All Too Human: Conflict and Common Ground in Interdisciplinary Research and Complex Problem Solving

by

James Welch IV
Associate Professor of History
University of Science and Arts of Oklahoma

Abstract: The identification of conflict and development of common ground, important steps in the interdisciplinary research process, become challenging when applied to solving complex real-world problems that involve opposing interest groups, especially those whose members do not possess academic or interdisciplinary training. This article examines psycho-social mechanisms that can complicate the interdisciplinary process in solving such problems, using attempts to solve the problem of anthropogenic climate change to exemplify the situation. Understanding the mechanisms of conflict as well as strategies of conflict resolution can improve the interdisciplinary research process in its application to complex real-world problems.

Keywords: interdisciplinary studies, conflict resolution, climate change, cognitive dissonance, confirmation bias, carnivalization, conspiracy thinking, groupthink, scientific method

Introduction

The interdisciplinary research process offers a method for solving complex real-world problems through the integration of insights produced by multiple disciplinary perspectives. This process enhances traditional research methods through the addition of steps designed to aid the problem-solver in understanding and organizing information from sources that may have differing epistemological assumptions, theoretical frameworks, and/ or conceptual languages. The process of integrating disciplinary insights begins by identifying conflicts among insights and creating common ground among them (Repko & Szostak, 2017, p. 85). The fact that the interdisciplinary research process is explicitly grounded in real-world problems can complicate matters, because problem solving in the real world

is often undertaken not just by interdisciplinarians trained in the process, but also by some combination of experts (disciplinary or non-academic), members of political and economic interest groups, and other stakeholders. Although the techniques of integration employed by interdisciplinarians can help resolve epistemological, theoretical, and conceptual conflicts, conflicts that arise among stakeholders in real-world situations often involve all-too-human psycho-social mechanisms that must also be taken into account.

The subject of anthropogenic climate change is exactly the kind of complex real-world problem that the interdisciplinary research process should be well-suited to address, meeting nearly all the criteria to justify using an interdisciplinary approach identified by Repko and Szostak (2017, pp. 93-95). The problem of climate change is complex–involving insights offered by two or more disciplines, including biology, Earth science, economics, sociology, political science, and others. No single discipline has been able to resolve the problem of climate change satisfactorily. Furthermore, ostensibly intractable conflicts among the insights of sciences and the social sciences have made climate change particularly difficult to address. Climate change is also an unresolved societal issue. And yet efforts to deal with climate change in any organized or consistent manner have met not only with opposition from groups with a variety of differing economic interests, but also with intense antagonism among ideological factions. The role of science as a source of objective, neutral expertise on this as on other complex issues has broken down, and the political process has failed to mediate conflict among stakeholders toward the common good.

Those familiar with the interdisciplinary research process should be able to use techniques of integration to identify conflicts over complex issues like climate change, develop common ground among those with conflicting views, and help resolve the problem. However, the intense nature of the conflict over climate change goes far beyond theoretical and conceptual dimensions, illustrating many of the psycho-social mechanisms that arise in solving complex real-world problems, psycho-social mechanisms that are not unique to the debate over climate change, but are common in our all-too-human attempts to deal with any controversial societal issue.

Before proceeding, it is necessary to clarify the dual nature of conflict in the context of interdisciplinary problem solving. According to Repko and Szostak (2017), "the existence of conflict is not some inconvenience that somehow keeps popping up…rather, it is endemic, inevitable, and central to the interdisciplinary enterprise" (p. 245). As they note, there is a sense in which conflict is a productive part of any problem-solving process: The tension of conflict can promote open-mindedness, exposure to diversity, and

emergence of important insights and innovations that often arise from the clash of different ideas and viewpoints.

Interdisciplinary study is indeed "messy," working through tensions and contradictions toward greater levels of integration (Seipel, 2005). Furthermore, interdisciplinary integration itself is not an end leading to complete resolution of a given complex problem; it is not a resting place. For any complex system, internal and external conflict make the system dynamic, requiring constant adjustment to changing conditions, continuously stimulating further and better resolutions. However, there is a point where conflict turns from healthy to destructive.

In particular, this article examines the dynamics of conflict that can occur when non-academics (i.e., representatives of interest groups, policy makers, and policy implementers) are involved in complex real-world problem-solving situations. These groups are collectively called stakeholders, those who have some sort of interest–economic, political, ideological, historical, religious, cultural–in the outcome of a particular complex problem. When the interests and beliefs of stakeholders clash, their conflicting aims and motives can and do hamstring efforts to find common ground–even when interdisciplinarians are involved in those efforts. Without common ground, progress into the later stages of integration–the development of a comprehensive, shared understanding and potential solutions to the problem–is all but impossible.

Repko and Szostak (2017) identify three types of assumptions as sources of conflict among disciplinary insights: epistemological, ontological, and value laden (p. 249). I have dealt with epistemological and ontological assumptions in previous articles (see Welch 2009, 2011, 2012) and dealt with the ways academics can learn (and have learned) to negotiate these challenges. The present article is focused more on the particular dynamics of conflicts that arise when competing value systems clash among non-academics involved as stakeholders in real world problem-solving situations. Although academics are themselves all-too-human, academic training, especially in the liberal arts tradition, helps them minimize (but never completely eliminate) their own psycho-social mechanisms of conflict. And of course it also helps them negotiate value laden conficts among non-academics with whom they are working towards solutions to complex problems.

In an effort to make interdisciplinary problem solving more effective in real-world contexts, this article will examine the complex nature of the human experience of conflict as it arises from a confluence of psychological, social, and cultural factors. Psychological mechanisms establish and maintain individual belief systems, and make them resistant to contradictory

influences. Group dynamics reinforce the inertia of these systems, which is further fortified by cultural and political institutions. I also consider the decentering of the role of science, a phenomenon that interferes with its potential as a means of arbitration in conflict situations. Periodically in this article, I will use the debate over climate change to illustrate these mechanisms that resist the resolution of conflict, thus grounding this theoretical study of conflict in a topical context. In particular, this article examines the ways the mechanisms of conflict problematize the interdisciplinary research process. It concludes with recommendations for reducing conflict so as to allow the creation of common ground, both as a part of the interdisciplinary research process and in complex real-world problem solving in general.

