity, remains critical to close important gaps in knowledge in order to reduce the danger posed; such research should continue" (WHO Headquarters, Consensus Points). The WHO thus pronounced that the risks of accidental release and bioterrorism are outweighed (not even mentionable) by the “danger posed” by the potential of a future, naturally occurring mutation.

The document exceeds its mandate even further, in ways not imagined by anyone prior to the meeting, and literally unimaginable in a context of a weighing of risks and benefits. It urges the global dispersal of the research: "Future research projects should involve countries from which source material were obtained." The WHO decision endorsed the global dispersal of the bio-containment risks and an expansion of the bioterrorism risks. This seems a shocking dictate at this time given that even the WHO

document recognized that public debate had arisen due to bio-containment and bioterrorism concerns, and even it had conceded that "a review" of these concerns was necessitated even if they might by addressed only as remediation prospects.

Table 2: Deaths from H5N1 and WHO Meeting Participants By Country

Country	Number of WHO Meeting Participants (Country as Listed in Official Biography)	Laboratory Confirmed Deaths from H5N1 2003–2012
Australia	**1**	**0**
Azerbaijan		5
Cambodia		17
China	2 (1 Hong Kong)	28
Egypt		59
France	**1**	**0**
Great Britain	**2**	**0**
Indonesia	3	156
Iraq		2
Japan	**2**	**0**
Lao People's Dem. Rep.		2
Netherlands	**4**	**0**
Nigeria		1
Pakistan		1
South Africa	**1**	**0**
Thailand		17
Turkey		4
United States of	**5**	**0**
Vietnam	1	61

The endorsement of dispersal arose both from the affective context of the WHO itself and in particular from the affective preferences of several of the participants. With regard to the broad context, WHO is appropriately concerned with global equity. The recorded death toll from avian influenza was highest in Indonesia, Viet Nam, Egypt, China, Cambodia, and Thailand and essentially nil in the Western world where the research was being done (see Table 2: World Health Organization, "Cumulative Number," 2 April 2012). Secondly, with regard to specific participants, the official representatives of WHO at the meeting had been active in formulating WHO policies that urge equalization of research capacities and full access to flu vaccines around the world (WHO, Pandemic Influenza Preparedness, 2011). Additionally, some of the directors of centers of flu expertise hailed from countries other than the US and the Netherlands. They predictably desired access to the research materials (the mutated viruses) for their own laboratories or scientists.

One should definitely endorse the fairer distribution of vaccines around the globe, as the WHO's "PIP" framework encourages. One might also reasonably endorse the fairer distribution of research capacities around the world to cultures that want to participate in this type of research endeavor. But *prioritizing* dispersal of an air-transmissible flu virus with a high fatality rate among multiple laboratories in the face of unsettled concerns about bio-containment and bioterrorism seems to qualify *prima facie* as an egalitarianism among the worlds' elites at the cost of the greater proportion of the world's peoples, at least in the short term. The WHO meeting's decision to prioritize that goal reveals just how thorough the individual affective priorities were in shaping the consensus statement. Everyone present in the conference room had their desires articulated in the consensus document; the flu researchers got an endorsement of their research, the journals and authors got an endorsement of their publication of the research, the WHO got to forward its understanding of its global research equity interests. But—and this matters a tremendous amount—the unknown affective reasoning of the overwhelming majority of the world's peoples, with their full range of expertise and risk valuations, were not articulated in the decision processes and so were absent from the consensus statement.

AFTER THE WHO CONFERENCE

In the face of the WHO decision, the US's NSABB changed its mind and in a split vote endorsed publication of the research. Revised versions of the scientific papers have now been published. US officials made tepid statements about increased monitoring of "dual use" research, but this monitoring was left in the sequestered hands of those who had previously failed to identify this research as problematic. WHO claims to have enacted its "public awareness" campaign (WHO, Update, 29 May 2012). There is no public evidence that it initiated the review of biosafety and containment that it recommended as a prerequisite to publication. The short time interval precludes the possibility that even a non-public review of any thoroughness was conducted prior to publication. The research establishment moves ahead using millions of public dollars in efforts to create novel, more highly transmissible, highly virulent viruses in level 3 containment facilities.

A noteworthy but largely unnoticed event has occurred in the interim. As has been periodically the case throughout the US and Western Europe, a major problem with the effectiveness of a bio-containment facility was identified in June of 2012. As AP reporters discovered, the US's Centers for Disease Control itself has (once

again) proven unable to maintain bio-containment. *USA Today* reported that "A $214 million bioterror germ lab at the Centers for Disease Control and Prevention in Atlanta has had repeated problems with airflow systems designed to help prevent the release of infectious agents, government documents and internal e-mails show" (Young, Airflow problems plague CDC bioterror lab, 13 June 2012). The report revealed a long-term pattern of complaints by scientists about the adequacy of biosafety at the facility. US officials insisted that nothing dangerous escaped and no one was harmed. But if the CDC cannot maintain these facilities successfully, should concerns about bio-containment in the laboratories of the world be deferred while such research continues? Are the benefits of flu research that creates new mutants really so great that such risks should be encouraged?

