ISSA Proceedings 2014 – Deference, Distrust, And Delegation: Three Design Hypotheses

Abstract: A design hypothesis in argumentation is a broad notion about how argumentative practice can be shaped toward greater reasonableness. Different design hypotheses do not compete with one another in the way empirical hypotheses do; each may add to our overall rationality in some circumstance, and each may have unwanted by-products. The complicated controversy over childhood vaccination displays tensions among three quite different design hypotheses related to the role of expert opinion in decision-making.

1. *Introduction*

A central premise of a design theory of argumentation (Jackson, 2012) is that argumentation is a set of invented cultural practices that change over time to adjust to material circumstances, including the emergence of new communication technologies. A design perspective suggests that societies try out ideas about how to reach conclusions and agreements, embodying them in techniques and technical systems, some of which accrete to a durable set of reasoning practices, even though they may not be consistent with ideas that have already been added to the set. The result at any point in time is some collection of practices carried forward from the past, plus new, emerging ideas that must somehow co-exist with the old.

I have argued elsewhere (Jackson, 2012; Jackson & Aakhus, 2014) that design is becoming much more important to our understanding of argumentation. New methods of inquiry may be needed that are neither empirical nor critical. Nelson and Stolterman (2012) describe design as a "third way of knowing," complementary to scientific and humanistic inquiry.

My purpose in this paper is to take a familiar kind of problem for argumentation

theory and use it to explore what this third way of knowing might add to argumentation theory.

2. *Weighing expert advice*

Many contemporary controversies include disagreement over the reliability of expert opinion. One such controversy, very active in the US and UK, concerns childhood vaccination. Public health officials in both countries are overwhelmingly supportive of vaccinating children for a range of infectious diseases. Within the public, however, a significant minority of parents refuse to vaccinate their children, justifying this refusal on a variety of grounds, but mostly on the suspicion that vaccination may cause dangerous and irreversible side effects such as autism.

Anti-vaccination movements have often accompanied a change in public health policy. Jones (2010) documents one of the earliest, a protest against smallpox immunization that spread from Muncie, Indiana, to the other localities within the state. Many of the themes seen in the current controversy over MMR are identical to those documented by Jones. In the 1893 protests against mandatory smallpox vaccination, as in today's resistance to the MMR vaccine, citizens questioned the safety and efficacy of the vaccine, but also objected to health officials denying them a free choice in whether to be vaccinated; and as is happening today, these citizens were represented as irrational in their refusal to defer to expert opinion. Then and now, the controversy was as much about individual responsibility for choice as about the safety and effectiveness of the vaccine.

But the environment for argumentation changed in the hundred years between the outbreak of protest over smallpox vaccination and the outbreak of protest against MMR vaccination. In Muncie, print journalism controlled the pace of the controversy and eventually throttled the ability of dissenters to publish their views. In the communication platforms that define the current media ecology, people move in and out of the active discussion as its relevance for their own lives shifts. At every moment there are participants who are absolutely new to the discussion (wondering whether to vaccinate their child) and participants who have grown jaded by seeing the same arguments recycled over and over. The controversy seems to pulse as interested participants enter, make their decisions, and exit. Various kinds of uninvolved commentators are part of the discourse, including academics introducing new concepts like "argument enclaves." It is an unsettled discourse that does not appear to be moving toward a single resolution

of the central question for parents (should they vaccinate their babies) or for communities (should vaccination be required by law for all babies).

John (2011) characterizes the controversy as "an instance of a general phenomenon: non-expert failure to defer to expert testimony." He continues: "It seems intuitive that something has gone wrong in such cases, and that non-experts ought, in some objective sense, to have deferred to expert testimony" (p. 497). When non-experts "fail to defer," is it really the non-experts who have failed? An important element of the public resistance to vaccination, especially the MMR vaccine, is the suspicion that this vaccine is linked to the onset of autism, a suspicion grounded in parents' own firsthand observations. Offit and Coffin (2003) fault the press (especially the television news program *60 Minutes*) for presenting emotionally affecting content without scientifically meaningful interrogation of that content. Parents' direct observations of symptoms of autism in their own children, appearing soon after vaccination, are a continuing source of evidence for the link. Offit and Coffin explain how *60 Minutes* might have presented observational evidence of this kind within a context that would have helped parents and viewers to reason more clearly about causality.