The Psychology of Conflict

In academic circles, there is the presumption that reasonable people with differing solutions to problems will respectfully hear each other's ideas, gather and weigh evidence, and, through a process of negotiation and compromise, arrive at a consensual solution. The interdisciplinary research process in particular expects researchers to collect and assess information from a variety of sources, dispassionately evaluate the insights generated, and integrate them toward a solution to a problem. This approach entails detaching from one's personal or disciplinary biases enough to incorporate valid contradictory perspectives into a comprehensive understanding. Unfortunately, this process disturbs powerful and deep-seated tendencies of human nature, as characteristic of academics as they are of non-academics.[1] These tendencies need to be examined and understood in order to help academics and any others involved in the process minimize their impact on complex problem solving. Thus, our study of the nature of human conflict begins with an examination of the psychological mechanisms that create and sustain conflict, particularly cognitive dissonance and confirmation bias.

Cognitive dissonance. The human aversion to pain applies just as much to mental distress as it does to physical sensation. According to cognitive dissonance theory, mental pain occurs when we are confronted with discordance between reality and our expectations of it:

> Inconsistent cognitions interfere with our action tendencies and thus create a negative emotion, motivating us to rid ourselves of

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[1] Note that although the psycho-social mechanisms discussed throughout this article are universal qualities of the human mind, this is not to say that they are absolutely determinative. There are countervailing tendencies in human nature, as well as methods of discipline and training which can, to an extent at least, compensate for them.

> the inconsistency. …[I]t is not inconsistency per se that causes us to be upset, but rather the effect that inconsistency has on our need to have an unequivocal stance toward action in the social and physical environment. (Cooper, 2007, pp. 81-82)

In other words, contradiction and ambiguity cause us psychological pain (or at least discomfort) and this pain is biochemical and psychologically measurable (p. 61). Unfortunately, contradiction and ambiguity are hallmarks of almost any complex real-world problem.

The way our minds cope with cognitive dissonance is not merely to ignore contradictory evidence, but to actually revise our perception of reality itself, so that our selective perception of the external world continues to conform to our preconceptions of it. In order to reconcile reality and expectation, we tend to attribute any disjunction to external sources, sometimes even forming the most complicated and circuitous explanations for phenomena, rather than revise our attitudes or beliefs to adjust to observations or evidence. Jackson and Jamieson (2007) observe in their media studies that we often avoid examining the world in any systematic way, preferring instead to take conceptual shortcuts, and draw conclusions that suit our sense of an established order. This is a decidedly irrational approach to the world, falling back on the emotionally biased thinking that has been hard-wired into our brains as an evolutionary response to a highly dangerous environment where we had to protect ourselves from predators.

The avoidance of cognitive dissonance may protect us from psychological pain, but it also may cause us to avoid "disturbing" ideas that may present possibilities for reassessment and innovation (Dominowski & Ballob, 1995). Ideas are dismissed simply because they are "weird"–outside our comfort zone–dismissed because, on a gut level, they make us nervous (Gladwell, 2007). Psychological studies have demonstrated the lengths that we will go to avoid changing our attitudes toward a world that is inconsistent with the way we think it should be. In some cases, cognitive dissonance has to do with self-esteem, or at least self-conception. "One's view of oneself–i.e., a person's self-concept–establishes expectations whose violation, in turn, leads to the arousal of dissonance" (Cooper, 2007, p. 97).

Most often, however, dissonance arises from an inconsistency between cultural or group norms and observation of reality. Most people are highly reliant on normative systems to create a sense of stability and predictability about the world. Behavior outside these norms creates dissonance, and this may lead us to categorize that behavior as deviant. This act of categorizing alleviates cognitive dissonance and allows us to avoid the psychological discomfort of reevaluating the normative system on which we depend.

"Whether behavior and attitudes are logically consistent or not, dissonance will be aroused only when the behavior violates standards and those, in turn, exist not in a vacuum but in a social context" (p. 149).

So, in crucial ways, processes essential to complex problem solving–comparing diverse points of view and weighing contradictory evidence–can be deeply disconcerting to the human mind. To some extent, we all depend upon accustomed habits of thought in order to maintain peace of mind. Therefore, even acknowledging conflicts so as to enable conflict resolution is difficult for us, even if we have enough training, skill, and/or motivation to reconfigure our own preconceptions in order to overcome conflict and create common ground. The very notion of integrating insights from multiple perspectives, necessary in the interdisciplinary research process, can induce cognitive dissonance among non-academic stakeholders, who often adhere to competing value systems. Professional academics do possess the training to work their way through cognitive dissonance toward new conceptualizations of the world. However, disciplinary specialization also tends to create its own normative center, which in turn makes it difficult for academics to give equal weight to ideas outside of their familiar field. For all these reasons, it is important to recognize the importance of cognitive dissonance as a fundamental mechanism of conflict affecting both academic experts and non-academic stakeholders.

Confirmation bias. Resistance to the disruption of accustomed worldviews is called "confirmation bias." Rising out of the need to avoid cognitive dissonance, confirmation bias powerfully protects and defends normative systems against observations, information, behaviors, or evidence that may threaten them. In general, we prefer the familiar, react negatively to the strange, and tend to make instant threat assessments. This instinct, a product of evolutionary development, is hard-wired into our brain physiology. It functions to stabilize our perception of the world around us, establishing categories of friend and foe, lest we underestimate threats. Cumulatively and collectively, these zones of familiarity establish paradigms that encapsulate our worldviews and belief systems. Paradigms, once established, have a tendency to become fixed and normative, often requiring concerted mental exertion to displace (Myers, 2002; Gladwell, 2005).

