Towards an International Political Ergonomics

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Abstract

This article introduces International Political Ergonomics (iPER). iPER is a novel research programme focused on achieving positive-political change through the ergonomic (re)design of world politics. The approach is grounded on a shift across IR that recognizes its epistemic (i.e. knowledge-producing) core is often inadequate to achieve change. Insights from the practice turn and behaviouralist IR, as well as from philosophy, sociology, and neuroscience, demonstrate that much international behaviour is driven by the 'unconscious' or 'non-reflexive' re-articulation of repertoires of actions even where the pathologies of this process are known. This implies that knowledge production and dissemination (i.e. to policy-makers, global publics) is often unable to effect influence over social practices. What is thus required is a non-epistemic means of effecting world political change. iPER is a research programme that takes up this task. It does so by describing how small material interventions into world politics can radically shift individual behaviours by encouraging greater rationality, reflexivity, and deliberation. After laying out the theoretical basis for this claim, the article demonstrates it by detailing the application of iPER to violence prevention efforts. The article concludes by reflecting on the radical implications that iPER has for the vocation of IR.

Keywords:

Ergonomics; design theory, practice theory, policy relevance, political violence, materiality.

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Jonathan Luke Austin

Die Philosophen haben die Welt nur verschieden interpretiert, es kömmt drauf an, sie zu verändern.[1]

What do we, as students of International Relations (IR), *do*? We read. We write. Some of us run numbers. Some of us go to archives, others head to the 'field' and observe this or that. Some of us develop models, others theories. Things like that. That's what we typically do. Now – instead – imagine a student of world politics standing in a factory, at the end of a production line with little objects flowing towards her. Imagine her picking one of these up and examining it with care. Or imagine her sitting in a studio before an architect's desk, sketching. Or sitting in a workshop surrounded by tools, metals, plastics: making things. Imagine a student of world politics doing all that. This is hard to imagine because, well, that's *not* what we do at the moment.

In this article I suggest we start doing things like that. I do so by advocating for the development of an International Political Ergonomics (iPER). iPER is an applied research programme founded on the idea that one promising means by which to effect world political change is the ergonomic redesign of the socio-materiality of the situations in which its events occur. In this, iPER seeks to reconfigure the vocation of IR such that beyond studying, analysing, and writing, we also begin *designing, crafting, building,* and *distributing* concrete things. Analogously, just as automobile engineers insert safety mechanisms into vehicles (beeping seatbelt indicators, lane departure warning systems) that are ancillary to their main purpose so I argue it is possible for IR to not dissimilarly intervene in world politics in as yet unconsidered but positive-political ways.

The need to develop an iPER stems from recent developments within practice-theoretical and behavioural IR (as well as work across neuroscience, philosophy of mind, and psychology) that challenge conceptions of how science gains social influence. Whether expressed via theories of Type-1 thinking, *aliefs*, habit, or practice, IR theory has come to identify factors that lead to the repetition of particular behaviours that are, at individual or collective levels, questioned in their desirability (i.e. are deemed potentially negative).[2] To simplify, the suggestion is that cognitively held knowledge that should at least give individuals 'pause for thought' before carrying out an action (e.g. ethical norms, bureaucratic 'best practices,' etc.) is frequently not enacted by humans, not necessarily because this knowledge has been consciously socio-politically or individually rejected but often due to a bias against self-reflective thought that is intrinsic to human action.

These ideas suggest that undesirable outcomes in world politics sometimes emerge less as the product of (more or less rational) choices/decisions framed by intersubjective horizons of meaning (that might be altered via logics of argumentation) nor cost-benefit calculations founded on a logic of consequence meditated over by (more or less) rational agents, so much as the product of an 'unconscious' or 'non-reflexive' re-articulation of repertoires of actions that force repetition even if these processes are collectively recognized as pathological or, at the very least, are the source of great socio-political controversy (c.f. Ringmar, 2017; Hopf, 2010; Pouliot, 2008). And one central implication of these findings is that knowledge production (i.e. epistemics) is typically a necessary but rarely alone a sufficient source of sustained world political change.

iPER thus seeks to address the emerging necessity of IR coupling its knowledge producing (i.e. epistemic) core with supplementary approaches that address the challenges these theories pose for the practical aspects of its vocation. Indeed, many in IR have long believed that the field's ability to effect change rests on epistemically revealing the workings of the world and sharing its findings with policy-makers or interested global publics (Walt, 2005; Lepgold, 1998; Jentleson and Ratner, 2011). It is then hoped that these agents will alter their behaviours by integrating this knowledge. And – of course – this process sometimes works. New ideas can change the world, especially if pushed for via a logic of argumentation founded on the modern vision of politics as grounded in (ideational) contestation (Risse, 2000). But sometimes ideas are not enough, and the continuing gap between normatively held ideals and political practice strongly attests to this fact.

