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Cognitive Dissonance and Non-adaptive Architecture: Seven Tactics for Denying the Truth

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Human physiology can lead people who have acquired false beliefs to stubbornly persist in holding them. Intelligent persons conform to irrational groupthink, employing a stock of tools to fight against any idea that conflicts with those already held. There is in fact a built-in resistance to new ideas that do not conform to accepted practices, even when such practices are demonstrated to be failures. We can understand this resistance to change within the framework of social learning and evolutionary adaptation. “Cognitive dissonance” is a state of physical anxiety to which we instinctively react in a defensive manner. We are programmed to counteract its occurrence. Studies in political science and psychology reveal strong innate mechanisms for preserving misinformation so as to avoid cognitive dissonance. Methods of handling contradictory information within settings requiring urgent action — while obviously appropriate at the evolutionary level of early humans — wreak havoc with our present-day rationality.

Introduction

Is today’s consumerist society headed for collapse because of its exponentially growing, hence unsustainable needs? For some years now we have been aware of the damaging affect that the material pursuits of both industrial and developing countries have on the earth and its biosphere. Yet, despite numerous well-made rational arguments that urge us to change the catastrophic global waste of natural resources and energy, expanding agricultural regions at the risk of losing the diversity of the biosphere, etc., it is frustrating to find that human inertia overrides sound logic and reason (Max-Neef, 2010; Wilson, 2006).

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Surprisingly, this is not a new phenomenon; it is a part of human nature that compels us to comply with group behavior as an extended form of self-preservation. Such conformity has its benefits when there is any chance of a genuine threat to the social group: it is better to flee than to stand around and try to figure out whether you are really in harm's way. The problem is, such crowd behavior has a way of working against what may be in our best interest, by motivating us to cling to fixed ways of thinking rather than accept better alternatives. In the case of a human-made global disaster we ignore the rational findings of science and take comfort in the fact that our neighbors don't appear to be too concerned. There are countless examples where humans chose to follow groupthink rather than the logic of an astute and well-founded argument. Furthermore, history is full of instances where this tendency was used to manipulate and coerce people to do things that just didn't make sense. Society promotes irrational ideologies and appears resistant to arguments because people maintain group beliefs in the face of logical evidence.

One could apply, for example, the same explanation to the present-day embrace of non-adaptive architectural and urban typologies. This occurs from simply repeating something out of inertia without ever questioning it. Another aspect is to follow fashion, as exemplified in the promotion of a small group of famous architects who build more or less the same non-adaptive buildings (Salingaros, 2008). Whereas rampant global consumerism is based upon ignorance and misinformation, less widely known is that the way we design and construct our cities violates the practices and principles of humanly sustainable architecture and urbanism (Alexander, 2001-2005). Many authors believe groupthink to be an active element of contemporary design thinking that has effectively entrenched misinformation in the practice of architectural design, to the detriment of people and the built environment.

This paper is less about architecture and more about general human nature. Summarizing some results from political science and psychology suggests that groupthink and resistance to rationality are part of an evolutionary adaptation. And yet, what made for an advantage in a tribal early human society is now likely leading us towards extinction. There exist mental mechanisms whereby people get induced into groupthink and adopt irrational and false ideas. Instinctive responses become techniques human beings use in the condition of groupthink to fight against education and rational arguments: the tools intelligent people employ to avoid revising their demonstrably false beliefs. Anyone who wishes to implement social change in society for the better must understand these mechanisms.

“Cognitive dissonance” occurs when a person is faced with two contradictory and incompatible thoughts (Tavris & Aronson, 2007). This state generates emotional tension and anxiety, and can lead to paralysis and inaction because the decision mechanism cannot resolve the conflict and decide upon any proper course to take. Clearly, this is a very dangerous state to be in, and human beings must avoid getting locked into a state of indecision (analogous to a computer program freezing up). Situations where this conflict arises are usually social ones, when others hold a contrary opinion. If one has to decide alone, there is usually less conflict among irreconcilable ideas. Biological/social co-evolution propagates the mechanism for groupthink. Apparently, nature predisposes us to accept a decision conforming to

what the majority of a group believes (Richerson & Boyd, 2005). The unavoidable tendency to conform easily overrides both rational behavior and moral inhibitions. Evidence demonstrates again and again how normal persons ignore their sensory apparatus to trust a false piece of information only because it is the accepted group opinion. In laboratory experiments reviewed here, people were led to abandon their own direct perception and to instead adopt a (deliberately false) groupthink opinion. In a related experiment, normal students were turned into sadistic prison guards (the Stanford Prison experiment). This idea is extended in conclusion with Thomas Kuhn's review of paradigm shifts in science, which can now be interpreted as just another sudden change of group opinion. Thus, even in science, where one expects rational and intelligent behavior, the acceptance of new theories is just as problematic and is delayed by group conformity, exactly like the same phenomenon occurring in ordinary society.

Stubborn and non-correcting behaviors have of course been documented throughout history, though this has not made the slightest difference to their continued misapplication. Philosophers have known for a long time that human beings are not rational, confusing as we do abstraction with reality. Friedrich Nietzsche cynically and perceptively observed: "*Men believe in the truth of anything so long as they see that others strongly believe it is true.*" (Friedman, 2003). These results validate the old saying "might makes right", in the sense that majority opinion overrides verifiable truth. The added surprise is that human beings are genetically predisposed to conform to group opinion, even if that opinion is based upon misinformation. Implementing change through education is therefore unlikely to occur within a majority system, because the social setting guarantees conformity of thought.

Conforming to group belief

Solomon Asch (Asch, 2003; 2004) showed in a classic series of experiments that a person is ready to mistrust his or her own perceptual apparatus and instead adopt a false belief because of peer pressure. In one experiment, subjects were consistently misled by biased group opinion and reported the wrong relative length of a line. People thus accept the majority opinion regardless. Conformity to group belief is stronger than one's own sensory apparatus. Granted, in these experiments, the rest of the "group" was selected and instructed to deliberately mislead the subject, but the relative length of the lines the subjects were asked to measure was obvious to anyone. Stanley Milgram performed distinct experiments that confirmed this conformity effect (Milgram, 1961), and a more advanced setting later extended the original results (Berns et. al., 2005).