According to Nickerson (1998), confirmation bias "appears to be sufficiently strong and pervasive that one is led to wonder whether the bias, by itself, might account for a significant fraction of the disputes, altercations, and misunderstandings that occur among individuals, groups, and nations" (p. 175). Confirmation bias gives preference to evidence that supports existing beliefs, being less receptive to counter-indicative evidence, seeking

to discredit or explain it away. In strictly psychological terms, when we examine competing explanations for phenomena, our need for self-esteem, control, and cognitive consistency can be more important than our need for accuracy. Moreover, studies have shown that confirmation bias operates not only in cases where valued beliefs are present, but also in cases where the individual has no vested interest, confirming that such bias is a matter of instinct, not motivation. In other words, confirmation bias can be resistant to rationality and negotiation.

Confirmation bias manifests in a variety of related ways. Commonly, we are prone to seeing patterns we are already looking for, regardless of whether or not they are really there. Humans are, by nature, pattern seekers, but this powerful organizational tool can also lead to delusion: "Taxonomies that are invented as conceptual conveniences often come to be seen as representing the way the world is really structured" (Nickerson, 1998, p. 183). Another manifestation of confirmation bias is called The Primacy Effect. Beliefs, once formed, resist change, and "bias the evaluation and interpretation of evidence that is subsequently acquired" (p. 187). Also, there is The Pollyanna Principle, which gives preference to evidence of desirable or pleasant propositions. As Paul Simon (1970) has written, "A man hears what he wants to hear and disregards the rest."

Confirmation bias can also be collectively expressed by social institutions. For instance, in policy rationalization, an administration first commits to a policy, then spends a great deal of effort continually justifying this decision rather than reevaluating and adjusting policy to best address changing conditions. Confirmation bias can even exist in the scientific community:

> The fact that scientific discoveries have often met resistance from economic, technological, religious, and ideological elements outside science has been highly publicized. That such discoveries have sometimes met even greater resistance from scientists, and especially from those whose theoretical positions were challenged or invalidated by those discoveries, is no less a fact if less well known. (Nickerson, 1998, p. 194)

This despite the fact that the scientific method was primarily formulated to eliminate human biases.

Confirmation bias is the product of the way the brain processes information. According to Nickerson, we tend to gather information about just one hypothesis at a time. Furthermore, once we have chosen to investigate a hypothesis, we tend to look for evidence that will positively confirm it, rather than evidence that will negatively falsify it. One explanation for this manifestation of confirmation bias is cognitive miser theory. This theory

postulates that it is a general tendency of the human mind to minimize the energy it takes to make decisions, solve problems, or do any other kind of cognitive activity. Positive affirmation of hypotheses requires less effort than exploring alternative explanations and evaluating them.

When searching for information about a topic, we have an unconscious tendency to stop searching when we find confirmation of our preconceptions. "The search seems to be not only less than extensive but, in many cases, minimal, stopping at the first plausible endpoint" (Nickerson, 1998, p. 210). Ebenbach and Keltner (1998) assert that we often "in the midst of a complex social world engage in heuristic, unsystematic processing to conserve cognitive resources" (p. 7). We thus distort our view of reality to favor our pre-established world views, and to avoid the effort systematic examination of our own beliefs and the complex realities of the world around us would require. Outside the hallowed halls of academia, evidence for these miserly tendencies is all but ubiquitous–climate change denial, exaggerated fears of Islamic terrorism, xenophobic concerns over immigration, and claims about "fake news" are a few examples.

Psychological conflict in complex problem solving. The psychological mechanisms of cognitive dissonance and confirmation bias pose problems for some of the basic assumptions underlying the interdisciplinary research process, at least in its application to complex real-world problems. According to Repko, Szostak and Buchberger (2015), cognitive capacities developed by training in interdisciplinary studies include, among other things, placing problems within a larger context, empathizing with viewpoints that may conflict, and reflecting on one's own biases and values (p. 27). However, such capacities don't guarantee that interdisciplinarians can deal effectively with their own or others' problematizing tendencies. As Nickerson (1998) contends, confirmation bias

> is especially prevalent in situations that are inherently complex and ambiguous… In situations characterized by interactions among numerous variables and in which the cause-effect relationships are obscure, data tend to be open to many interpretations. When that is the case, the confirmation bias can have a great effect, and people should not be surprised to see knowledgeable, well-intentioned people draw support for diametrically opposed views from the same set of data. (pp. 191-192)

Certainly, interdisciplinary scholars, as well as public policy makers, have seen the mechanisms of cognitive dissonance and confirmation bias play out in the heated rhetoric over complex real-world problems like climate change. Verbal abuse has come to characterize much of the discourse surrounding

that and other contemporary controversial issues. Often, aggression is most apparent from those who have not reflected deeply on the weakness or indefensibility of their own positions, where lashing out seems a response to the denial of their own insecurity (Jackson & Jamieson, 2007; Cooper, 2007). And in real-world situations with diverse stakeholders possessing conflicting interests and opinions, such insecurity can be especially rife, even among academics who may be involved. In these forums, human nature, with all its biases and heuristics, is on full display.

Cognitive dissonance and confirmation bias compound the tendency we all share to establish positions and defend them against forces that may upset or destabilize them. These positions–be they be based on ideology, philosophy, religion, or culture–create paradigms within which we collectively live, supplying our underlying assumptions–our basic understanding of truth, being, and value. It's no wonder that paradigms operate in the same way that physical territorialism does. When we are faced with ideas that seem threatening, deep-seated psychological instincts can cause us to respond with the ferocity of a momma bear defending her den. Such ursine tendencies don't serve to promote the integrative work of the interdisciplinary research process.

Social Dynamics of Conflict

The psychological mechanisms of conflict (addressed above) are amplified and reinforced by sociological forces, and manifest in such social phenomena as carnivalization, conspiracy thinking, and groupthink dynamics. Conflict is most often externalized as a clash between opposing groups, classes, or institutions. When conflict is collectivized, social dynamics add another dimension to the challenges of conflict resolution and the development of common ground. An examination of these dynamics will provide us with a still deeper understanding of the causes of conflict over complex problems, which will in turn help us develop strategies for overcoming them.