iPER provides an applied materialistic alternative to knowledge-production. This approach is grounded on the attention many of the theoretical schools of thought mentioned above give to exploring the material, environmental, and situational factors underlying non-reflexive action.[4] Intuitively, if non-human factors drive certain (individual or collective) behaviours then making material changes to socio-political settings may be critically important. And there are very old examples of this intuition. The 19th century re-design of British parliamentary architecture, for instance, was dictated by an awareness that Parliament's capacity to be democratically transparent was not limited by a "lack of desire among MPs to publicize their oratorical endeavours" (Rex, 2014: 457). On the contrary, the importance (and, indeed, potential advantages) of this publicity had long been recognized. However, Parliament's capacity to become publicly transparent in its activities was – *in spite of this belief/desire* – still very significantly "constrained by the physical space it occupied" (Rex, 2014: 474). Hence, the eventual re-design of Parliament notably included a set of galleries – for the press and public – that significantly materially altered the capacity for the public to 'look back' at and perhaps even influence parliamentary behaviour.

iPER seeks to imagine similar interventions that might counter-act negative world political phenomena, which occur due to non-cognitive factors, by working to augment the socio-technical systems of individuals and the collectivities they comprise in ways that might increase reflexive decision-making capacities. The approach draws on ergonomics, design theory, and cognate approaches due to the applied thinking styles of these fields, which grounds their knowledge-production in the desire for change. Likewise, the focus of design-centric approaches on the interaction between human-machine systems and their efforts to design changes into these socio-technical networks that alter the likelihood of behaviours is especially relevant to IR. Indeed, particularly useful is a sub-field of ergonomics focused on safety and the reduction of decision-making biases, as well as the design or redesign of materials in ways that increase human reflexivity (Dekker, 2014b; Dekker, 2014a). Ergonomics and design-centric approaches are most useful, however, because the theoretical postulates they operate under echo those now common across IR. The social and technical interventions made within ergonomics and/or design theory do not *presume* the presence of a rational, thinking, or reflexive subject. Instead, they (through different means) change behaviour by altering the material, technological, or significatory systems in which humans are embedded (Hancock and Diaz, 2002; Chung and Williamson, 2018).

Ultimately, then, drawing on ergonomics and/or design theory is one way to ensure that the theoretical and empirical knowledge developed across IR as its bread and butter can continue to be nurtured whilst also always having the potential to be materialized in objects and technologies

(or in other ways) that would apply this knowledge concretely, and (potentially) independently from any particular social or political authority that might dilute its socio-political independence (c.f. Jahn, 2016). iPER is thus presented as one means of expanding IR's vocation such that it becomes a field possessing an applied variant. Developing iPER means to create an *applied IR*. And though such an applied sub-field raises innumerable ethical questions, which I discuss at length in the conclusion that follows, the promise it offers to change worlds is not insignificant.

In order to reach this argument, I will now begin by discussing how IR has previously sought to change the world. As glossed above, this discussion dwells on how knowledge as a representational object has been central to these endeavours. The second section then theorizes how IR's change-making activities are limited by this epistemic focus and notes how the approach ignores the drag effects of habitual, practical, and/or 'natural' sources of behaviour. The third section then theorizes an iPER able to address these challenges. This is achieved through a comparison with other social and natural scientific fields that already materially intervene in human behaviour, as well as by way of analogy to Thomas C. Schelling's deterrence theories. The final section concretizes my discussion by exploring examples of iPER 'in action' focused on violence prevention. The paper concludes by discussing what exploring iPER seriously would mean for the vocation of IR. In doing so, I urge that IR takes the world in its own hands and goes beyond delegating praxis to politicians and civil society groups by instead becoming directly (if riskily) involved in re-designing the contours of international relations.

IR and Making Change

Many IR scholars have long been concerned with changing the world. From its beginnings, the field has been preoccupied with sharing knowledge of the workings of politics with relevant practitioners and/or with critically challenging assumptions in how the world *should* be ordered (Cox, 1986). Falling in line with the still-standing enlightenment tradition, the hope is that employing an ideational logic of argumentation supported by the weight of social scientific procedures can produce evidence through which to debunk myths about the social world and in doing so provide the impetus to change the extant paths of policy-makers or global publics. Of course, IR scholars know well that we rarely implicated in the genesis of change. However, following Goldsmith and Krasner (2003: 43), the view is that "ideals can be pursued effectively only if decision-makers are alert to… the consequences of their policies." The goal of many is thus to better inform practitioners of the consequences, alternatives to, etc. of their actions. Not all agree, of course. A counter-argument exists critiquing the very idea that scholarly knowledge should be co-imbricated with the contingencies of politics (Jahn, 2016). Nonetheless, most believe that "it is both in the discipline's self-interest and part of its societal responsibility to link its scholarly mission" to politics (Jentleson, 2002: 181). Specifically, two trends orient this work. The first is policy-relevant scholarship focused on core policy questions through "case-oriented and actor-specific analyses, [and] 'user-friendly' empirical analysis" (Eriksson, 2014: 95). By contrast, others demonstrate the relevance of more abstract, critical, meta-theoretical, or grand theoretical work within IR that lacks such 'direct' applicability (Mearsheimer and Walt, 2013).