Pretend pollsters got perfectly straight answers to fictitious questions, emphasizing how perceived authority and the urge to conform validate misinformation. Students happily answered questions about nonexistent places; nonexistent legislation; nonexistent political figures; and even gave directions to fictitious locations (Prasad et. al., 2009). The responders mistook the act of asking questions by some presumed authority (the pretend pollsters showing all the right signals of legitimacy) as proof

that the topics they were questioned about really existed. Responders went further to invent fantastical explanations so as to avoid looking ignorant and thus external to the “group” by not sharing its common knowledge. In another study, adults were asked to remember details about a medical skin test performed while at school (Mazzoni & Memon, 2003). Even though there was never such a test, the subjects invented a detailed, convincing recollection of the fictitious event.

As an example of conforming behavior, though not belief, recall how susceptible everyone is to canned laughter in television shows. This particular social trigger of conformity to group action is universally despised, yet omnipresent. The reason for its persistence is that psychological studies confirm the effect to be contagious (Cialdini, 1993). Viewers simply cannot resist being influenced, even though canned laughter is both obvious and silly. In terms of audience manipulation, it is found that the worse (i.e. flat and unintelligent) the joke is the more canned laughter helps to make it work. Television executives therefore habitually override a director’s and actors’ requests not to include canned laughter in their theatrical masterpiece. The contagious nature not only of emotions, but also social habits and even physiological characteristics is now established (Christakis & Fowler, 2009).

Boyd and Richerson (Richerson & Boyd, 2005) argue that forms of groupthink and “ideological conformity” were very useful in forming early human societies. Conformist transmission in social learning is strongly favored in natural selection. Even if an actual belief is wrong, it matters more for the survival of the group if it holds itself together during the time required to reach a collective decision, thus conformity is one very powerful factor in survival. By contrast, internal dissention within a group over conflicting ideas weakens the group’s solidarity and purpose. An indecisive situation proves disadvantageous to the group in making short-range decisions, such as in emergencies and fighting with competing groups. We don’t have to look very far for historical examples where internal bickering when the enemy was at the city gates allowed an invasion that could have been prevented had the population shown more solidarity.

Ideological conformity is certainly good for fighting off an invading army or another tribe competing for the same territory and resources. Even in early civilization with a small population, however, adoption of misinformation ultimately leads to extinction, as we see in the archaeological record. Societies drove themselves to collapse by holding onto false beliefs about the natural environment upon which they depended, deforesting and denuding agricultural land, losing their productive soil to erosion, polluting their only water sources, etc. (Diamond, 2005). These drawbacks arise on an entirely longer time scale than the immediate one of quick decision-making. Our knowledge of whether any dissenting voices proposed more rational solutions and practices in a society headed for extinction is non-existent. Those societies self-destructed by following groupthink right to the very end (Diamond, 2005).

Truth is what the controlling group decides it to be

George Orwell's original and frightening conclusion is that society promotes groupthink, which forces people to accept misinformation as truth (Orwell, 1949). Validation of an idea or set of ideas is based upon whether those are accepted by the majority: a deceptive parallel to democratic governance. Orwell described a totalitarian regime, but we now know that this conformity mechanism applies just as well to a democratic society. Once the majority has accepted misinformation, it is almost impossible to correct it in the public consciousness. Even in an educated democracy, a person naturally decides to accept majority opinion, irrespective of truth, in order to continue enjoying the benefits that society offers.

Our age may be characterized as one of massive manipulation; exactly the opposite of what one is led to believe about progress in contemporary society. In the words of Richard Hames, we live in "*an age characterized by the collapse of certainty and by the failure of systems we rarely challenge yet whose genesis arose from flawed assumptions and questionable intentions. Many of these are grand lies; misfortunate social memes that have ingrained themselves across generations and cultures to shape a shared civilizational Weltanschauung... But what should we do in a political and cultural landscape in which alarmist rumors, lies and superstitions are peddled as sacrosanct beliefs and where such fictions have more currency than fact-based truths?*" (Hemes, 2011). Continuing with Nigel Thrift: "*the feverish work of glorification of a non-existent deity has continued... through the use of the media as both ceremonial and liturgical builders of reality.*" (Thrift, 2009: page 19).

The advertising industry flourishes in democracies, where its primary goal is to misinform people so that they will consume a product. Whereas some of the massively advertised products do what they claim to do, a large number of them are either of marginal value or are actually pathogenic. The global consumerist system promotes many products of doubtful benefit that replace more worthy local products, and this unfair competition (because the global companies are linked into an economic power structure) kills regional industries. Specifically, the linked examples of interest in this paper — unsustainable consumerism, and its global non-adaptive architecture — are promoted using all the massive power of the global media. These represent crucial industries for global industrialization (though they are certainly not the only examples).

Two related mechanisms influence people to accept misinformation as truth: passive conformity to majority beliefs; and deliberate falsehood promoted by a system of authority in order to further its ends. The instinctive mechanism of conformity is seemingly innocuous and is not amenable to human control. Passive conformity simply occurs because of human nature. Investigating the propaganda and conditioning apparatus employed by systems of authority to deliberately spread misinformation requires a separate study (Hoffer, 1951; Salingaros, 2008). Individuals promote irrational beliefs so as to gain control over a group of people. We have examples in cults, dangerous sects, extremist political movements, etc. However innocuous the advertising industry may appear to be compared to a totalitarian regime coming to and holding power, the same techniques of persuasion are used to sell fatburgers and soft drinks laden with synthetic fructose.

Setting the stage for atrocities

The experiments of Stanley Milgram following World War II tried to discover a psychological basis for the atrocities committed during the war. Researchers put ordinary, intelligent people in compromising situations to see if they would do terrible things when ordered to do so. The results are frightening: yes, perfectly normal people can be turned into monsters. It is not very difficult. All you require is a pretend power system that grants authority, and the subject will follow orders to perform terrible tasks.

In Milgram's experiments, individuals were ordered to deliver lethal electric shocks to subjects, and they obeyed (Milgram, 2004). Those administering the shocks did not know that the current was turned off, and that the subject was an actor screaming from the supposed shock. Actually, the consequences are even more frightening than seem on the surface. The subjects knew these were laboratory experiments carried out in a university environment, and yet they followed orders against fundamental human morality. In real-life situations, the power system giving orders often has the right of life-and-death over the subject, which makes any objection to following orders even less likely. Milgram's classic experiments were repeated decades later, with distressingly similar results (Burger, 2009).