This essay cannot answer that question. Perhaps the 22 carefully selected experts made the right decision for the world. If so, however, they did so by accident, not because they employed the correct calculations or engaged in rational deliberations appropriate to the question. As Table 3 indicates, such a calculative process would have been impossible; most of the variables are unknown and not calculable. Of equal importance, however, humans cannot make this kind of decision through calculation alone. They must use their affective capacities in a collective, deliberative fashion, and the affective capacities of this group were too narrow for the task.

Table 3: Some Variables Required for a Calculative Comparison of Risks vs. Benefits of Research Creating H5N1 Flu Strains With Enhanced Transmissibility

++ A. Biocontainment Risk Levels:

++ Likelihood of Accidental Release From Level 3 (or 4) Facilities over X Timeframe (PIP Global Dispersal Ideal vs. Limited Sharing Model)

++ Likelihood of “Amateur” Production of Virus From Published Data and Accidental Release

++ Probability of Dispersal Patterns in Various Scenarios

=Death and Illness “Probability Costs”

B. Bioterrorism Risk Levels:

Likelihood of Terroristic Access to Level 3 or 4 Containment Facilities (and transit)

++ Likelihood of Terroristic Production from Published Data

++ Probablity of Dispersal Patterns in Various Scenarios
++ Death/serious illness rates

= Increased Costs of Monitoring + Probability Costs in Death and Illness

C. Benefit Levels:

++ Likelihood per Time Unit of Discovering Useable Vaccine (Useable= economic, acceptable secondary effects, acceptable level of protection: all TBSpecified)
++ Predicted Achievement of Dispersal of Vaccine Over Scenario Coverage Areas in Relevant Time Frame

=Probability Benefits of Utilizing Vaccine

A BETTER WAY TO DECIDE GLOBAL HEALTH ISSUES

Theory-building and critical analysis are widely accepted components of published essays in the contemporary Western academy. Recently, however, there has been increasing encouragement from many quarters for scholars to move beyond negative critique toward positive recommendations. One such nascent school identifies this work as a revivification of the Isocratean tradition of rhetorical studies. Leah Ceccarelli (2011) and Marita Gronnvoll and Jamie Landau (2010), among others, suggest that the scholar's task does not properly end with analysis or critique. If a better alternative cannot be offered, then a critique may be misleading as to merit or self-serving rather than constructive of positive social changes to which its putative audience would agree. Ceccarrelli and Gronvoll & Landau have respectively offered improved argumentative strategies and preferred metaphors as a component of their scholarly essays. Given the recent infusion of media theory into rhetorical studies, some rhetoricians may also be well schooled to offer suggestions for alternative media and communicative processes as well.

Working from that frame, the analysis above encourages the following proposal. The WHO should terminate the use of small closed-door meetings for decision-making on all cases of species-creation or other border-spanning health issues. Such meetings inevitably certify the narrow affects of highly interested parties as official policies. Instead, WHO should establish a global, open-access deliberation process via the internet. Such a process will place experts of multiple backgrounds in public discussion with the general public. Decisions can thereby utilize the human capacities

for *both logos* and *pathos* to incorporate the broadest available range of deliberative inputs.

This process will not be perfect, but it can be optimized by attending to the many emerging issues that have been identified with regard to equalizing participation in public discussions. The literature on internet-based democratic decision-making indicates that a period of experimentation or trial-and-error is inevitable and important; the internet is not automatically democratic regardless of the forms it takes (Ferdinand, 2000; Groshek, 2009; Lei, 2011). Initially, different approaches should be tried on different issues to discover what produces the broadest, global affective weighing of the issues involved. Although the internet brings its own media-specific challenges to processes of deliberation, the bar has been set quite low by the current processes. Consequently, it should be possible to improve upon the existing standard, even if perfection is unachievable.

Several procedures might be tried to address various challenges that have been identified in existing literatures on deficiencies in public deliberation (Irwin, 2001; Kerr et al., 2007; Molster et al., 2011; PytlikZillig et al., 2011; Zavestoski et al., 2006). One difficulty is to gain input from a sufficient range of people, including those who are not highly educated or not accustomed to public contributions. A process of deliberate invitation can prod persons of different types of scientific expertise to participate where relevant (e.g. makers of flu vaccines, those who have to deliver flu vaccines "on the ground", those who have experienced biocontainment failures). Active invitation can also ensure inclusion of persons who are not subject-matter experts and who are not accustomed to public participation. The regular inclusion of such members of the “general public” may also stimulate the involvement of voluntary representatives through “bottom up” processes (e.g., members of the Grameen Bank board). Simultaneously, the level of interest can be taken as one measure of the trust peoples have in the decisions that are being made by the process. Decision-boards where processes routinely produce good decisions are likely to gather less interest than those where decisions are unbalanced, reflecting people’s choices about where they need to spend their scarce time (which enables an integration of authority with democratic process as suggested by Warren (1996)).