Specific orientation aside, IR has long been distinctly unhappy about the extent of its 'relevance.' As Walt (2005: 23) once put it, "policy makers pay relatively little attention" to IR, adding that the

common counter-argument that IR gains relevance through 'trickle-down' effects (teaching, media engagement, etc.) has become "increasingly questionable." Nye (2008) also claims that the gap between IR and policy has grown, and most agree. Indeed, some believe IR's position has weakened as think-tanks and others have colonized its privileged status (Jentleson, 2002: 181). Often, this problem is connected to the socializing effects of academic culture and its divergence from the 'real' world (George, 1994). The answer to the question posed by Lepgold two decades ago – *is anyone listening (to IR)* – therefore *mostly* continues to be answered quite simply: *not really*.

This article shares the concerns of Walt, Lepgold, Nye, and others who think similarly. But it explores this dilemma by beginning with a quite different orientating question: *does listening (always) matter?* The entire debate on the policy-relevance of IR rests on epistemics. The belief is that IR can provoke change by developing and communicating 'better' knowledge about the world. But the tenability of this approach is coming unstuck. It seems today that the ideals of democracy, human rights, economic interdependence, etc. are losing traction. The entirety of the next section of this paper dwells on this point, but let me first briefly demonstrate it now via a case in which scholars *have* been listened to: the constructivist literature on human rights in IR.

Generally, constructivist work on human rights norms has focused on the powers of a logic of appropriateness and the idea that developing stronger norms is central to improving world politics (Onuf, 2016). Indeed, in optimistic moments, norm theory suggests that, once an international norm has reached widespread acceptance, conformance becomes 'automatic' (Finnemore and Sikkink, 1998). Here, the work of Kathryn Sikkink (2011) on torture is instructive. Throughout her work, Sikkink has collaborated with human rights activists and intervened at (domestic and international) legislatures in order to strengthen global anti-torture (and other) norms. Indeed, Sikkink's work is exemplary of the impact scholarly activism has.

However, while Sikkink has aided in the growth of a *post-hoc* 'justice cascade' in which the strengthening of human rights norms has seen a rise in criminal prosecution, the *practical* effects of norm diffusion are less encouraging. For example, the strengthening of anti-torture norms has occurred without continued drops in the state-led use of torture (Noack, 2014; Austin and Bocco, 2017; Austin, 2017; Austin, 2016b). And this fact should be unsurprising. It has long been known that the prosecution and punishing of crimes does not produce significant declines in rates of drug dealing, gang violence, or the like. Similarly, criminalizing and punishing violations of international law appears to have limited consequences for reducing the frequency of their occurrence. In cases like this, then, scholars within IR *have been and are being* listened to. They testify before legislatures, advocate expertly in courtrooms, and help draft new policies. The problem is not a lack of an audience for scholarly knowledge but the lack of change occurring.[3]

Desire Lines and the Deep Psyche of World Politics

If you take a walk through any town, city, or natural habitat, you will come across seemingly random paths cut in the ground. Dirt tracks that twist and turn and – typically – provide shortcuts bypassing formal walkways. Within urban planning, these paths are termed desire lines: routes worn into the earth by people 'naturally' following the path of least resistance (Tiessen, 2007). Such desire lines are paradoxical. On the one hand, they indicate human

purposefulness. Instead of doing what we are told, following paths blindly, we often do what we prefer. But, on the other hand, desire lines are cut into the earth by thousands of people following the same desire. People create these paths like ants marching with a striking lack of individuality, as if human desires were unconsciously shared via a certain 'deep psychic' force.

In this section, I show that desire lines are at the root of world political problems based on social practices that are a) *collective* in their emergence but, also, b) (partially) *unthought* or *unplanned*, while c) having – nonetheless – a patterned regularity. An example: Autesserre (2014) has demonstrated how various personal and bureaucratic practices within peacekeeping operations that are organizationally recognized as negative vis-à-vis the efficacy of those missions persist nonetheless due to a set of individual and/or social preferences that push aside the possibility of reflexive behavioural change. Below, I discuss many other examples in which international order is deranged by such patterned forms of collective non-reflexivity. First, however, I should note that the term desire lines is unusual. I am employing it here solely to avoid affiliating with one or another school of theoretical thought in IR, each of which has its own terms to describe this issue. Indeed, typically, IR explores the problem in question in the terms of either A) human nature, B) inter-subjectively held ideational structures, or C) the repetition of social practices.

Table 1 disaggregates these most common 'paradigms' through which the deep psyche of world politics being discussed is explored vis-à-vis the schools of thought employing them, the level of change identified as being possible (mutability), the methods for achieving change, and the internal logics each presupposes. Deliberately, a wide range of approaches are included, many of whose variants do not necessarily ally with deep-psychic thinking. For example, Waltzian neorealism does not rely on assumptions about human nature, favoring instead a structuralist ontology. Likewise, the issue of how change occurs is deeply contested across the approaches. My intention of grouping these theoretical approaches together is thus not to imply homogeneity or agreement. Instead, it is to note that since its foundations, IR has proliferated theories that appreciate the relevance of desire lines for world politics. For the purposes of our discussion, let me dwell only on the third and most recently identified source of the deep psyche of world politics identified: *habits*. Most closely, this term refers to the recent practice turn in IR (Adler and Pouliot, 2011). As Pouliot (2008: 258) summarizes, practice theory:

> Starts from the premise that most of what people do… does not derive from conscious deliberation or thoughtful reflection… Instead, practices are the result of inarticulate, practical knowledge that makes what is to be done appear 'self-evident' or commonsensical. This is the logic of practicality.