Burgess, Burgess, and Leask (2006) apply a general framework for understanding "public outrage" to the MMR vaccine controversy. This framework specifies a dozen situational factors – for example, perceived coercion – that amplify outrage. All of these factors were present to some degree in the way the public health establishment reacted to a conjecture, published in the medical journal *The Lancet*, that MMR vaccination might trigger autism through other immediate physiological reactions to the vaccine (Wakefield et al., 1998; retracted by the journal's editors in 2010). One factor of special significance was the unresponsiveness of the public health establishment to parental fears–a dismissiveness that eroded trust in the expert community. Tindale (2012) makes a similar point from an entirely different set of background assumptions: what happened here was not citizens' failure to defer but experts' failure to win trust. So against John's characterization of this as a case of failure to defer, we have a number of other analyses of failure to inform and failure to persuade.

Note that all of these accounts assume that citizen and parental resistance to vaccination really should have been overcome in the end. But two empirical studies, Hobson-West (2007) and Hample (2012), raise doubts about whether it is useful, or even accurate, to see this controversy as a failure of anything. Both

examined groups critical of mandatory vaccination. Hobson-West's data came from face-to-face interviews with leaders of 10 groups organized around a range of issues spanning decades of debate in the UK over vaccination. Hample's data came from online discussions within a virtual community formed around resistance to required vaccination in the US. The picture of citizen reasoning emerging from these analyses is complex and multi-faceted, not reducible to a matter of deferring to expertise or refusing to do so. Hobson-West's qualitative analysis of interviews with group leaders exposed a number of themes having nothing to do with questions of expertise. One important theme (of five) was the notion that vaccination is a governmental strategy used in place of more fundamental improvement in living conditions, especially for the poor; against this notion, the safety and efficacy of vaccines are beside the point. Hample's detailed qualitative content analysis of an online discussion group identified several additional themes of interest: suspicion of government/industry conspiracy, feelings of guilt associated with both vaccinating and not vaccinating, and supporting community members in their off-line confrontations with "provaxxers." Both studies contradict any simple characterization of vaccine resistance as an irrational refusal to defer to expert authority.

Very importantly, both of these empirical studies also portray contemporary resistance to vaccination as a difficult and socially costly choice that involves active search for information beyond what is typically received from the family physician. Parents who resist medical advice on vaccination do not simply reject expert opinion but engage in serious and sustained inquiry. In some cases, resistance to vaccination also involves active search for physicians who will provide the kind of treatment judged best by the parent. Empirically, this controversy is not about argument from expert testimony, nor about general epistemic postures such as deference to expertise. For most participants, the controversy is simply about whether to vaccinate their children. Much is at stake in this decision, and the resources available for making the decision are extraordinarily difficult to evaluate.

3. *A problem for argumentation*
Given that there are experts and non-experts, and that both are often parties to a controversy, what should happen when most experts line up on one side of the controversy? This is an open question for argumentation theory. John (2011) suggests that in such cases, people behaving rationally should defer to experts,

and in some cases they may have a moral obligation to do so. Mizrahi (2013) argues, to the contrary, that expert opinion is a poor basis for deciding what to believe or do, because experts, notwithstanding knowledge superior to that of non-experts, still do not demonstrate a high enough correlation between truth and expert belief. In other words, relying on experts does not yield a high enough proportion of good decisions. Responding to Mizrahi, Seidel (2014) argues that to forego expert advice is "self-undermining," recommending instead a policy of "reasonable scrutiny" that would help differentiate between reliable expert judgments and unreliable ones.