Carnivalization. One example of the way that social dynamics complicate conflict is the phenomenon of "carnivalization," a term coined by Mikhail Bakhtin, derived from the ancient tradition of holiday celebrations such as the Roman Saturnalia. This festival, traditionally held December 17-23, temporarily inverted the social order, allowing slaves to act as masters during the ceremonial period (Holt, 2004). This annual ritual and others like it (Mardi Gras, for instance) were designed to help stabilize the social order by offering a temporary outlet for the frustrations of those in oppressed classes. In reaction to perceived structures of authority and oppression,

groups who feel they are powerless seek to denigrate those in power and thereby uplift themselves. This manifests as a familiar social power dynamic of "David vs. Goliath," i.e. underdog versus authority. This dynamic is quite pervasive, recurring throughout history, art, and literature. It creates a formidable rationale for creating and/or sustaining conflict–providing a sense of righteousness and justice for the resentful underdogs.

The symbolic nature of carnivalization can be seen in the almost arbitrary assignment of the roles of authority and underdog, roles that are, in practice, highly situational. The debate over climate change illustrates the arbitrary assignment of authority quite clearly. Environmentalists see authority as resting in the rich and powerful, corporate moguls and their commissars who directly profit from rampant consumption, waste, overproduction, exploitation, and greed. Environmentalists see themselves as underdogs, fighting an uphill battle against entrenched capitalism and the special interests that support it.

Conversely, opponents of environmentalism characterize themselves as the underdogs. For them, environmentalism is itself an entrenched position, oppressing good, honest, ordinary folks with its vision of a New World Order that is supported by authority figures like scientists, professors, and bureaucrats. In the conflict over climate change, both sides make simultaneous claims to representing a populist uprising. They categorize competing ideas as the products of established authorities unjustly protecting their interests. This carnivalizing tendency presents a formidable challenge to the interdisciplinary strategies of creating common ground and integrating insights from diverse perspectives, not least because the tendency to invert perceived power structures undermines the very notion of expertise. The interdisciplinary research process is primarily concerned with mediating among disciplinary experts and the concepts, theories, and negotiations involving stakeholders, which are often characterized by value-laden conflicts; experts can be seen as authority figures seeking to imposing their will on ordinary citizens who see their views as just as valid. This attitude toward expertise can hamstring problem-solving efforts by undermining the research process from its outset.

Conspiracy thinking. The phenomenon of carnivalization creates an elevated sense of importance for those groups who perceive themselves as underdogs. This sense of importance is often reinforced by constructed narratives that explain the perceived imbalance of power and the mechanisms contrived to keep that power structure in place. These narratives are often formulated as "conspiracy theories." Complex, controversial problems, like climate change, often spawn conspiracy theories that can be incredibly

elaborate. These theories sometimes become fixed belief systems, held in place by psychological mechanisms (such as those already discussed) and social dynamics.

How so? When confronted by ideas or worldviews that contradict our established paradigms, we may relieve the cognitive dissonance by weaving a storyline that explains away the discrepancy between our belief system and others', reducing the complexity of problems that are often highly relativistic and multidimensional (i.e. problems requiring an interdisciplinary approach), creating a narrative structure that posits a conspiracy we feel we must resist. Such narratives can be more important to psychological and social stability than empirical facts. And those involving conspiracy theories are very much reinforced by confirmation bias and carnivalization, often making them very difficult to displace (Jackson & Jamieson, 2007).

Climate change provides a fertile ground for conspiratorial thinking on both sides of the debate. Climate change deniers see the "environmental agenda" as a concerted effort to undermine basic human needs and desires expressed through consumerism. Liberty itself, in this light, rests upon the principles of free markets, free trade, and free enterprise. Environmentalists, by seeking to interfere with these freedoms through government regulations, are placing their own priorities above the liberty of the market, which is based upon our common human desires to make a better world for ourselves. Alex Jones, widely known for his rants over the radio and internet, claims that environmentalism is part of a conspiratorial project ultimately aimed at depopulating the earth in order to create more resources for a chosen few.[2] The Great Climate Change Swindle, a video widely distributed over the Internet, claims, among other things, that environmentalists are conspiring to protect and enhance their own interests.[3]

Some environmentalists, for their part, see climate change denial as the work of conspiratorial forces protecting their own profitable status quo through such things as control over the media, distortion of research findings, and suppression of alternative energy solutions. One example of such thinking is the widespread conspiracy theory about the suppression of the electric car by "big oil" and automotive manufacturers.[4] Similar theories can be found about the sabotage of public transportation, solar panels, and wind energy.

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[2] See http://www.mojvideo.com/video-alex-jones-eugenics-wars-global-warming-scam-pt1/3ad690ea1f4ab262cc74 . Alex Jones' website can be found at http://www.infowars.com/

[3] See http://video.google.com/videoplay?docid=-5576670191369613647

[4] See http://insideevs.com/electric-car-conspiracy-theory-video/

In examining both sides of the climate change conflict, it is important to note that in some very important ways, it does not matter which side has more empirical evidence or credibility. Conspiratorial thinking synthesizes confirmation bias and carnivalization into an "us vs. them" mentality. Those on both sides of the controversy believe their concerns arise from a natural, common sense conception of the world. Cognitive dissonance results when those on either side are confronted by opposing viewpoints of other citizens who themselves claim some form of "common sense." The notion that reasonable people can disagree can be deeply distressing. Those on both sides attempt to reduce cognitive dissonance by proposing that ordinary citizens with differing ideas are being manipulated by powerful interests conspiring to advance their nefarious agendas.[5]

Conspiracy theories are social phenomena, constructing a shared narrative that identifies an in-group and differentiates its members from those in out-groups who do not accept that narrative. Moreover, conspiracy theories carry with them a mystique of possessing special, hidden knowledge that has been intentionally kept from the public. This raises the self-esteem of those "in the know," while also explaining that others who embrace opposing ideas are simply ignorant of the "way things really are." The sense of community that comes from possessing a shared narrative involving secret knowledge powerfully reinforces the group's resistance to alterative narratives, regardless of how well researched and supported they seem to be. Such resistance can undermine the interdisciplinary research process by pre-emptively shutting down the exchange of ideas and preventing the discovery of common ground through a shared narrative.