Following these principles, practice theorists have shown how bureaucratic pathologies (Neumann, 2007), political violence (Austin, Forthcoming 2018; Austin, 2017; Austin, 2016a; Austin, 2016b), terrorist recruitment (Crone, 2014), legal adaptations to technology (Leander, 2013), inefficiencies in humanitarian policy (Autesserre, 2014), and beyond, are less the product of particular (more or less rational) choices or decisions framed by intersubjective horizons of meaning (that might be altered via logics of argumentation [Risse, 2000]), nor cost-benefit calculations founded on a logic of consequences meditated over by (more or less) rational agents, so much as the product of that somewhat 'unconscious' or 'non-reflexive' re-articulation of repertoires of actions that force repetition even where these practices are either consensually recognized as pathological or, at a more minimal level, subject to a great deal of social controversy. Put simply, these are practices that occur repeatedly despite their not existing a

consensus for their desirability. And one central implication of these findings is that a mere cognitive awareness of the problematic status of any practice is rarely enough to actualize change.

Other strands of IR draw from multiple elements of Table 1. Take behaviouralism. Over time, the approach has embraced a nuanced understanding of cognition, bearing a striking resemblance to practice theory. As Hafner-Burton *et al* (2017: S2-S3) write, recent behaviouralist work:

> Has spawned important theoretical advances, such as a growing consensus around a 'two-level' model of cognition in which some choices are intuitive and immediate – what Kahneman calls 'System 1' or 'fast' cognition – while others are slow, deliberative, and more 'rational' – referred to as 'System 2' or 'slow' thinking.

The distinction between System 1 and System 2 levels of cognition is key. System 1 or 'fast' cognitive models are similar to the pre-reflexive modes of action described by practice theory, the linages of which can be traced to Freud or Heidegger (Harman, 2002; Freud, 2011). Ultimately, the claim made is that slow, rational, or reflexive thought (System 2 thinking) is most often *not* employed when decisions are made or actions undertaken and such a view indeed finds supporting echoes in contemporary philosophy of mind. Take the distinction between *belief* and *alief* made by Gendler. An *alief* is "to a reasonable approximation, an innate or habitual propensity to respond to… a stimulus in a particular way" *irrelevant cognitively held beliefs* (Gendler, 2008: 552). This language of alief is especially useful in allowing us to study 'norm-discordant' events in which an individual's behaviour contradicts their ideas/beliefs. A basic example: "an avowed anti-racist" who "exhibits differential startle responses when Caucasian and African faces are flashed before her eyes" (Gendler, 2008: 553). A complex example: a Syrian soldier who tortures prisoners despite his personal belief that torture is immoral (Austin and Bocco, 2017).

Importantly, and finally, the above claims are also now supported by neuroscientific evidence. Most controversially, studies of decision-making in the brain suggest humans lack reflexive free-will (Damasio, 2012). This has been demonstrated experimentally through neuroscientific imaging, which shows that 'choices' are made *before individuals are cognitively aware of (having made) them* (Haggard, 2008; Adina, 2013). What is argued is that when an event or situation emerges before a person and demands an action/choice, an array of possible actions 'come to mind' without thought, reflection, or deliberation. Options simply appear in our heads. It is thus that when realizing a fire has broken out, we look unthinkingly for the exit (Ringmar, 2017). Of course, in more complex situations, a wider array of possible courses of action come to mind. Nonetheless, for reasons about which neuroscience is agonistic, these options are already ranked in preference when they come to mind. Nonetheless neuroscience does also confirm that free will is not exactly absent. Instead, it operates *negatively*. As opposed to thinking of our being-in-the-world as directed with ontological primacy through conscious choice, it is suggested that we think in terms of *free-wont's* (Damasio, 2012). These are decisions to 'countermand' what comes to mind in the immediacy of a situation. In short: depending on circumstances, exogenous pressures, etc., there always exists a window of opportunity *after* a choice has been preconsciously formulated to say *no* and act differently. And the history of human progress attests to this. For example. Rosa Parks' decision *not* to step to the back of the bus was an active negative decision that likely countermanded an urge to comply with social norms. And the spread of human freedom continues, to this day, to follow this pattern of heroically forcing the Self to say *no*.

Table 1: Explanatory Paradigms for the Deep Psyche of World Politics

	Source(s)	Schools	Mutability	Logic(s)	Change *via*
Human Nature	Biology; (clashes of) interests; (bounded) rationality; evolution.	Classical Realism; Neorealism; Liberalism; Functionalism.	Low	Consequences; realpolitik; incrementalism	Exogenous shock; balancing; negotiation; rational deliberation; (religious) salvation; technology; war.
Ideology	Culture; history; economic forms; institutional forms; materiality.	Constructivism; Historical Institutionalism; Marxism; Critical Theory.	Medium-Low	Argumentation; appropriateness; enlightenment; social-material relationality; historical legacies.	Exogenous shock; knowledge production; technology; communicative action; radical action.
Habit	Practices; repetition; training; problem-solving; social fields (& capital); materiality.	Practice Turn; Pragmatist Sociology; Critical Theory.	Medium-Low	Practicality; structure of socio-technical networks; material-semiotics.	Exogenous shock; incremental contestation; technology; citationality of practice; reflexivity.