Philip Zimbardo designed and ran the infamous "Stanford Prison Experiment" (Zimbardo, 2007) to further extend the work of Milgram. In a similarly unexpected scenario, ordinary students turned into sadistic prison guards when given the appropriate rubric of power and conformity. Things got so out of hand that the experiment had to be stopped only after a few days. Because of his experience with this disturbing phenomenon, Zimbardo was asked to testify in the Abu Ghraib prison scandal investigation (the terrible events perpetrated by US service men and women in a prison in Iraq in 2004). As should be expected from the mechanism of conforming, the individuals involved in those sometimes-sadistic power games turned out to be no different than other, psychologically normal soldiers.

The mechanism of conformity drives human beings to accept misinformation and irrational beliefs, and the same mechanism makes a normal human being do terrible things to other human beings because of peer pressure or direct orders from some presumed authority. In all of these related but distinct acts, our hoped-for internal checks seem to dissolve. People do not reflect before adopting a group belief; they do not weigh the evidence on whether the logic behind this belief is sound or not, they just accept it like they accept advertising. When authority or society asks them to perform an unspeakable act, their innate morality, which is their conscience grown from lessons of ethics and compassion, simply vanishes.

Non-adaptive architectural implementations

For architecture and the built environment, a tendency to follow or accept information that is verifiably incorrect has the effect of diminishing human wellbeing. In the past few decades we have seen, for example, the deliberate

dismemberment of a historic urban plaza that had been the focal point of social life for centuries. The damage is done by well-meaning politicians who commission an architect to “upgrade” this urban space by introducing a more “contemporary” aesthetic and getting rid of existing “old-fashioned” components (Salingaros & Pagliardini, 2009). The usual result is the creation of an unpleasant, psychologically menacing environment that few persons feel comfortable using after the supposed “renovation”. Nevertheless, this alarming trend of destroying usable urban space is now becoming established practice all around the world. Citizen protests apparently have no influence, while the architectural establishment routinely gives out awards for these projects.

This contradictory practice applies not only for urban spaces, but also for many contemporary architectural and urban interventions. Explanations are needed for the behavior of the two principal actors in these actions: first, the politicians who willingly commission a project that degrades working public space in their constituency; second, the architects who conceive and implement the instrument of destruction. Politicians’ actions are driven by the desire to oblige powerful groups that can help finance their re-election, and this agenda includes following current fashions without reflecting on negative longer-term consequences. The dominance of a particular architectural aesthetic in today’s society means that, inevitably, an expert consultant upon whom a politician relies for advice on architectural and urban projects will propose a non-adaptive intervention.

The second actor — the architect who ignores what is best for the people and place he or she is designing and deliberately, if not defiantly, designs an environment that is by its very nature psychologically hostile — is driven to negligence by different motives. It is not an exaggeration to accuse such professionals of committing an act of aggression against the human dimensions of social spaces (albeit with the best of intentions). Contemporary practitioners have been trained to implement a peculiar design aesthetic, regardless of whether it damages the quality of human life in and around those spaces after they are built (Salingaros, 2010). They substitute the singularity of an object form for the rich informational complexity of context, which is what formerly gave life to an urban space throughout its historical evolution.

The ideologically-oriented education of the past several decades does not teach architectural practitioners how to evaluate the adaptive success or failure of a working architectural form or space; the sole criterion used for judgment is whether the design conforms to a narrow set of approved visual stereotypes. A built form is “good” when it has a certain hard industrial-minimalist look. In the majority of cases, the result of such an untested approach is damaging to the environment. During the process of “upgrading”, these new structures take on a novelty that might attract more people coming to see them; but unfortunately this act perpetuates the illusion that this is an effective urban space even when in reality it is a fleeting condition of self-feeding ideology.

How can contemporary architects and their clients act against people’s fundamental sensibilities; against traditional design rules tested throughout millennia to guarantee the users’ physical and psychological comfort; against common citizens protesting the hostility of the structures being erected; even against the architect’s and

client's own sensory feedback? Such an architect or client is following a mandate and authorization from the reigning design paradigm, which considers itself above all other responsibilities. There exists a higher authority that overrides both science and neuro-engagement. Architects never admit they are causing damage to the built environment, but feel immune to possible consequences because they are satisfying the wishes of an established organizational structure. For them, there is no liability towards society as long as the system's ideology is obeyed.

Cognitive dissonance and the utopian fallacy

The human mind craves solutions but is challenged intellectually by complexity, and thus it would rather accept a simplistic cognitive *schema* that is a non-solution instead of having to tackle a complex problem directly. Clearly, something deep within the evolved human mind makes utopian proposals irresistibly attractive; possibly their promise of a clean and instant solution to a host of extremely complex problems. Utopia provides the lazy mind a way out. The British philosopher Roger Scruton discusses the mindset of those who embrace utopian ideals, which henceforth determine a false but comforting view of the world. Following the Hungarian philosopher Aurel Kolnai, Scruton terms this syndrome "The Utopian Fallacy" (Scruton, 2010).

Unfortunately, those who accept a utopian worldview become blinded to reality. In keeping with what is presented in this paper, a believer refuses to abandon a set of flawed beliefs, even in the face of evidence and proof. He or she is able to ignore both logical analysis and physiological input when those contradict an accepted ideology. Quoting from Kolnai and Scruton: "*The utopian mind [is] shaped by a particular moral and metaphysical need, which leads to the acceptance of absurdities not in spite of their absurdity, but because of it... and its dreams are continually recycled as 'solutions' to problems that they themselves create... This 'immunity to refutation' is what I mean by the utopian fallacy.*" (Scruton, 2010: pages 63-64).

Accepting beliefs in terms of obedience to a group, but going in the face of rationality (instead of using proven precedent and evolved patterns as is justified, for example, in traditional religions) touches upon the workings of sects and movements compelled to violence. For in those cases, the basis for accepting a utopian fallacy is one's willing embrace of irrationality. An intellectual submission to some abstract WILL and not to some superior order or intelligence is a prerequisite for worshipping power rather than order. A follower has to conform to an abstract ideal that he or she can never understand, and which is the opposite of reason. Knowledge is sacrificed to the deep yearning for power and control.