Groupthink dynamics. All of the psycho-social mechanisms we have explored thus far are assimilated and fortified through group behavior. Membership in a group based on shared ideas has many benefits, but also can become a means of collectively amplifying conflict. Individuals within a group are prone to more extreme responses then they ordinarily might have, because their own self-concepts tend to become invested in the success of the group. Individuals can become depersonalized into the group identity and begin to stereotype others according to their group affiliation. Group identity has considerable psychological benefits, including "elevated self-esteem, self-acceptance, and a reduced feeling of social loneliness" (Amichai-Hamburger, 2005, p. 43). However, the de-individuating nature of

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[5] To be fair, the environmentalists do have a great deal of evidence for their claims; however, this kind of conspiratorial thinking, regardless of how well founded, does reduce the complexity of environmental issues, and enable environmentalists to dismiss many of the reasonable claims of their opponents.

group identity can increase hostility, reduce inhibition, and encourage more frequent anti-normative behavior. In fact, group identity establishes its own normative center, and sees established external norms as alien. Thus, group identity develops a worldview and value system that tends to be isolationist and self-reinforcing (McKenna & Seidman, 2005). Moreover, individuals who identify with a group are collectively emboldened to make their ideas known. "Our biocultural DNA contains instructions that cause us to want to announce our ideas and denounce others, that make us want to interact, comment, converse, communicate, react, respond, elaborate, tweak, inform, refine, argue, criticize–and to do all of this with other members of our tribe across the boundaries of time and space" (Burstein, 2005, p. xvii). These communities of interest can become solipsistic, unwilling to look beyond their collective agenda (Fernback, 1997).

And even if they look, they don't approve. Quite the contrary. Group identity is often established through contrast with those holding alternative belief systems. "Members of a community must believe in themselves, their collective personality, by downgrading their enemies and asserting who 'they' are" (Fernback, 1997, pp. 41-42). Groups become like gated communities, establishing themselves as the self-sustaining "ideal" and walling themselves off from others and their "unconventional" modes of thought. Individuals immersed in group identity often express their conflict with members of other groups in the language of territorial imperative, labeling advocates of alternative ideas as would-be invaders or social contaminants whose ideas will usurp sacred principles and disrupt social stability. The norms and value of the group are generalized to represent what is best for society as a whole. Thus, group members come to see themselves as saviors, out to preserve society against those who would destroy it (Zickmund, 1997).

In stakeholder negotiations, group dynamics, by solidifying oppositional polarity, prevent productive communication and promote suspicion and hostility among members of groups with competing interests or desires. The process of negotiation and compromise involved in complex problem solving can feel like a violation of group norms for those invested in one particular position or another. This not only increases the importance of mediation, a central component of interdisciplinary practice, but also increases the amount of care and skill required of any mediator hoping to guide people through a process of successful problem solving.

Interdisciplinary problem solving within psycho-social conflict. As we have seen, then, the conflicts that arise from attempts to solve many complex real-world problems like climate change often involve a multidimensional array of psychological instincts and social forces. Our instincts to make snap

judgments without sufficient evidence, to establish and defend our belief systems without sound justification, predispose us to avoid the cognitive pain of confronting differences and evaluating our own thoughts and ideas. Additionally, social forces collectivize our belief systems, gathering them into ideological territories within which we strive to defend ourselves and our comrades against those with competing ideas and beliefs. All of these psycho-social mechanisms reinforce and amplify each other. The interdisciplinary research process and any other kind of complex problem-solving must take these mechanisms into account in order for those involved to develop common ground and find an integrative solution to the problem at hand. A primary means of compensating for the deleterious effects of psychological biases, heuristics, and group identity has been the scientific method. Unfortunately, as we shall see, this role of the scientific method has been weakened by deliberate attempts to undermine its validity, including the postmodern critique of objectivity.

Science and Conflict Resolution

In addition to its importance for research and technological development, the scientific method has traditionally played a crucial role in conflict resolution. The very notion of "objectivity" upon which the epistemology of science rests provides a means for establishing a mutual framework for decision making that resists the distortions of psychological biases and groupthink delusions. The scientific method is, in fact, specifically designed to offset the very psycho-social mechanisms that create conflict due to differing ideas and belief systems. The mediating role of science can be seen in forensics, education assessment, public policy evaluation, etc.

Climate change provides a wonderful example of the scientific method discovering and revealing the facts concerning a phenomenon, presumably without bias or agenda. Once established scientifically, facts are by definition (supposedly) irrefutable, and the facts about the alarming consequences of climate change, established by objective inquiry, should form the basis for solving the problem. However, in contemporary debates, the authority of the scientific method has not carried the weight necessary to develop a consensus on the causes and severity of climate change, much less a plan to combat it. The strength and persistence of climate change deniers represent a more general repositioning of scientific authority, which has weakened its ability to fully compensate for the psycho-social dynamics of biases and group identity.

The founder of pragmatism, Charles Sanders Peirce, contended that

empiricism is engaged in the pluralistic exchange of ideas, founded upon skepticism and the ongoing process of trial and error. Science provides a method for sorting out contentious ideas and arriving at stronger levels of consensus. Pragmatism sees the empirical approach to knowledge as a dynamic process that admits to uncertainty as a core precept (Peirce, 1877, 1878). In fact, science is engaged in the continual project of revising itself in the light of incoming evidence. From a research perspective, this is a good thing, for it allows for the open-ended accumulation of knowledge and its constant reevaluation. Yet, for practical policymaking, this intentional lack of certainty is problematic.