N.B. *This table is illustrative of the multiplicity of approaches incorporating some understanding of the desire lines of world politics, but is not intended to be comprehensive or fully representative of specific theoretical nuances.*

Ultimately, all the sources of the deep psyche of world politics discussed above suggest reasons why particular world political practices that are deemed controversial (i.e. are not consensually accepted) persist nonetheless. Because individuals most often follow the path of least resistance when acting, so even personal unease over the ethical or political status of their actions is often unable to effect change. Of course, by way of caveat it should also be noted that this human use of 'automatic' modes of cognition is not necessarily negative and, in fact, is very often positive. As human beings move about the world they are inevitably "bombarded by environmental stimulation" despite having only a "limited capacity for processing information" (Desimone and Duncan, 1995: 193). In consequence, human practice is dictated by the "ability to filter out unwanted information" (Ibid). This capacity is crucially important not only to ensure human safety (i.e. to selectively adjudicate what is dangerous and navigate it; e.g. crossing roads) but also to allow for the development of skilled performances (Garfinkel, 1967). These latter behaviours are typically learned over time and are vital for the smooth running of society. More than this, it is clear that much of what it means to 'be' human rests on non-cognitive processes: our ability to appreciate art, aesthetics, and culture, by way of example, cannot and should never be reduced to deliberative thinking but always also as relating to affect, emotion, corporeality, and beyond.

In spite of this, it seems clear that non-reflexively enacted practices can also have negative effects, especially where they enable outcomes that are not consensually accepted (i.e. are considered socially controversial). For our purposes, what is thus surprising about the turn to appreciating the non-reflexivity of much of world politics is that little consideration has thereafter been given to the challenge these insights pose to IR's vocation. Because, while there undoubtedly exists "a connection between politics and knowledge at the epistemic level," it seems self-evident that the insights developed by constructivists, behaviouralists, and practice theorists suggest a substantial void in trying to improve our collective world political lot (Jahn, 2016: 4). Indeed, the rise of these approaches reaffirms a longstanding fact: ideas are quite often the weakest vehicles of change. They are necessary but manifestly insufficient to change the world. Much like only *telling* a long-term smoker that their habit will kill them is typically futile, so current efforts to change the world political through disseminating ideas (i.e. *Torture ≠ good intelligence! Respecting human rights = political stability!, etc.*) are often equally ineffective. Knowledge *alone* cannot always change things.

Designing Against Desire: Towards an International Political Ergonomics

The previous section showed that IR has sophisticated tools for understanding the 'stickiness' of world political practice and that these tools challenge contemporary conceptualizations of how the field seeks to influence practitioners and produce change. The goal today must thus be to "reform the academic world" by altering its "prevailing norms" quite radically (Walt, 2005: 41) and expanding notions of policy relevance "beyond the direct and action-oriented application of ideas" (Eriksson, 2014: 94). Getting to such an expanded vision of 'making change' might be achieved in different ways. Underlying iPER at this stage is, however, the basic principle that we can advance disciplinary perspectives *today* by comparing the status of IR with (seemingly) distinct fields whose approaches to changing social life go radically beyond a focus on epistemics.

To begin, it is important to note that what might be considered the more 'influential' (i.e. socially powerful) sciences, such as engineering, mathematics, economics, medicine, etc., do not gain that influence (solely) by communicating their knowledge in 'policy friendly' or 'accessible' ways. Indeed, Jahn (2016: 69) has persuasively argued that it is precisely the abstract language of science – "embodied in numbers, formulae, models, scientific languages," etc. – that gifts it political power. Quite obviously, the medical sciences, technological disciplines, engineering fields, and beyond, all possess significant societal influence while retaining intensely abstract and socially-distant languages of expression. And, crucially, such languages also ensure scientific knowledge is produced autonomously, lessening the influence of contingent socio-political pressures (Ibid).

But how then do other scientific fields gain the power to make social change, in spite of the persistent non-reflexivity of human behaviour, and if not by speaking in the everyday languages of the world? In my view, most discussions of IR's political influence make one key omission vis-à-vis understanding the greater autonomous influence that other natural and social scientific approaches possess: the stronger *materiality* of scientific practice that can be seen across other disciplines. It is clear that many other scientific fields are concerned not only with knowledge production (epistemics) but also with the material 'actualization' of knowledge. Many disciplines not only theorize and inquire epistemically but also *design, craft, and build* objects that 'prove' the validity or utility of what is otherwise often deeply abstract knowledge. And, absolutely crucially, this materialistic goal of science is *not* related to any distinction between natural and social scientific practice. Yes, scientific fields like physics, chemistry, biology, and mathematics all have 'applied' variants that consistently with this materialistic goal. But so too do fundamentally social sciences like architecture, organization studies, military science, economics, and far beyond.