These three very recent papers give contemporary interpretations of ideas that have waxed and waned throughout Western intellectual history. Different times and circumstances have favored any of three competing ideas:

(a) that rational people should defer to authority greater than their own;
(b) that they should distrust all authority and attempt direct examination of any question of importance; and
(c) that they should trust authority once it has been adequately tested for reliability. Each of these postures may be considered to be a mid-range epistemic policy – a preference for reasoning of some particular kind, or a disdain for that kind of reasoning.

Each of these epistemic policies has been considered a way of being rational, and each has also been subject to sustained critique. As uniformly applied policy, these postures are mutually incompatible, and all have vulnerabilities. Hence, what to do with authority in general, and expert opinion in particular, remains challenging for argumentation theory.

But these theoretical ideas about appeal to authority also reflect change in argumentation as a practice. Appeal to authority has actually been a different kind of argument over the centuries – depending on many factors, but especially on what at each time and place has been considered the source of authority. Nowadays, appeal to authority mostly means reliance on experts, and this requires entirely different argument evaluation strategies than those employed before there was such a thing as an expert in a specific field – a modern notion, not an ancient one. Asking whether a speaker is an authority "in X" would have made little sense until perhaps the middle of the 19th century, even though it is certainly also the case that there have been people with extraordinary knowledge

and skill, meriting others' deference in some specific domain but not in others, throughout human history. Nor has appeal to authority remained static in the post-WWII era, as it has become increasingly difficult to differentiate scientific authority from government policy.

Structurally, appeal to authority may have had very similar characteristics across the ages. But if the environment changes, the strengths and weaknesses of this argument form may also change. In some contexts, appeal to authority may be the best available basis for a conclusion; in others, it may be only a shortcut; in still others, it may represent a refusal to engage in deeper thinking about a topic. In other words, argumentation practice is sensitive to change in media ecology, and our theoretical assessments of particular argument forms may need constant updating.

4. *From argument appraisal to design hypothesis*

If we understand argumentation as a changeable practice that is constantly being redesigned to meet the needs of its practitioners, all ideas about argumentation are liable to affect the practice. A design hypothesis is any notion, theoretical or intuitive, about how argumentation might be conducted to better achieve its purpose. Like an empirical hypothesis, a design hypothesis must conform with facts, but its real test is its ability to support particular human purposes in particular circumstances. Design hypotheses do not compete with one another in the way empirical hypotheses do; each new design hypothesis may add to our overall rationality in some circumstance. New problems, or new contexts for old problems, may need new design ideas. Design theory builds by adding options.

In a design theory of argumentation, normative components can take the form of design hypotheses, and these may concern not only standards for appraisal but also procedures to follow or resources to provide or anything else that may improve the outcomes of argumentation. Both deferring to experts and challenging the authority of experts can be reframed as design hypotheses. And other design hypotheses can be imagined. One of these is the idea of making a deliberate prior choice to delegate a difficult question to someone who can be trusted to find the best possible answer. Deference, distrust, and delegation are three distinct ideas about how to integrate expert opinion into a discussion; each tends to add distinctive features to how people interact.

4.1 *Deference*

A posture of deference is based on the idea that people should accept conclusions that are accepted by those most knowledgeable about a topic. In some places and times, this has been not just an epistemic policy, but a sort of social obligation involving the giving of respect to people who have in some sense earned that respect. If deference is built into the rules of a kind of interaction, the only reasonable question to ask of an authority is what they believe or what they recommend.

A strong contemporary defense of deference can be found in the work of the Third Wave science studies group led by Collins and Evans (2007). Based on careful examination of what is involved in becoming an expert in anything, Collins and Evans aim for a philosophical defense of deference to experts. Within their framework, expertise is defined primarily in relation to expert communities. Individuals may have various kinds of expertise depending on how they stand with respect to an expert community. Collins and Evans have distinguished several forms of expertise, of which the most relevant to my topic are contributory expertise, interactional expertise, and primary source knowledge.

Contributory expertise, interpreted within a wide range of enterprises other than science, consists in having the capacity to move a discussion forward, toward a resolution of disagreement among experts themselves. People who publish original research in the specialized literature of a field are contributory experts. The contributory expert helps to build the expert field through direct extension of what an expert in that field knows. According to Collins and Evans, contributory expertise can only be acquired by immersion in the expert community and direct practice in contributing.