The fact that science is based upon skepticism and the consequently "unsettled" nature of scientific inquiry present an opening for attack by those who would question the policy recommendations of scientific experts. Oreskes and Conway (2010) document systematic efforts by industry to recruit scientists tasked with undermining other scientists' empirical findings about the dangers of industrial enterprises. A different and yet supposedly still "scientific" narrative is formulated that negates the findings and recommendations of the original research the industry wants to suppress. This narrative is widely disseminated though the media and achieves presence in mainstream discourse.

This strategy has been used in the policy debates about the dangers of many problems related to industry, including cigarette smoking, air pollution, and, of course, climate change. The strategy of undermining scientific authority has the consequence of allowing people to argue alternative explanations for phenomena, insisting there is no real way of objectively choosing among them. This creates difficulties for the complex problem solving at the heart of the interdisciplinary research process, and, more crucially, undermines the very premise of research–that it is possible, though careful investigation and evaluation of insights, to attain a more comprehensive understanding of complex phenomena. The construction of alternative narratives plays into the human tendency to create and maintain paradigms (that may have little or no basis in fact), developing collective worldviews shared by those who claim a group identity.

The dynamics of paradigm construction have been thoroughly explored by postmodern thought, providing us useful insights into our examination of conflict. Lyotard (1979) described the creation of grand narratives, which are collective cultural paradigms. Foucault (1977) identified paradigm-making as the essential act of power, arguing that power, in the postmodern sense, doesn't involve overt use of force, but rather projects itself by configuring the very worldview that underlies our perception of reality and our expression

of values. Postmodern techniques like deconstruction attempt to bring about a metacognitive awareness of our tendency to situate our thoughts and ideas within socially constructed paradigms (Derrida, 1977).

Indeed, postmodern views account for all the psycho-sociological biases and groupthink dynamics described so far, along with their consequences of creating self-validating systems of thought as well as resistance to systems of others. Kuhn (1962/1996) has even contended that science is itself an absolutist paradigm, enveloped in its own solipsistic rules of order and resisting change like every other kind of paradigm. For postmodernism, any kind of objective, universal understanding of the world is impossible for human consciousness.

The relativistic outlook of postmodernism has thus challenged science as a means of making objective truth claims that can help establish agreed upon facts and testable solutions to problems. Science, stripped of its fundamental claim of objectivity, becomes open to interpretation within the dynamic interplay of social discourse, itself situated within the interplay of contending political, cultural, and philosophical positions. Therefore, science faces challenges both from leftist critical theory and the religious right. The postmodern claim that science is socially constructed allows critics to treat it as nothing more than a competing belief system rather than a means to establish facts, promote mediation, and solve problems. The normative principles of scientific inquiry–skepticism, disinterestedness, and universalism–are incapable of settling urgent matters where facts are held to be uncertain and values are disputed, in other words, most complex problems.

Hulme (2009) argues that disagreement over climate change arises from its envelopment in a complex system of modalities involving much beyond simple questions of scientific validity: "There is an increasing appreciation, both among scientists and among the public, of the contingent factors of personal belief, cultural context and institutional arrangements, which influence the way scientific knowledge is established" (p. 82). Scientific expertise does not pass into popular understanding pure and unalloyed. It becomes part of a narrative shaped by existing worldviews projected by cultural institutions and by the daily media, which frame and filter information according to ideologies, norms, and audience preferences. As Hulme puts it,

> We disagree about science because we have different understandings of the relationship of scientific evidence to other things: to what we may regard as ultimate 'truth', to the ways in which we relate uncertainty to risk, and to what we believe to be the legitimate role of knowledge in policy making… Certainty is the anomalous condition for humanity, not uncertainty. (p. 106)

Although the scientific method supplies means for gathering empirical evidence and evaluating truth claims, it is proving incapable of establishing certainty among the diverse stakeholders involved in attempts to solve complex real-world problems. Furthermore, as can be seen in the case of climate change, scientists themselves often have difficulty incorporating wider political and cultural complexities into their findings and recommendations. From an interdisciplinary point of view, scientists need to learn to do so, understanding that scientific disciplines are part of a greater constellation of expertise needed to solve complex problems. Perhaps in the absence of the traditional role of scientists as objective and impartial mediators, those of us trained in the interdisciplinary research process can help facilitate a more effective way to deal with the many sources of conflicts among those holding multiple perspectives, discover common ground, and develop integrative solutions to complex problems.

Recommendations

This article has described some underlying aspects of human nature that can create and intensify conflict and undermine problem-solving efforts. Psychological resistance to change, social mechanisms for collectively reinforcing the familiar and rejecting the foreign, the inversion of authority structures, conspiratorial thinking, the relativity of postmodernism, and the ambiguities of science are all obstacles to problem-solving efforts in general. In particular, they are exacerbated by the very kind of complex problem solving interdisciplinarity seeks to master. Solving complex real-world problems–like climate change–requires coordination of non-academic stakeholders with competing interests and academic experts operating under separate disciplinary paradigms. Thus far, the literature dealing with the resolution of conflict by the development of common ground in the interdisciplinary research process has focused primarily on the theoretical and conceptual tensions among academic experts. It presents a process for working out a common knowledge base among disciplinarians. This is a very useful and necessary step in problem solving, but it does not adequately address the tensions caused by the psycho-social dynamics that may and do occur in real-world settings involving non-academic stakeholders.

The breadth and ambiguity inherent in complex problems are, in themselves, a source of cognitive dissonance. The interdisciplinary toolkit includes appreciation of diversity, tolerance of ambiguity, and interdisciplinary perspective taking (Repko, Szostak, & Buchberger, 2015, pp. 50-57). These traits and skills are useful throughout the interdisciplinary

process to enable integration of diverse perspectives. However, embedded in human nature are defense mechanisms that react to this open-ended process–reflexes that allow consciousness to retreat into the first viable paradigm, surrounded by the likeminded. We all are often more willing to defend inadequate paradigms than to embrace multiple perspectives as the interdisciplinary research process recommends. In closing, this article suggests strategies to aid everyone involved in interdisciplinary projects in developing common ground in the face of the mechanisms of conflict we have been exploring.