Various literatures have identified the contributions of some persons to be prone to low *ethos* due to grammatical, vocabulary, or stylistic differences from expectations in formal public venues. To reduce such disadvantages, a volunteer corps of rhetoricians (including argumentation experts and composition instructors)

might assist such contributors in maximizing the effectiveness of their statements for a global audience. This also raises questions of choice of language. Translations into all languages would be pragmatically prohibitive, but versions in three or four languages could be maintained with translation assistance available for would-be contributors.

Moderator(s) could be charged not only with issuing a broad scope of invitations, but also with tiering contributions by factors such as relevance and emotive effects. An effective discussion cannot be infinite in its scope (if you followed the "threads" on the Occupy Wall Street board, you will have a sense of this). Indeed, in venues where sneering, *ad hominem* attacks come to dominate, they tend to drive out other types of commentaries over time. This means that a "focal" tier of comments will probably need to be maintained. To mitigate the possibility that moderators might simply relegate any commentary with which they disagreed, the WHO should maintain at least two (perhaps more) threads or sites, one for primary attention, another relegated for secondary attention rather than deleted. If all commentary submitted is available for public scrutiny, the judgments of the moderator are transparent, and everyone has a publically accessible "say", even if not every commentary will be located in the same place. The peoples of the globe would ultimately determine by their reading preferences which tiers or threads received the greatest attention.

The most repeated objection I have heard to this proposal is that multi-national corporations have the financial capacities to swamp such on-line discussions. While this may be true with a largely inactive global public, and will remain somewhat true even with a more active global public, that is hardly a disadvantage as compared to the present approach. As it currently stands, in most global decision-making processes, corporations and individuals rich in social, economic, political or intellectual capital are the only agents who have *any* real access to decision-makers. Our proposed internet discussion process adds to those voices, even if it would not delete the participation of the existing voices. The test of the process is not "Does it offer a perfect mode of decision-making" but merely "Does it have a good possibility of substantial improvement on what we now employ?" Any mildly broadened discussion process would leap the bar set by the current WHO process in important respects.

On issues where part of the question is the release of sensitive information, dual-level reviews could be adopted. A first, closed-door phase (with a wider body of experts) could make a preliminary determination. The public, which includes persons of a range of

expertise, could have input on who should be represented in the closed-door meeting. If those included in the meeting decide (as in the present case) that public disclosure is warranted, then a second level of public review can be undertaken before release. Although the public in such cases would not have all of the information for such a decision, they could judge the broad sufficiency of the expert process. To focus on publication, however, is something of a smokescreen or a "too little, too late" approach. More crucial would be a process to decide whether to spend public funds on such research before it ever generates potentially dangerous information or organisms. The information for such up-stream decisions appears typically to be available in the scientific record before such research is undertaken for any research that will itself be publishable.

Some process for summarizing contributions may also be desirable, with partisans from different views invited to participate in a summary list of arguments for different aspects or positions. It may prove more valuable to produce competing summaries rather than a synthetic summary in many cases. Such summaries might themselves have a short commentary period before an identified closing date of a phase of a discussion that leads to a policy decision. One ideal might be to have a global vote on a proposal, but this is as yet not achievable, and many substantive questions would need to be settled before such a process arose. In the interim, voting delegates to world bodies such as the UN, IMF, WTO, etc., could be required to provide a response to the summary sheet as a part of their voting process. Although this would not guarantee that delegates have taken the summary documents seriously, or even read them, it would maximize the circulation of these documents among decision-makers (their staffs, at the least).

In the current state of the world, there is no guarantee that such public deliberations or even WHO decisions will bind nation-state governments. However, at the present time we do not even know what an informed, global-scale deliberation would lead to as a matter of preference. Once we develop mechanisms for finding out what such preferences might look like, we will find that there is some influence on some governments and then seek ways to increase the impact of such articulations.

CONCLUSION

This article suggests that an appropriate understanding of the role of emotion and its relationship to decision-making in processes of public deliberation, even deliberation about technical or scientific subjects, reveals that major decisions about world health, such as

that made by the WHO on the "super-flu," are employing sub-standard decision processes. Human decision-making requires affective mental processes. No single human or small group of humans can embody all of the inputs relevant to the weightings required for maximally rich (and often even for minimally sufficient) decision-making for policy choices that have life-and-death consequences on a global scale. Including the bio-terror and bio-containment experts in the "super-flu" meetings would have redressed some of the missing affect, but such experts could not have sufficiently represented the balance of fears (of naturally occurring vs. human-made flu) for different populations around the world. The risks and benefits are different in Indonesia and Egypt and Vietnam and the Netherlands. They are different because of the different risks of exposure, but also because of the different benefits of the biological research enterprise to the nations, and because of the different meanings of different causes of death (natural vs. inflicted by carelessness in experiments in other nations). Only a sustained, global-level deliberation can link up a sufficiently broad range of affects to process the relationship of all of these risks and benefits to all the world's peoples. This essay thus indicates that developing the theory and practice of *pathos* in ways analogous to the developments in logos over the past two thousand years may prove to be similarly fruitful.

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