Interactional expertise is an understanding of the field sufficient to be in conversation with experts even if unable to contribute anything new. This form of expertise involves understanding the methods of the field, and even being able to critique the application of these methods to scientific problems, but it is expertise developed toward an end other than contributing new knowledge. Interactional expertise is not just a diminished version of contributory expertise but an acquired ability to do a different job. Interactional expertise is partly generalizable across fields, but it must also be developed in interaction with contributory experts.

Primary source knowledge is a form of expertise that is acquired at a distance

from the expert community. A person can acquire primary source knowledge by reading the expert literature. However, this is a very different kind of knowledge than the knowledge possessed by even a novice contributor. The relationship to the expert field is completely unidirectional in this case and lacks the tacit knowledge that contributory experts possess but do not (and maybe cannot) communicate in writing. As Collins and Weinel (2011, p 402) point out, "to become an expert in a technical domain means acquiring the tacit knowledge pertaining to the domain. As far as is known, there is only one way to acquire tacit knowledge and that is through some form of 'socialisation'; tacit knowledge cannot be transferred via written or other symbolic form so some form of sustained social contact with the group that has the tacit knowledge is necessary." This is extremely important; it means that no matter how diligently a person studies what has been written about a topic, that person will still lack important components of expert judgment.

In short, the argument for deference is that to really understand an expert's judgment requires prolonged immersion in the material and social world of the expert – in other words, altering one's life course to become an expert. Attempting to retrace an expert's reasoning or to evaluate the same evidence the expert had available will not replicate expert judgment, because tacit knowledge and experience are indispensable ingredients in such judgments. Except in special conditions where experts' trustworthiness is compromised, our most rational posture toward expert fields, according to Collins and Evans, is to believe what they say.

As a design hypothesis, deference works by acknowledging true gaps between what an expert knows and what can be fully defended to skeptical non-experts. In sustained questioning of experts by non-experts, a point must always be reached where the expert "just knows" something that cannot be known in the same way by anyone who has not been socialized into the expert community. If experts are part of a discussion, they must be allowed their expertise, even if what they see when they look at evidence is uninterpretable to anyone else looking at the same evidence.

Collins and Evans describe their own aim as a normative theory of expertise that includes an "approach to the question of who should and who should not be contributing to decision-making in virtue of their expertise" (p. 52). Designing around deference generally means differentiating among the participants in a

discourse and assigning special communication privileges to some but not others; it may involve forms of compulsion (such as rules and laws) that take matters out of the realm of individual reasoning. It can mean limiting the kinds of questions that can be asked of experts or the kinds of arguments that can be raised against their conclusions. In the vaccination controversy, laws that require vaccination for enrolment in school enforce deference to medical science, at least in the US. An individual has options for avoiding compliance, but not for escaping the societal deference that is paid to medical research.

4.2 *(Dis)trust*

A posture of distrust is based on the idea that accepting anything without question is dangerous and that authority is most dangerous when it is most difficult or most costly to question. In some places and times, this posture has been accompanied by the assumption that all citizens are capable of making independent assessments of facts and reasoning if they are willing to inform themselves – and that they have a duty to do so. In contemporary practice, this notion leads motivated citizens to conduct exhaustive "primary source" research on topics of interest to them. The challenge for this posture is the collapse of the assumption that ordinary citizens, sufficiently motivated, can reach independent conclusions of a quality equal to the conclusions of experts. If Collins and Evans are correct about what expertise really consists of, no amount of exposure to "primary sources" of expert fields will allow the consumer to develop expert judgment. However, even those who agree with Collins and Evans on the nature of expert communities do not always give up on the idea that non-experts should withhold trust until experts themselves have been tested. The idea of retracing and directly evaluating an expert's reasoning has not completely disappeared within the general public, but among theorists it has given way to the idea that what can be interrogated is whether the authority should be trusted. To competently interrogate authority requires a different, potentially generalizable set of skills, possibly included in what Collins and Evans call "interactional expertise."