Utopia can only be achieved by denying (or even destroying) the real world with all of its uncomfortable complexities. People who hold utopian beliefs are constantly subject to cognitive dissonance when confronting the real world. Since utopia is unattainable, those who have accepted it as a guiding principle are continuously frustrated, and turn this frustration into hostility against non-believers. Failure to achieve utopia is blamed on those who do not share in its basis of misinformation. This drives individuals to become extremely belligerent in condemning others who

do not agree with their false beliefs: the “others” are turned into the cause for the frustrated individuals’ cognitive dissonance. Belief in misinformation is reinforced by attacking anyone who does not accept the deception. Cognitive dissonance thus becomes a justification for aggression and violence.

A century of utopian architectural ideology tied to power and violence has determined the “industrial” shape of our contemporary built environment. It has been a colossal failure from the human point of view, generating vast stretches of unsustainable, inhuman, and dysfunctional urban regions structures (Alexander, 2001-2005; Salingaros, 2005; 2006; 2008). Those same utopian ideals that drove architects to build in this manner are still driving the profession, however. Architecture schools continue to hold conferences praising the worst urban failures as visionary and innovative. Clever propaganda gives the false impression that a majority of the population actually likes the inhuman structures built during the past several decades, whereas in fact only a handful of believers do. Our innate mechanism of conforming to the majority is thus manipulated by manufacturing a fictitious consensus.

The system is constantly working to save itself from cognitive dissonance

Cognitive dissonance helps to explain many curious phenomena in contemporary architecture. All the vast effort — comprising juries, competitions, publications, academic courses, seminars, conferences, exhibits, etc. — of presenting alien structures as “friendly” is simply an attempt to reduce architects’ cognitive dissonance when they confront nature. Since they could literally be sickened by cognitive dissonance generated from the incompatibility between biological forms and forms they themselves design, contemporary architects go to any length to try and justify their creations. Abandoning that alien aesthetic altogether would sever them from their society of peers; therefore it is not a considered alternative.

A new building that evokes feelings of alarm and repulsion is invariably accompanied by lavish praise coming from architectural critics. A negative visceral reaction in the public to inhuman architectural forms, spaces, and surfaces is countermanded by bestowing prizes on the new building; for example, yet another menacing and twisted Museum of Contemporary Art. The organizations that usually give out these prizes all follow the utopian fallacy, so they certainly do not represent true majority opinion. Nevertheless, this strategy gives the misleading impression of universal approval and thus deceives common people into accepting menacing and outrageously expensive buildings as architectural “masterpieces”.

Its followers identify those who would disagree with the utopian fallacy as enemies of the entire society. This well-tried scapegoat technique was used repeatedly in history to victimize groups who refused to conform to a utopian doctrine. Identifying some victim group (totally innocent, of course) serves to build solidarity among the group that believes in utopia, and to attract others to join it (as long as they themselves do not belong to the group singled out for victimization). Scruton puts his finger on the utopian and totalitarian nature of architectural ideology: “*One of the most remarkable characteristics of the modern movement in architecture*

has been the venom with which it cleared a space for itself. Those opposed to it were regarded as enemies, reactionaries, nostalgists, who were impeding the necessary march of history. They were to be removed as soon as possible from positions of influence and power.” (Scruton, 2010: page 149).

Scruton goes further to emphasize the essential *a priori* nature of modernist utopia. “*The a priori is the refuge of those who fear experience and cannot learn from it. The idea that you should look at what has been done, and at what people have thought and said about it, seems to be anathema to them.*” (Scruton, 2011). This includes the modernist architectural and urban program as defined by its teaching and implemented by its disciples. Hence today’s contradictory situation, in which stubborn followers of a failed artistic *avant-garde* from the 1920s refuse to admit either recent scientific results, or proven traditional patterns (Salingaros, 2005; 2006; 2008).

Seven tactics in a strategy for denying the truth

Educating people who are stuck with irrational beliefs has been a problem since the beginning of recorded history. De-programming somehow has to overcome avoidance techniques that people utilize to block input that could change their ideas. Cognitive dissonance arises when external information contradicts an already held belief. The way all of us normally deal with this is NOT to rationally compare two competing theses and resolve conflicts using reason and available evidence. Rather, we react in the same way we react to a physical threat. We instinctively fight against information that threatens our beliefs, inventing any means of defense possible. This strategy has nothing to do with rationality or truth: it simply implements a toolbox of protective mechanisms. We normally accept information only if it reinforces beliefs already held, and we reject information that conflicts with something we already believe (Nickerson, 1998).

This behavior of maintaining a false reality has been documented in political science. Once voters adopt a political position for whatever reason, they then invent spurious “facts” to rationalize their existing opinion. “*Voters tend to assimilate only those facts that confirm what they already believe*” (Lehrer, 2009) ... “*inventing facts or ignoring facts so that they can rationalize decisions they’ve already made.*” (Achen & Bartels, 2006). The experimental evidence emphatically does not support the traditional picture of a healthy political process, in which issues and candidates are intelligently compared and evaluated.

A recent paper on the sociology of political beliefs (Prasad et. al., 2009) lists techniques that people use to prevent cognitive dissonance, extending another earlier list (Zuwerink-Jacks & Cameron, 2003). The two lists are combined and expanded, and their original labels are given below in brackets. Colorful labels referring to defensive techniques from the animal kingdom are introduced here, suggesting a biological analogy for these tactics. The methods of blocking rational arguments, although requiring human intelligence applied towards an illogical end, basically work on a pre-human level. Only the last one appears uniquely human. These seven techniques are used to reject a rational result whenever it contradicts misinformation already accepted by a person.

Seven tactics for denying the truth:

1. The “Ostrich” technique — (*Tuning Out, Selective Exposure*).
2. The “Rhinceros” technique — (*Source Derogation*).
3. The “Eel” technique — (*Displacement, Disputing Rationality*).
4. The “Squid” technique — (*Irrational Counterarguing*).
5. The “Lizard” technique — (*Selective Support, Attitude Bolstering*).
6. The “Chameleon” technique.
7. The “Self-justifying Prosecutor” technique — (*Inferred Justification*).

1. The “Ostrich” technique comes into action when you — the questioner — are talking to a person — the subject — and present evidence that his or her beliefs about a topic are wrong. Cognitive dissonance creates a high state of stress, which is unpleasant, so the subject responds by blocking what is being said. In a common physiological response, the subject tunes out the message and severs the channel of communication, just staring back with a blank look. Withdrawing from reality ends further engagement with the questioner. [A popular myth is that the Ostrich reacts to threats by digging a hole and hiding its head in the sand; in fact, the Ostrich lies down to look like a lump.]