Indeed, let us stay with economics. "Economics is often seen as enjoying a common conception of a rich subject matter and highly developed and mature tools of investigation" (Jahn, 2016: 71) that translates into the 'real' world. Indeed, economics is a fundamentally *performative* discipline that "does things, rather than simply describing… an external reality that is not affected by economics" (Callon, 1999: 98). And this performative quality of economics gains authority largely due to the ways it has been intimately involved in the creation of material tools that perform outside the ivory tower. Take the example of the Black-Scholes-Merton (BSM) pricing model. The development of the mathematical equation underlying the BSM model was intended to correctly estimate the prices of stock options. Prior to the development of this model:

> Traders of options had no reliable scientific method for deciding whether an option was overvalued or undervalued… *they had to guess the volatility of the underlying stock price*, meaning how the price would change over time, and therefore how much the option was worth (Muellerleile, 2013).

Guess work of the kind used before the BSM model emerged can be intrinsic to (practical) deep psychic modes of cognition. Previously, acting on 'gut' feeling was deemed a virtue among those working in finance. Indeed, those who first began using BSM sheets were sometimes told "You're not a man if you're using those theoretical value sheets… Be a man. Trade like a man"' (Ibid: 162). Ultimately, however, this instinctive approach to trading resulted in cognitive biases, biases that often had catastrophic effects. Indeed, financial traders are known to be more profitable in their work where they employ fewer (cognitive) biases and, recently, evidence shows that traders are becoming less susceptible to these biases (Evans, 2003). Devices like the BSM were central to removing these cognitive, emotional, and group biases by providing an authoritative material foundation for action. Indeed, the BSM was eventually distributed via a set

of "computer-generated sheets of theoretical prices for all the options traded on U.S. options exchanges" (MacKenzie, 2006: 162). Notably, the price sheets produced in this way were designed with the ergonomics of their cognition in mind, including "what options traders using the Black-Scholes-Merton model needed to know, but no more than they needed to know… There was virtually no redundant information on… [the] sheets—hence the sheets' easy portability" (MacKenzie, 2006: 162). It was a combination of the technical qualities of the model (its base epistemics) and the design of their dissemination (its material-ergonomics) that slowly transformed financial market behaviour. Now, whether this transformation was positive or not is irrelevant to the fact that it was the material-ergonomics of the model created by economists that gifted it power or "assembled" its social and political "credibility" (Aradau and Huysmans, 2019).

iPER is founded on the principal that those within IR concerned with changing world politics must develop an understanding of how the field can similarly materialize its knowledge. This understanding is philosophically supported by the idea that 'aliefs', 'habits' or 'System 1' thinking are/is most likely to emerge "when a subject's environment is unstable, atypical, or undesirable… or when a subject is reality-inattentive in certain ways" (Gendler, 2008: 554). Indeed, a growing literature suggests that the materiality of the situations in which people find themselves can very often drive unintentional, non-reflexive, and/or unconscious behaviours (Latour, 1999; Clegg et al., 2013; Cunha et al., 2014; Austin, 2016b; Austin, 2017). Improving the 'stability' of the material world thus has the potential to increase norm-concordant behaviour, based on the idea that material "objects help us make our minds, reaching out to us to form active partnerships" (Turkle, 2007: 308).[5] These principles lie at the root of certain variants of practice theory, post-humanist philosophy, and even the work of Heidegger on the ways that material objects which are 'ready-to-hand' (*Zuhandenheit*) radically impact human behaviour by gifting authority (e.g. to science), shaping action (e.g. like trading screens in stock brokerages), and in many other ways (Harman, 2002). Material objects can achieve this by standing as the materialization of (scientific or not) knowledge that exists at least somewhat independently from human being in the world.

However, one need not delve into philosophy to understand this point. In fact, Political Science already evidences it. Take the work of Thomas Schelling, which contains one of IR's few non-epistemic examples of change-making. Schelling's theoretical and empirical inquiries were distinctly problem-solving in form, concerned with the effective design of deterrence policy. Theoretically, therefore, Schelling had little interest in notions of deep psychies. However, his efforts to make deterrence more effective share a great deal with the postulates of iPER. Take Schelling's (1960: 45) concept of the 'trip wire' and view that "deterrence often depends on relinquishing the initiative to the other side." An example here is the global positioning of NATO bases coupled with the principle of collective defense. Such socio-material configurations demand that it is the other side who must 'decide' that a war will begin, without the opposition losing its capacity to defend or offend in response. As Schelling (1960: 47) expands:

> How do we maneuver into a position so it is the other side that has to make… [a] decision? *Words rarely do it.* To have told the Soviets in the late 1940s that, if they attacked, we were obliged to defend Europe might not have been wholly convincing. When the administration asked Congress for authority to station Army divisions in Europe in peacetime, the argument was explicitly made that these troops were there not to defend against a superior Soviet army but to leave the Soviet Union in no doubt that the US would be automatically involved in the event of any attack.