Theoretically, distrust of authority can co-exist nicely with trust in expert opinion, so long as expert opinion can be evaluated through non-expert questioning. This is demonstrated in Walton's (1997, 2002) very detailed analyses of arguments from expertise, which include explorations of how institutions (e.g., courts of law) design procedures for rigorous testing of whether to admit expert testimony and

for specifying what can be concluded from any particular piece of expert testimony. Distrust is a starting position from which non-experts can arrive at confidence in experts, but only after those experts have been thoroughly scrutinized.

As a design hypothesis, distrust operates through audit-like procedures that check for anything being hidden, anything that might incentivize experts to prefer one judgment over another, anything that experts might be missing or ignoring, any change in meaning as an assertion passes from context to context, and so on. This has design implications both for citizens and for experts, including implications for how to design participation formats to fit particular controversies: formats that adjust to differing degrees of citizen trust in expert communities and public bureaucracies. For example, in "post-trust societies" (as described by Löfstedt, 2005), there may be greater public calls for openness of information and transparency in how information is used. It can also mean regulating the experts themselves. Snoeck-Henkemans and Wagemans (2012) pointed out that one protection that makes it reasonable for patients to trust their physicians is a Dutch law that requires physicians to cooperate in patients' efforts to get a second medical opinion when they do have doubts.

4.3 *Delegation*
A third design hypothesis, less visible within argumentation theory, is delegation of a decision through implicit or explicit bilateral agreement. The core idea behind delegation is that some issues require such sustained analytic effort that the only feasible way to make progress toward resolution is to transfer responsibility to some trusted person or group that willingly accepts this responsibility. Where deference and critical trust may be seen either as epistemic policies or as design hypotheses, delegation really only makes sense as something designed into a broader framework for making decisions. Retrospectively, accepting a result from a delegated inquiry may look like any other argument from expert opinion. Procedurally, it is quite different.

Delegating responsibility for a question implies that the answer will be accepted once it has been returned from the delegation process, so it is tempting to see this as a version of the deference posture. But delegation is not just deference, and indeed, sometimes it involves nothing that could be mistaken for deference to authority. For example, delegation is the design principle behind use of trial juries, where a judgment that any citizen is capable of making is handed over to

selected individuals who agree to invest time, attention, and effort in arriving at their judgment.

But delegation is different from deference in another very important respect. Deference is an acknowledgement that some individual possesses superior knowledge that others are not in a position to question. Delegation involves a sort of agreement between the community as a whole and the individuals who take responsibility for the community's questions about a domain. When important matters are delegated to experts, it is assumed and often explicitly stated that the experts owe a duty of care to anyone who depends on their expertise. Delegation may require someone to *become* an expert on the question at hand – for example, as a juror – but that expertise does not merit deference unless understood as part of an implicit contract in which acting in good faith is as important as being knowledgeable. In other words, deference does not involve any accountability, while delegation does.

As a design hypothesis, delegation works through a kind of bargain in which deference to a judgment is promised in exchange for dutiful performance. Without some form of accountability to ordinary citizens, experts and expert communities may feel that they deserve deference, but ordinary citizens do not have to agree to this. In such cases, experts must make their way in argumentation just as any other arguer would.

Scientific fields sometimes behave as though they hold delegated responsibility for society's knowledge about a domain, and other times behave as though they are completely autonomous, so using delegation as a tool to understand the role of expertise in public affairs remains complex. The best contemporary examples of delegation as a design principle involve explicit bilateral agreements. One model is the practice associated with "informed consent" for both acceptance of medical procedures and participation in experimental research. Informed consent specifically acknowledges the autonomy of the recipient's decision and the obligation of an expert to fully inform the recipient of benefits and risks associated with each possible decision.