2. The “Rhinceros” technique involves attacking the questioner while ignoring the question. This action could range from politely disputing the questioner’s credentials and expertise, to implying a corrupt or dishonest motive (i.e. a deliberate ploy), to outright insults and violence. The questioner could be accused of being brainwashed, even though the subject is more likely the one holding onto mistaken beliefs in this instance. Any pretext that can justify a personal attack on the questioner is useful. A real or imagined social, religious, or racial difference between the questioner and subject can be brought up in a classic prejudicial attack: for example, the questioner is accused of being fascist, totalitarian, communist, anarchist, etc. [When annoyed or threatened in any way, the Rhinceros just puts its head down and charges the source of annoyance.]

3. The “Eel” technique is a response that engages at some minimal level, but the response is founded upon irrationality. The person holding the false belief — the subject — answers that the issue does not depend upon facts, but is instead purely a matter of opinion. Clinging to this absurdity, however, any rational discussion would be extraneous to the topic and logical argument is futile. There is some minimal engagement but no analysis. The existing false belief is maintained intact and free of any threat from revision because it has been displaced into the realm of opinion as far as the subject is concerned. [The skin of an Eel is covered by slimy mucus so that when someone tries to catch one, it slips out of grasp.]

4. *The “Squid” technique* invents evidence that obscures what the questioner is claiming. In protecting an irrational belief, the subject who holds such a belief is forced to introduce many irrelevant arguments. The problem is that the subject is supporting an irrational belief against the questioner’s competing rational thesis backed by logic and facts. Using verification as the basis for arguing could settle the argument very quickly, but that is never the case. The strategy’s goal is to fully engage in order to confuse the issue and retain the false belief, not to allow it to be questioned. It is impossible to produce a coherent logic to defend an irrational held belief. [The Squid frustrates its predators by releasing a cloud of ink in the water, making it impossible to see anything and facilitating its escape.]

5. *The “Lizard” technique* is a method of ignoring the evidence presented against a false belief, and instead bringing in other peripheral and distracting pieces of information that might seem to support the false belief. Here the subject tries to build up a logical but tangential edifice for supporting his or her false belief, skirting around the main logical objections to the belief itself, and employing a diversionary tactic. There is no direct engagement on the fundamental issue, only clever side-stepping. [The Lizard drops its still-wiggling tail to divert attention elsewhere while it escapes.]

6. *The “Chameleon” technique* utilizes basic deception to agree with the questioner. The subject listens sympathetically to the arguments. Possibly, the subject may be impressed at that instance by the logic, facts, and rational arguments, but even if this is an honest conviction, it is totally superficial and fleeting. The moment the subject is back in his or her usual milieu, he or she reverts to the original basis of misinformation. [The Chameleon changes its skin color to adapt to its environment and to social situations, responding to temperature, light conditions, mood, and sexual attraction. The change is temporary, and changing color for camouflage is only one aspect of this behavior.]

7. *The “Self-justifying Prosecutor” technique* justifies believing misinformation because it is accepted by authority and/or by the group majority. Presumably, something that is settled should not be questioned. No rational reason is needed for the initial acceptance of misinformation, just groupthink. What happens next is crucial, however: the subject’s brain evolves circuits to create a seemingly rational explanation after the fact. Once that stage has been accomplished, then to the subject holding the false belief, it appears natural and obviously true. The subject claims that the consequences of this false belief (which may be substantial and even catastrophic) actually justify the belief itself. This thought process follows a perverted inverse logic, which assembles a fictitious backwards chain of reasoning to justify misinformation. The colorful label “Self-justifying Prosecutor” is drawn from the criminal justice system. Researchers documented the refusal of judges, prosecuting attorneys, detectives, and police officers to admit to error after a conviction was later reversed through DNA evidence (Tavris & Aronson, 2007). It is very common for the involved parties in the system to stubbornly dismiss the DNA testing and to reinterpret the old evidence so as to justify the original verdict, getting very angry with others in the same system who are re-opening cases already closed. The bottom line — which is never openly expressed — is that admitting error puts the entire

system at risk, thus every effort must be made to deny the mistake. The need for self-justification leads prosecutors to use an inverted logic by which if a person actually went to jail, or was executed, then this outcome in itself is sufficient to justify the process that led to that person's conviction.

Encoding misinformation into permanent memory

The physical, visceral, and emotional feeling of knowing something to be true (Lakoff & Johnson, 1999) is worth discussing. The neural path that stores a packet of knowledge in the brain (even if that knowledge is false) becomes part of someone's physical being, and is henceforth associated with a precise emotion. After neural encoding, a piece of misinformation is registered as "true", and any subsequent reference to that misinformation can evoke the characteristic "true" physical and emotional response. The subject is therefore hardly able to go against his or her bodily signals confirming that something is intuitively true, even in the face of rational evidence to the contrary. Reaction to having a basic belief questioned by another person can only be irrational, since it is based upon an emotional state generated by cognitive dissonance.

Another point has to do with the evolution of both complex neural circuits and software. When a piece of software, or a neural net evolves to "learn" something that is set as the goal of the exercise (i.e. to solve a particular task in the case of software code), the system goes through an evolutionary process involving many steps. Each step in the evolution of a neural circuit or genetic program generates many alternative choices via some random algorithm, and a selection process chooses the result that comes closer to satisfying the desired conditions. The end result is a circuit or program that works, but without someone understanding how it does what it is supposed to do. Here the crucial feature is that evolved circuits and programs are very difficult if not impossible to understand, since they were not built according to a rational plan (Hillis, 1998). One cannot analyze the process that generated them.

Conjecturing, the same evolved neurological mechanism applies to the brain circuits that "grow" a spurious explanation for a particular piece of misinformation. Neither the subject nor anyone else can explain or make sense of the physical neural circuit encoding misinformation, because it was never grown logically. It evolved *a posteriori*, and no one can guess what associations in the subject's brain were used to anchor it to the permanent memory. Nevertheless, a piece of assimilated misinformation FEELS true and it is definitely associated with the visceral emotion of something that is indeed true. Misinformation stored in this manner becomes embedded in a pre-human consciousness: it becomes intuitive, one's "gut feeling", something that cannot possibly be argued with logically or rationally. And here lies the great obstacle to learning once false beliefs have become embedded.