Undecidability. Undecidability is a postmodern concept borrowed from mathematics that states that consciousness is situated within and surrounded by a constellation of competing paradigms, each of which possesses its own center of truth and sense of reality (Bates, 2005). Most of us are situated in our respective paradigms without our being completely conscious of being so. The great revelation of postmodernism is the metacognitive awareness of this complex relativity. Similar to Heisenberg's Uncertainty Principle, undecidability describes a phenomenological state of mind that attempts to keep perception in relative suspension–by choosing not to choose. In quantum terms, undecidability tries to keep the probability waves from collapsing. In accordance with general systems theory, undecidability describes an inherent trait of complex systems–that they are by their very nature dynamic and changing, and therefore perpetually "unsettled." Because undecidability as a state of mind reflects the undecidability inherent in complex systems, this makes it a powerful strategy for complex problem solving.

The strategy of undecidability can be effectively employed at various steps of the interdisciplinary research process. When one is formulating the interdisciplinary problem itself, open-mindedness is required to discern all the facets and nuances of the complex problem under investigation. This approach is in contrast to the thesis/hypothesis-building of disciplinary research, where a position is established and defended and the very act of defining the problem often collapses its complexity. In the exploration of relevant disciplinary perspectives, and in the literature search as well, the interdisciplinarian seeks to be inclusive rather than exclusive, mapping out the aspects of the problem so that the relationships between them become apparent. Undecidability facilitates a give and take between knowledge acquisition and problem formulation.

In the next stages of the interdisciplinary research process, undecidability remains useful, particularly in mediating conflict and developing common ground. Undecidability prevents the interdisciplinary researcher from settling on one side of a given complex or controversial issue. It helps create

a mutual mediating space that permits multiple conflicting perspectives to coexist, facilitating the negotiation of common ground among those involved in the dispute. Although the unsettled nature of undecidability can create cognitive dissonance, the interdisciplinary research process provides a structure that also creates a sense of stability and control. The mental discipline of not choosing can be practiced and honed, like any other skill. There is a certain Zen to undecidability, the calm receptiveness of open-ended inquiry, able to embrace all relevant perspectives simultaneously. From this position of undecidability, mediation can take place, allowing the creation of common ground, and promoting the process of integration that brings conflicting views together into a more comprehensive understanding.

Compassion and empathy. Another strategy that can help in solving complex problems is acknowledgment that doing so requires more than the impersonal exchange of concepts and theories. It necessitates finding common ground through personal interaction. Compassion and empathy add an important dimension to interdisciplinary practice because they facilitate such interaction. This article has detailed numerous sources of conflict that are instinctual or socially constructed. Understanding the unconscious nature of many such sources of conflict allows us to have compassion for those who have difficulty with complex problem solving (including ourselves). Knowing that none of us are immune to biases related to the dynamics of group identity allows us to have empathy, as well.

It is also worth noting that, in spite of all the trouble they may cause, these psycho-social dynamics can have important and beneficial functions. Cognitive dissonance is a mechanism for minimizing stress. Confirmation bias protects us "against easy and frequent opinion change" (Nickerson, 1998, p. 209). It excuses us from having to supply an extensive rationale for every little thing we think, feel, or believe. It insulates us from the "controversy, conjecture, contradiction and confusion" that often accompany complex problems (p. 208). The paradigms we inhabit, and the institutions and media that project them, provide us with a comfortable sense of structure and stability. Group identity endows us with a sense of belonging, purpose, and self-esteem. As we have seen, these psycho-social mechanisms can become sources of conflict; yet they are not inherently dysfunctional. Understanding the positive effects of these aspects of human nature helps us accept their negative effects, even as we work to mitigate them for the common good.

And of course compassion and empathy help effectuate a de-escalation of conflict. By choosing to reach out emotionally to those involved in attempts to resolve conflicting positions rather than retreating into psycho-social territorialism, we help create an atmosphere that is conducive to the

development of common ground. "It's empathy, more than reason, that stands as the *first* antidote to manipulation and fear" (Neisser, 2008, p. 148). Granted, those of us who are drawn to the interdisciplinary process and the integrative mindset may well be unusually willing to sacrifice the kind of security and stability that comes with positioning ourselves in a single value system or disciplinary perspective–and unusually willing to empathetically entertain the positions of others. We aspire to be professional paradigm shifters; however, we shouldn't expect everyone else to share that aspiration. And we should be willing to extend them understanding when they do not. When engaging with disciplinary academics and non-academic stakeholders interdisciplinarians have to actively negotiate and mediate not simply among concepts, theories, and assumptions, but also among the people who hold them–and hold them all the tighter thanks to the psycho-social mechanisms we've been discussing here. By exercising compassion, interdisciplinarians can demonstrate good faith and open avenues for communication–avenues which may lead to the development of common ground. Compassion requires a great deal of practice, inner strength, and self-control. Nonetheless, exercising our capacity for compassion and empathy will greatly enhance our power as problem-solvers in conflict charged situations.

Conflict resolution. Another indication of the ubiquity of conflict is the equal ubiquity of resources dedicated to conflict resolution, management, facilitation, or mediation. There are wide variety of websites, leadership training courses, parenting seminars, and scholarly sources readily available, all offering very similar advice. In almost every case, the techniques and strategies presented are directly aimed at compensating for the psycho-social mechanisms this article has identified as sources of conflict. Many of these techniques and strategies can be of great use to interdisciplinarians helping to mediate conflict in real world situations.

The University of Wisconsin-Madison offers extensive training courses on conflict management.[6] Like most courses and other resources offering advice in this area, they suggest there are three aspects to conflict resolution: introspection, stage setting, and pro-active negotiation. Introspection is advised as a way of framing our own mindset before entering into the problem-solving situation. Its techniques involve reflecting on our own biases and "triggers"–behaviors by others that tend to cause us to lose our temper or composure. Reflecting on our expectations of the problem-solving situation can also be helpful, not only in terms of the content and procedure of the negotiation to come, but also in terms of our psychological needs,

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[6] https://www.talent.wisc.edu/onlinetraining/resolution/stepsoverview.htm

such as feeling respected and secure. Self-reflection techniques like these can help us to enter into mediation situations with a mindset that is clear, neutral, and calm.