But nothing like informed consent qualifies many of the efforts scientific fields make to influence public policy. Occasionally, experts demand deference without acknowledging any duty of care, without manifesting this duty of care in their behavior, and, frequently, with explicit disavowal of any duty of care. Scientific

communities desire autonomy from public accountability, and research literatures reflect interests (and viewpoints regarding those interests) that acknowledge no duty beyond various forms of research ethics. But unilateral assertions of authority by experts are not at all the same as the voluntary delegation of authority to experts – and it should come as no surprise when members of the public refuse to defer to such unilateral assertions.

The motivation behind delegation is the belief that a problem is of sufficient complexity to require a great deal of diligence for a good solution. This diligence takes at least two forms: preparation for attempting the solution (for example through professional training), and prolonged consideration of the problem from all possible angles. What makes delegation safer than generalized deference is the assurance that the expert community will in fact "do due diligence" on behalf of the public. Deferring to expertise is dangerous when an individual expert or a community of experts refuse to accept a duty of care. Delegation as a design principle is about structuring a system in which it is understood that specific people or institutions are responsible, to everyone else with a stake in the conclusion, for exercising the due diligence needed to understand an issue and make good decisions as needed.

5. *Design hypotheses in action*
Design hypotheses are ideas about how something might be improved, and these ideas get embedded in invented practices that can achieve surprising levels of permanence as other practices are built over them. Deference, distrust, and delegation are all deeply woven into the contemporary practice of argumentation. All three are actively present in the anti-vaccination controversy, not only as explicit themes in the discourse but also as features of designed systems that come into play.

Although the idea of deferring to disciplinary expertise (that is, to medical research rather than to the judgment of individual doctors) is still relatively new in human history, it has become deeply embedded in technical practices such as randomized clinical trials for proposed treatments and peer reviewed publication. Public health authorities, legally empowered to decide for all of us which treatments are safest and most effective, willingly defer to upstream medical research; downstream, they expect deference from citizens, and they get it from the vast majority. Most citizens acknowledge that they are in no position to seriously review the conclusions of experts, and they willingly defer both to public

heath officials and to their own health care providers. A variety of durable institutional arrangements reflect a decision that society has already made to defer to medical expertise on matters of public health. This decision can be revisited – for example, to consider other kinds of expertise that might guide thinking about public health, such as sociology or economics – but the scale on which this re-evaluation takes place is not the individual argument from expertise but the design of these durable institutional arrangements and the highly elaborated technical practices that represent our current best ideas about how to reason our way to good decisions.

Caution with respect to expert authority is similarly built into the environment in which the anti-vaccination controversy thrives. Despite the high levels of deference afforded to medical research, researchers themselves operate under increasing levels of oversight and scrutiny, mandated by law in many countries (including the US and throughout the EU). Independent ethics committees that review and approve the conduct of research differ from scientific peer review in having members who are not from the researcher's own field, and even in some cases members who are not scientists of any kind. One danger in deferring without question to an expert field is that the members of the field will become socialized into a common disregard for the values of the surrounding society. Our designed systems for managing this danger have the flavor of Walton-like tests for testing an individual expert, but they are adapted to inspecting the taken-for-granted practices of the expert field. They are built into the environment, and, besides their direct effects as regulatory mechanisms, they also keep alive the idea that experts must continue to earn our trust, even after we have made decisions to defer to them routinely.

6. *Conclusion*
In academic research on the controversy over MMR vaccination, critical attention has been divided among the small minority of individual parents who resist mandatory or recommended vaccination, the journalists who amplify fears about vaccination, and the public health authorities who fail to be responsive to public fears. No doubt some of these players are performing incompetently.

Design thinking about argumentation draws attention to a rather different class of questions: for example, about how an innovation like peer review affects a whole society's capacity for reasonableness, both positively and negatively. If we zoom out to examine the impact of designed systems for producing, evaluating, and

deploying expertise, our attention is drawn to the overall behavior of these systems, and especially to their ability to naturalize deference to expert fields while continuously enforcing due diligence. Most importantly, a design perspective on argumentation draws attention to the features of the communication environment that are changeable and to what can be done to make individuals and societies more or less reasonable.