Some examples from the author's experience

The innate defensive strategy for maintaining misinformation explains the illogical and sometimes bizarre reactions my friends and I come across when

presenting innovative work on architecture and urbanism. In developing a theoretical basis for designing buildings and cities, we have had to fight against a profession that lacks a rigorous logical and rational basis, a curious anomaly indeed. Scientific results inevitably contradict accepted twentieth-century visual typologies and models of what architecture has come to mean (Alexander, 2001-2005; Salingaros, 2005; 2006; 2008). What is considered appropriate in design is now defined in a circular manner by what is currently fashionable, and this illogical model is supported by a group of architects, architecture critics, architectural magazines, architecture prize boards, etc. Arguing against the establishment involves contradicting an organizational structure that has been formed by conforming to accepted images and a group belief system.

Mentioning that some architectural or urban typology is dysfunctional, and that a particular famous architect who applies it has made a serious mistake triggers cognitive dissonance. The student who has been socialized into unquestioningly accepting everything that famous architects do as valid — moreover, as the highest possible example to aspire to — simply does not know what to do in this situation, hence tunes out. The students' eyes show a frightened look characteristic of a fight-or-flight response: this happens because the students are desperate of losing their worldview. Their body reacts viscerally on a more primitive level than rational conversation. Those students were never prepared for the possibility that something they were taught and now believe to be the truth may in fact be wrong.

We have also experienced *Tuning Out* with architects, where it takes the form of rudely cutting off the dialogue. With a more senior architect or faculty member, the typical reactions are *Displacement*, *Selective Support*, or *Irrational Counterarguing*. Frequently, practicing architects and architectural academics become hostile and belligerent, applying an extreme case of *Source Derogation*. This sometimes-violent response is explainable in terms of their emotional unease due to the sudden onset of cognitive dissonance. Architects' habitual position of authority within their closed society relies upon everyone else around them conforming to the ideology, and thus their whole value system is threatened when someone questions it. The prospect of losing a worldview that has taken a lifetime to build up and having to start all over again can be terrifying.

When the tables are turned, however, there is nothing remotely comparable to risking an architect's catastrophic loss of identity that provokes irrational hostility. Suppose, for example, that an architect is questioning a scientist about the validity of a well-established scientific phenomenon. Scientists simply dismiss those who debate topics using unscientific arguments as uninformed or ignorant. There is no unprovable dogma at risk here: the basis for science is experiment, which cannot be questioned except by other, more accurate experiments. Indeed, science thrives precisely because each idea is tested and contested until it survives. Science is open to every possibility, but is fiercely selective in what to believe, accepting something only through a trial by peers who apply verifiable and reproducible tests.

In discussing architecture with architects, nothing is ever clarified because they are forced to present irrelevant material. Many deny the very existence of a scientific

basis for architectural and urban design, dismissing offhand all the published literature on the topic. This defensive strategy ignores the experimental basis for architecture, by asserting that this discovered body of knowledge is personal preference and thus not rational at all. Those who actually attempt to debate the scientific results behind adaptive architectural design turn to politics and argue around the facts altogether. Using irrational counter-arguments leads architects to talk by going around in circles. But the desired result of protecting their false beliefs from the threat of revision is achieved.

It is true that contemporary architecture willfully eschews rationality in design so as to achieve a shocking brand of visual innovation; therefore this intentionality is not the primary source for the architects' own cognitive dissonance. What is essential but never stated is the assumption that this practice is just an innocent game without serious consequences. But this is false, because the preferred forms, spaces, and textures used by architectural cult heroes to achieve distinction have a direct psychological and physiological effect on their users. Therefore, the deceit lies not in applying irrationality to design (which is admitted) but in claiming that it is not only valid but also harmless to do so.

The disturbing reaction to questioning global consumerism tied to non-adaptive, dysfunctional, and unsustainable city form approaches religious conviction. Architects are trained to see the world differently than normal people: as a collection of detached objects instead of as contextual relations. Surrounded by the products of an industrial aesthetic paradigm deceptively promoted as necessary for economic progress, common people assume that there **MUST** be inevitable and logical reasons why these unsustainable practices and non-adaptive built forms are all around us, but cannot articulate them. Surely trusted experts have decided that consumerism and alien-looking buildings are part of the natural evolution of humankind? It is **INCONCEIVABLE** that all of this could be based on misinformation and misunderstanding, let alone something as shallow as a cult of images. Could it be that philosophical thinking brought a schism to the practice of design? Architects, forced to justify their own profession, are often no better at explaining these contradictions.

The “Chameleon” technique is wonderfully described in a short story by Aleksandr Solzhenitsyn (Solzhenitsyn, 2006: pages 73-84). A high government official goes on a boat ride along a beautiful river that is scheduled to be destroyed by some monstrous and ill-conceived industrial project. He allows himself to be convinced by sound arguments against this folly; but, as Solzhenitsyn concludes, once back in the corridors of power, the official will go along with what was already decided. In our experience, we have talked with architects, politicians, and journalists who understood — or pretended to understand — our arguments for adaptive architecture; who then went on to promote and sponsor non-adaptive projects conforming to the worst that the global consumerist system is promoting. Fashionable images and cult heroes deeply ingrained in their subconscious, as well as the overriding authority of entrenched power, undermined our efforts.

Another recent and disturbing trend concerns architects who have learned the principles of adaptive design on the human scale from our publications and lectures.

But instead of implementing them to create biophilic and sustainable buildings and urban fabric, they practice those techniques in a superficial manner to camouflage the old inhuman industrial paradigm! They don't see the contradiction, or if they do, their allegiance to ideology overrides logic and rationality. Every genuine advance in understanding is applied ideologically, not towards a better built environment, but to continue the existing system. Famous architects have learned how to successfully use the media and promote a phony paradigm shift, supposedly from nonsensical post-modern models to a new "green" architecture.

Lock-out and the wall of mistrust

A turn towards a more sustainable future for our world needs to apply technology on the small, local scale, and become very suspicious of large energy-consuming projects favored by global industry, international funding agencies, and governments alike (Max-Neef, 2010). The built environment should be shaped to facilitate emotional nourishment and human socialization and to reject non-adaptive industrial typologies (Alexander, 2001-2005). A refusal to accept the falsity of many of the global consumerist society's basic assumptions presents an obstacle to reform. People simply deny the truth, although they see the evidence, and this has led to our global consumerist society's dependence upon irrationality. We therefore need to understand why irrational beliefs are accepted in the first place.