In this example, the flesh and blood of soldiers garrisoned in Berlin become material objects that change the status-quo more effectively than verbal commitments: "words," indeed, "rarely do it." As Schelling bluntly described, those soldiers themselves could do nothing except "die" (Ibid). But as active materializations of deterrence theory they served as the most credible of commitments. Perhaps the more literal actualization of our claims, however, is found in Stanley Kubrick's *Dr. Strangelove*, where the USSR's 'Doomsday Device' materializes deterrence *in extremis* by excluding humans from decision-making entirely. Deterrence is described here then as being actively designed into socio-technical systems, quite literally materializing its military strategies.

And it is this word 'design' that we must now reflect on. One way to read the work of Schelling on the formulation of credible commitments is through ergonomics and/or design theory. In practice, deterrence policy was implemented to a great degree by focusing on improving "the ergonomics of man-machine systems" used in military settings, as the Russian government itself once put it (Dick, 2007: 493). Or, as another deterrence theorist wrote, "history demonstrates convincingly that the reliability of deterrence is vulnerable to *human factors*[6] ranging from desperation to gross misperceptions and faulty information" (Payne, 1995: 214). Much of the work of figures like Schelling was thus related to considering how more effective systems of deterrence could be designed that helped fully take into account the interactions between human operators, technological systems, and wider society. The goal of deterrence theory, to some degree, was to ergonomically *design* international affairs more 'safely' or 'rationally' than before.

Now, Schelling's work was forced by circumstance and the novelty of nuclear weaponry. Nonetheless, its importance rests on how it stresses the value of *small, material, and micro-level changes* for producing vast 'macro' level effects on world politics: just 10,000 troops stationed in Berlin defended against annihilation. Moreover, each of Schelling's examples are premised on disrupting automatic behaviours by leveraging counter-acting forms of automaticity. The notion of the trip-wire, for example, works to disrupt the risk of an unthought stumbling into conflict (for whatever reason) by leveraging and making the inevitability of mutually assured destruction so plainly obvious that it need not be thought through in and of itself: in essence cancelling out the risk of one of systems 1 behaviour (military posturing, miscalculation, etc.) with another equally practically and rapidly evoked behaviour (i.e. our social-somatic aversion to nuclear holocaust). To understand this point, it is worth introducing the further neuroscientific concept of the somatic marker. As Damasio (1994: 173-174) puts it, somatic markers are triggers that (emotionally, affectively, or cognitively) focus our:

> Attention on the negative outcome to which a given situation may lead, and… [so function] as an automated alarm signal which says: *Beware of danger ahead if you choose the option which leads to this outcome.* The signal may lead you to reject, immediately, the negative course of action… [But] there is still room [here] for using a cost/benefit analysis and proper deductive competences.

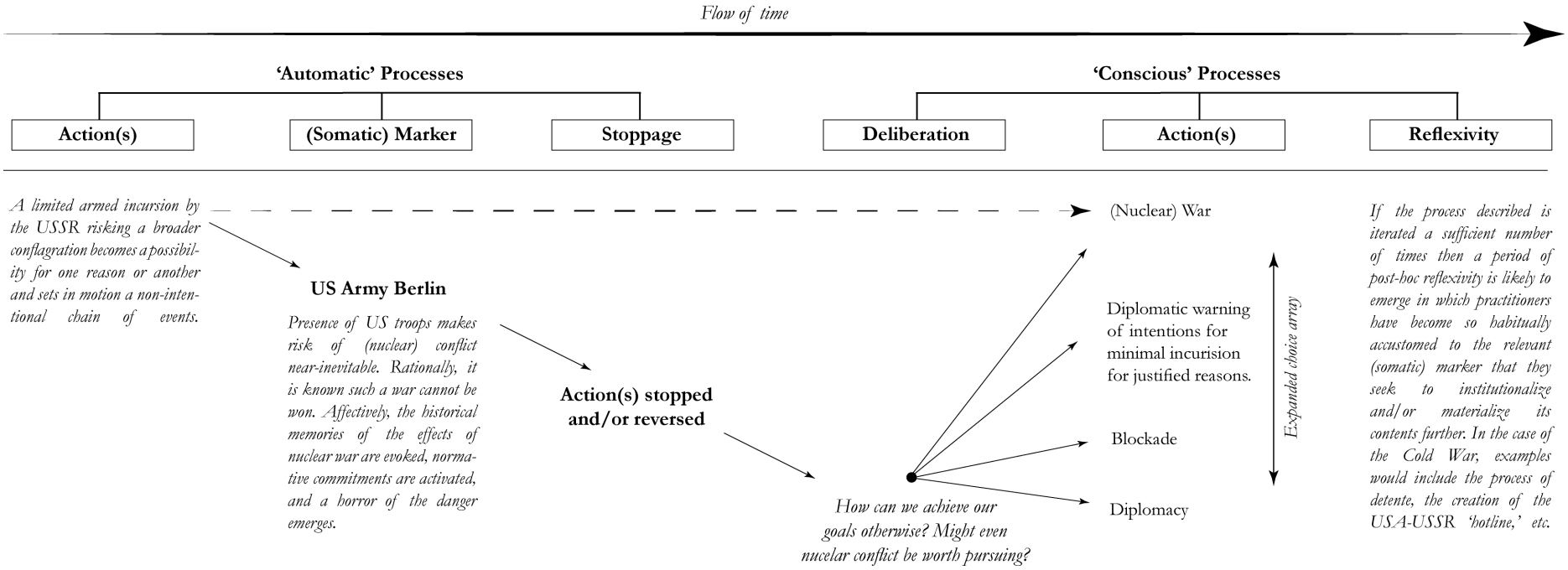
Somatic markers are essentially 'prompts' that counter-act the automaticity of practical action by introducing those "automated alarm signals" that connect a particular situation and its mood, affective orientation, or material constitution to previously learned information. Indeed, somatic markers are, it is crucial to note, based on prior knowledge-production (whether scientific or not) even when they are materially and automatically actualized. In Schelling's case, his trip-wire might be interpreted as a somatic marker working to evoke the physical, chemical, biological, social, political and historical knowledge of the consequences of nuclear war that crystalized into a social taboo post-Hiroshima, for example (Tannenwald, 2005). Alternatively, at the strategic-rational