References
Burgess, D. C., Burgess, M. A., & Leask, J. (2006). The MMR vaccination and autism controversy in United Kingdom 1998-2005: Inevitable community outrage or a failure of risk communication? *Vaccine*, 24, 3921-3928. DOI: 10.1016/j.vaccine.2006.02

Collins, H., & Evans, R. (2007). *Rethinking expertise*. Chicago: U. of Chicago Press.

Collins, H., & Weinel, M. (2011). Transmuted expertise: How technical non-experts can assess experts and expertise. *Argumentation*, 25(3), 401-413. doi:10.1007/s10503-011-9217-8.

Hample, J. M. (2012). Analysis of arguments favoring vaccine resistance. In J. Goodwin (Ed.), *Between citizens & scientists: Proceedings of a conference at Iowa State University* (pp. 183-193). Great Plains Society for the Study of Argumentation.

Hobson-West, P. (2007). 'Trusting blindly can be the biggest risk of all': Organized resistance to childhood vaccination in the UK. *Sociology of Health and Illness*, 29, 198-215.

Jackson, S. (2012). Black box arguments and accountability of experts to the public. In J. Goodwin (Ed.), *Between citizens & scientists: Proceedings of a conference at Iowa State University* (pp. 1-18). Great Plains Society for the Study of Argumentation.

Jackson, S., & Aakhus, M. (2014). Becoming more reflective about the role of design in communication. *Journal of Applied Communication Research*, 42, 125-134. doi:10.1080/00909882.2014.882009.

John, S. (2011). Expert testimony and epistemological free-riding: The MMR controversy. *Philosophical Quarterly*, 61, 496-517. doi:10.111/j.1467-9213.2010.687.x.

Jones, K. H. (2010). Rebelling against lawful authority? The vaccination controversy during the smallpox epidemic at Muncie, Indiana, 1893. *Journal of the Indiana Academy of the Social Sciences*, 14, 74-87.

Löfstedt, R. E. (2005). *Risk management in post-trust societies.* New York: Palgrave MacMillan.

Mizrahi, M. (2013). Why arguments from expert opinion are weak arguments. *Informal Logic,* 33, 57-79.

Nelson, H., & Stolterman, E. (2012). *The design way: Intentional change in an unpredictable world* (2nd ed.). Cambridge, MA: MIT Press.

Offit, P., & Coffin, S. (2003.) Communicating science to the public: The MMR vaccine and autism. *Vaccine,* 22, 1-6. DOI: 10.1016/S0264-410X(03)00532-2.

Seidel, M. (2014). Throwing the baby out with the bathwater: From reasonably scrutinizing authorities to rampant scepticism about expertise. *Informal Logic,* 34, 192-218.

Snoeck-Henkemans, A. F., & Wagemans, J. H. M. (2012). The reasonableness of argumentation from expert opinion in medical discussions: Institutional safeguards for the quality of shared decision making. In J. Goodwin (Ed.), *Between citizens & scientists: Proceedings of a conference at Iowa State University* (pp. 345-354). Great Plains Society for the Study of Argumentation.

Tindale, C. W. (2012). Dismantling expertise: Disproof, retraction, and the persistence of belief. In J. Goodwin (Ed.)*, Between citizens & scientists: Proceedings of a conference at Iowa State University* (pp. 393-402). Great Plains Society for the Study of Argumentation.

Wakefield, A. J., Murch, S. H., Anthony, A., Linnell, J., Casson, D. M., Malik, M., Berelowitz, M., Dhillon, A. P., Thomson, M. A., Harvey, P., Valentine, A., Davies, S. E., & Walker-Smith, J. A. (1998). Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *The Lancet,* 351(9103), 637–641. doi:10.1016/S0140-6736(97)11096-0.

Walton, D. (1997). *Appeal to expert opinion: Arguments from authority*. University Park, PA: Pennsylvania State U. Press.

Walton, D. (2002). *Legal argumentation and evidence*. University Park, PA: Pennsylvania State U. Press.