It is very easy to prejudice a person's opinion about a subject or event by saying something positive or negative before that person comes into contact with the event. This effect is well known to political lobbyists, who will rush to be the first to talk to an incoming politician. Whoever has the first word can implant either positive or negative thoughts in the politician's mind, and those subconscious thoughts will influence decisions during the rest of that person's career. Some authors refer to its negative application as "lock-out" (McFadyen, 2000), a technique used in character assassination. Say something nasty about person A to person B before A and B meet, and person B will be forever aligned negatively against A, who is the target of this "lock-out". The same technique works to discredit an idea or person by making a derogatory comment before either comes up for evaluation. Lock-out works to insulate a group's beliefs from outside influence. A society is defined by a set of mutually shared beliefs, whether those are factually correct or not. At the same time, this commonality actually defines a group in terms of its particular beliefs. Hence the seeming paradox of groups of people living in close physical proximity to each other, but very distant in terms of belief overlap. Genocides occur in which people who have lived together for generations, but who belong to socially distant sets of beliefs, turn upon and kill each other. Or the parallel phenomenon is seen, where architects call for the destruction of all vestiges of the past because those disturb their vision of modernity.

Every social group maintains cohesion through its beliefs, and therefore wishes to protect existing beliefs from external influence. Binding together is essential in maintaining the group's power base. If beliefs are verifiable, then education and openness are the best policy for attracting members. If not, then a wall of mistrust is

erected towards any competing beliefs found on the outside since those pose a threat. In cults, one of the primary messages to followers is not to believe anyone outside the cult, which is but an extreme version of the natural exclusiveness of any socially cohesive group. Only select information that tends to confirm the group's beliefs is allowed to penetrate. Selectively justifying a previously held opinion in the face of data that could disprove it avoids cognitive dissonance (Nickerson, 1998).

Curiously, the more outrageous the shared belief, the more effectively it holds a society together. Anecdotal evidence comes from the study of religions, dangerous cults, and terrorist organizations. Believing in something that is obviously good and promising not to do something that is obviously bad is an easy individual decision, and does not require cognitive re-orientation aided by the reinforcing rubric of the social group. But if conforming to the group requires an unusual, or unusually difficult action, then the act of acceptance brands the initiate as someone special and makes the group reality even more relevant and vital. This point is confirmed by experiment (Gerard & Mathewson, 1966). Initiation rites, common to all societies, are more marked and arduous in some than in others. It is no surprise that the more difficult the task of initiation, the more permanent is the attachment to the group.

A person conforming to a group by accepting especially egregious misinformation needs to cling to the group all the more tightly, and ceases to think as an individual. The reason is that absurd beliefs are "true" only within the social context of the group but dangerously false outside, which makes life outside the group problematical for persons holding such beliefs. In this polarizing scenario, true knowledge freely available in the outside world threatens the essence of a believer's worldview and sense of self, and drives that person into the isolation and comfort of the cult. The implications turn out to be as pessimistic as they are unexpected: people holding the most erroneous beliefs are the most difficult to approach, and certainly the most difficult to educate (Nyhan & Reifler, 2010).

Cognitive dissonance and the urge to proselytize

It would be a mistake to underestimate the disturbing effect that cognitive dissonance has on the emotional state of the human body. A person holding misinformation cannot insulate himself or herself from the contradictions arising from everyday life and encounters with the real world. Even so, the believer is not driven to reconsider erroneous beliefs, but instead employs considerable ingenuity to justify already-held beliefs. Another means of lessening doubt and unease arising from a state of cognitive dissonance is to spread the misinformation so as to find comfort in numbers. The more persons in immediate contact with the individual holding erroneous beliefs, and who share those beliefs, the more reassurance there is that not everything is amiss.

The believer of misinformation derives a false sense of validation from the number of other sympathetic believers and the social effect they provide. Expanding the wall of isolation by including others inside it manufactures the comforting illusion of an irrefutable reality. Security in numbers is the cultural surrogate for validating the false belief itself (which is impossible). The need to proselytize and convince others

to adopt the same erroneous beliefs arises out of an intrinsic need to increase the emotional buffer that would counteract the unease of cognitive dissonance. This helps to support an untenable worldview.

Pseudo-religious sects expend considerable resources on proselytism, sending their acolytes out into society at large with the mission of converting everyone else to the beliefs of the sect. Initiation into the sect's beliefs occurs hand-in-hand with the stated objective of training the convert into becoming a minister for recruiting new members. Just as much effort is spent in brainwashing the sect member to assimilate irrational beliefs and misinformation that the sect is promoting as part of its agenda, as in acquiring practical training in techniques of persuasion which can be used for converting others. Training oftentimes inculcates a culture of deceit that presents both the sect's dogma, and the proselytizer, as being reasonable and attractive.

The classic study of people who refuse to abandon misinformation — in this case, their belief in an apocalyptic event that never occurred — was done by Festinger, Riecken, and Schachter (Festinger, Riecken & Schachter, 2008). It was discovered in this study that far from discrediting the erroneous belief, the total failure of the prophecy actually increased the subject group's fanatical reliance upon the cult teachings. This is a profoundly disturbing demonstration of the role of misinformation in reinforcing a counter-intuitive detachment from reality. A powerful commitment to the "faith" (and a high initiation price that discourages any turning back) leads to mental tricks inventing all sorts of self-delusions to try and rationalize the disproof of one's erroneous beliefs. When the failure becomes dramatic, the subject turns to proselytism so as to convert others to those beliefs: "*If more and more people can be persuaded that the system of belief is correct, then clearly it must, after all, be correct*" (Festinger, Riecken, and Schachter, 2008: page 11).

In criticizing/complementing Festinger's work, Mathew Schmalz (Schmalz, 1994) points out that denial of a failed ideology and the re-invention of a new myth that avoids facing reality strongly depend upon an existing powerful ideological and organizational framework. Going against reality succeeds only when the group's belief demanding total submission to its ideology is backed up by social support. Schmalz identifies the crucial ingredients as the power "*hierarchy's exclusive possession of charisma, its control of power and information within the organization, and its expansive legitimating ideology*". The existence of a complex organizational structure provides the necessary support for the ideology, which might otherwise exert too weak an effect for it to sustain the failure of its predictions. These characteristics are a key attribute of architectural education and student training as practiced today.