Another important strategy is setting the stage for conflict resolution by carefully choosing the place and time for negotiation. The negotiation "space" is both physical and psychological. It should be a room that is not "owned" by anyone involved in the negotiation and it should allow for open discussion without fear of eavesdropping or intrusion. Psychologically, all who will be involved must feel that they are safe to speak their minds without fear of negative consequences. The time and duration of the negotiation should also be mutually acceptable. And it is also very important to establish ground rules in advance that promote the civil exchange of information and opinion, such as setting up equal time limits, making sure one person speaks at a time, and agreeing to treat all participants with respect and confidentiality. The mediator not only establishes these ground rules, but must model them as well. Framing the negotiation experience in these ways is one of the most important aspects of facilitating conflict resolution. The role of mediator is a natural one for interdisciplinarians.

The pro-active negotiation strategies also recommended by those offering instruction in conflict resolution involve the mediator's active attempts to guide the actual problem solving process so as to minimize destructive conflict and promote the creation of common ground. The technique of active listening can be highly effective here. In active listening, one attempts to avoid typical responses that can become "roadblocks to communication," such as "ordering, warning, moralizing, arguing, blaming, judging, name-calling, analyzing, probing, sarcasm, and even reassuring and praising" (Davidson & Wood, 2004, p. 11). Active listening is not merely about refraining from assertiveness, but it is also about encouraging others to share their issues, clarifying those issues, usually by restating statements to ensure they are mutually understood, reflecting on others' feelings, and validating their concerns. Other strategies useful during negotiation include various ways to structure discussions so as to follow a series of steps, as, for example, brainstorming alternative solutions, weighing the advantages or disadvantages of potential solutions, agreeing upon a "workable" outcome, testing the solution in a real-world setting, and evaluating it after a period of time (Davidson & Wood, 2004).

To anyone acquainted with the interdisciplinary research process, many of these strategies undoubtedly sound familiar. However, as all of these recommendations have suggested, and as we have suggested throughout this article, conflict resolution in the real world is highly dependent on

establishing and maintaining productive relationships among everyone involved in problem solving situations. Most stakeholders involved in attempts to resolve complex real world situations will most likely not possess academic training, much less familiarity with interdisciplinary research strategies. Hopefully, the recommendations presented here can help interdisciplinarians facilitate conflict resolution and create common ground.

Conclusion

   To be sure, the capacity for cooperation, for overcoming differences and creating common ground, is all-too-human even as its opposite is. Nevertheless, the psycho-social mechanisms of conflict examined in this article have the power to interfere with real-world complex problem solving. We ignore them at our peril. A great number of the seemingly intractable problems confronting contemporary society–not only climate change, but also immigration, ethnic and religious conflict, the economic and cultural transformations of globalization, etc.–are made more difficult by the dynamics of conflict that entrench stakeholders in opposing camps resistant to negotiation or re-evaluation of their own positions. Many of these societal problems are characterized by complexity, ambiguity, and advanced rates of change. Luckily for all of us, the interdisciplinarian is adept at understanding just these kinds of dynamic systems and possesses techniques that may aid in the mediation of conflict among contending ideas and people. The interdisciplinary research process facilitates fruitful interaction by translating concepts and theories, thereby establishing a mutually understood foundation for communication. It helps find correspondences within theories held by those with differing perspectives, and reorganizes theoretical frameworks so that they can be seen to complement each other, allowing a more holistic understanding of the problem under consideration. And it promotes the development of trust among all involved, including non-academic stakeholders, by promoting civil engagement, coalition building, and community organization (Oden, 2010).
   For complex real-world problems, the deepest sources of conflict often involve assumptions and the value systems from which they are derived. Because these value systems are usually unconscious, their adherents are especially prone to react to threats of cognitive dissonance with all the defense mechanisms designed to protect against it. In order to resolve conflicts founded in value systems, there has to be some sort of transformation of entrenched positions. And that can be more easily accomplished if people can be persuaded to agree that disagreement is not a disease in need of a cure. In the best sense of the word, disagreement is an art that celebrates

discourse across disciplinary and ideological boundaries (and even the boundaries that delineate our most basic assumptions) within an atmosphere of mutual respect.

The interdisciplinary research process, along with the traits and skills of interdisciplinarians, helps develop this atmosphere, creating common ground by helping stakeholders to engage meaningfully with each other, working out differences, and making progress toward solutions to pressing problems. The interdisciplinary approach to complexity enables systems to function within contention and relationships to flourish among those with diverse interests, with ambiguity tolerated as a means for expediting ongoing discourse and progress.

It is important to understand that interdisciplinary integration is not some final resting place in which all conflicts are resolved and all perspectives unified. Rather integration *is* progress, an ongoing collaboration of people pragmatically sorting through the dynamic possibilities of a mutually shared future. In the case of climate change, as with many other complex human problems, we must acknowledge that our future depends upon the way we collectively construct our perceptions of truth and value, synthesizing all our conflicting interests and aspirations into a workable effort to solve complex problems. Thankfully, the psycho-social mechanisms of conflict explored here do not present insurmountable obstacles for the process of integration. Rather they are opportunities to incorporate a deeper understanding of human nature into interdisciplinary practice, enhancing the interdisciplinarian's vital role in resolving conflict and solving complex problems.

Biographical Note: JAMES WELCH IV has published several articles and book chapters on interdisciplinary theory, as well as the application of interdisciplinary practice in complex social issues such as public policy, gun violence, social work, urban affairs, integrative thinking and sustainability. He is currently Chair of the Division of Social Sciences and Business at the University of Science and Arts of Oklahoma. James has been a board member of the Association for Interdisciplinary Studies since 2008, and presently serves as President. He can be reached at jlfwiv@mac.com.

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