One can identify disciplines that are founded upon misinformation rather than on a verifiable body of knowledge. Conditioning students involves imprinting dogmas, statements, images, and cult heroes without any justification, while at the same time weaving a cultural mythology of moral superiority, ethical purpose, the mission to change the world, etc. (Salingaros, 2008). The negative side of this indoctrination is also essential: to condemn using apocalyptic terms any messages that would question the misinformation. "Education" is done strictly within an ideological context, so that any threat to the misinformed ideology will always be perceived as an attack on

the sect's morally superior principles; a reactionary move to arrest progress; an attempt to set the clock back, etc. This indoctrination strategy succeeds in making an acolyte impervious to future questioning of the dogma he or she has acquired during their training.

The urge to proselytize characterizes architects who have accepted the abstract thinking of contemporary architecture as pseudo-religious dogma. This group is absolutely convinced it is right and that its work is what is best for society. So strong is the institution of these false beliefs that those within this paradigm simply cannot allow themselves to re-consider their thinking, despite valid research showing the innate value of biophilic structures, ornamentation, comfortable spaces, and buildings on the human scale (Alexander, 2001-2005; Salingaros, 2005; 2006; 2008; 2010). Cognitive dissonance is averted through the fiction that the rest of the population is ignorant. Hence, those architects' repeated and insistent calls to "educate" the public so that it appreciates contemporary architectural forms because of their supposed intellectual if not moral superiority. Even after a century of failing to convince common people to love such alien forms and surfaces, the architectural movement to proselytize the public continues undiminished in a messianic rejection of society's actual needs.

Proselytism in architecture and urbanism is readily though naively abetted by today's global media. Some of the world's most respected media sources allow themselves to be misused as vehicles of architectural propaganda. News features entitled "Places one has to visit" inevitably include some cities solely because of a single building designed by an architectural cult hero. Such articles, written by advertising agencies but presented as guides to tourism, promote ideology under the guise of innocent reporting. They propagate a discredited dogma: that a contemporary building in a non-adaptive style transforms a city into a tourist attraction. Reprinting the story assures that the message spreads throughout the world. Manipulating the authority of the original media source thus embeds images of a non-adaptive architecture — and the names of the handful of architects who are the current ideological champions — in the collective subconscious.

Kuhn and his paradigm shifts

When Thomas Kuhn introduced his famous "paradigm shifts" (Kuhn, 1970), he described a discontinuous process whereby a scientific theory is suddenly accepted by the majority of researchers, after a long period in which it is neglected despite its correct basis of evidence. Kuhn theorized that it is necessary to build up some sort of "momentum" before one theory can replace another, even if the newer theory has a perfectly rational scientific base and inevitably explains observed phenomena better than the theory it will eventually replace. This is not the way science is supposed to work, however. Ideally, a better explanation supported by scientific data ought to easily displace an older and cruder theoretical formulation of the same observed phenomena. But it doesn't happen that way.

All too often in the history of science, a much superior explanation is resisted by the contemporary scientific community and is marginalized and forgotten, to be re-

discovered and appreciated only much later. This phenomenon sounds very much like the behavior of non-scientists who switch from one belief to another under the mechanism of groupthink. In this latter case, there is frequently no basis for rationality: a segment of the population may switch political alliances, or popular beliefs, or some key aspect of cultural behavior. Fashions take over the minds of a nation, run their course, and then give way to yet another fashion. The point is that during the period when one fashion holds reign, it is nearly impossible to convince its followers to switch to something else, and rational arguments have no effect. When change eventually comes, it is sudden.

Kuhn was talking about scientists, who naturally represent one of the most intelligent and rational segments of any population. Yet scientists apparently act in an irrational manner when it comes to accepting beliefs about their own discipline, which itself is supposed to explain natural phenomena rationally. Science after all has an experimental basis: researchers measure phenomena in the laboratory, and then analyze observations rationally and not as mere philosophical speculations. Nevertheless, if scientists are not immune to irrationality, how then are we to expect non-scientists to be influenced by rational arguments? Kuhn introduced a term that has been talked about steadily for several decades, but unfortunately he did not indicate how the paradigm shift occurs, and, more importantly, how it could be speeded up. The pieces to answer this question lie in understanding cognitive dissonance.

Conclusion

One of the immediate dimensions of the global crisis, which is complicated by the inertia of a group mentality, is a reluctance to let go of the industrial model of consumption and its allied design ideology. The material expectations of our modern society — coupled with the continued desire for new, supposedly better products — aggressively waste energy and natural resources. Designing on the basis of substantive quality rather than quantitative measure could have a positive effect on our environment. Two conditions keep this process from moving forward, however: (i) the unshaken belief in the industrial model to solve the problems it has itself created; and (ii) the methods of practice, reliance upon misinformation, and controlling interest of today's architectural community. Even if the desires of the world's citizens were to become more realistic, there is still the effect of contemporary design thinking that would need to be overcome.

While the primary interest here lies with contemporary architecture and urbanism, the mechanisms for maintaining irrational beliefs are universally applicable. This paper reviewed the strategy — here classified as seven tactics for denying the truth — which people habitually employ to maintain their false beliefs against evidence that refutes them. Individuals holding a worldview founded upon misinformation occasionally come to an enlightening breakthrough all by themselves, and then they turn to the available sources of true information to enrich their knowledge base. The literature reveals only little direct success in converting someone who has been following groupthink, however. This pessimistic assessment is borne out by

professional psychologists who deprogram members of dangerous cults, where unfortunately a very small percentage of former followers are ever successful in resuming normal life.

A little investigation reveals why the situation in architecture is so terribly polarized. Currently, architects go through an educational system that instills conformity to ideology, and which trains young architects in a way of thinking that accepts no revision of certain pre-formed beliefs about their discipline. The professional milieu is no better, as it continues to operate on the basis of never questioning a body of dogma (the “canons” of modernist architecture and urbanism, which are only a century old). Any non-architect can readily verify these conditions by attempting to debate architects about the soundness of their fundamental core beliefs. Since our built environment and the sustainability of our world depend upon constructing buildings and cities according to scientific knowledge that revises prejudices, this narrowness of thought poses a serious obstacle to progress.

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