level it might appeal to the widespread acceptance of the impossibility of winning a nuclear conflict (Cohn, 1987). It is thus indeed – to reiterate – that iPER is in no way about claiming knowledge-production to be irrelevant. On the contrary, it is the only basis on which the interventions it describes become possible. To repeat, however, the necessity of materializing ideational constructions rests on the fact that ideas alone are often not sufficient to create behavioural (self)-compliance: any particular idea, norm, belief, etc. typically has to be consistently and repeatedly environmentally evoked and be ethically, normatively, or affectively 'felt' in order to push-back against factors that might otherwise lead to it being forgotten in the heat of the moment or the listless flow of everyday life. To summarize (see Figure 1), the chain of events described here can be formulated simply: if the conditions of possibility for undesired event Y emerge then the purpose of (designed or natural[7]) somatic marker X is to disrupt those conditions of possibility by 1) creating 'automated' material-semiotic prompts that cannot be ignored and so 2) force a 'stoppage' in human behaviour that nullifies the automaticity of undesired event Y and – thereafter – possibly, 3) encourages post-hoc deliberation (see below).

The process of disrupting non-reflexive human actions through material means just described is at the core of ergonomics and design theory. These fields are both focused on reordering the "interactions among humans and other elements of a system" in order to shift its conditions of possibility (Chung and Williamson, 2018: 41). Indeed, a particular focus on 'disrupting' what are deemed potentially negative non-reflexive behaviours can be found within the subset of ergonomists who explore the conditions for behavioural safety by redesigning material aspects of our interaction with the world to decrease risks caused by miscalculation, bounded rationality, and System-1 type thinking in settings like road traffic or aviation safety (Dekker, 2014a; 2014b). Likewise, extensive work within design theory describes how many technologies can be seen as "inherently moral entities," implying therein that "designers are doing 'ethics by other means'" or – more simply – are 'materializing morality' (Verbeek, 2006: 369; Hancock, 2012). And much of this work has now come to focus on the relationship between material design and human rights, democracy, and/or political transformation more broadly (c.f., inter alia, Buchanan, 2001).

Importantly, this focus of iPER on 'disruption' through ergonomic design must now be distinguished from the work on 'nudges' within behavioural economics (Thaler and Sunstein, 2008). That approach founds itself on the idea of developing a "liberal paternalism" that specifically encourages choice X over choice Y. Crucially, however, the approach anchors itself around a view of humans as autonomous economic (utility maximizing) individuals for whom rationality (however bounded) is core to their being and in which individual 'choice' is thus the object to be manipulated (c.f. Hausman and Welch, 2010). Such a view is diametrically opposed to the practice-theoretical, philosophy of mind, and neuroscientific literature cited above which displaces 'choice' or 'decision' as core to human being-in-the-world and which thus (either explicitily or implicitly) embraces a post-human ontology of the social. From this latter perspective the goal of material (or other) interventions are not about 'recommending' choice X over Y (though this might be implied, see below) but about *making choice possible* in the first place.

Figure 1: *An International Political Ergonomic Interpretation of Deterrence Theory*



Indeed, if we return to Figure 1 then it becomes clear that the 'markers' described work – yes – to *stop* action X but only in the sense of stopping its *automatic* occurrence. Thereafter deliberation and a return to action X is possible and, perhaps most importantly, *no alternatives are (necessarily) prescribed*. Indeed, it is worth stressing Damasio's (1994: 174) words that somatic markers do not preclude the post-hoc possibility of employing "a cost/benefit analysis and proper deductive competences," of whatever kind and in doing so deciding to 'ignore' the marker that has been activated and returning to the original or, more likely, a different, modified, etc. version of the original set of actions that might cause a certain event (war, a car crash, etc.) to emerge. Of course, in Schelling's case, the risk of mutually assured destruction means choosing war is highly unlikely (consider, however, the nuclear policy of Israel[8]) but in other cases (see below) such a decision is quite possible. By contrast, nudge theory is preoccupied with presenting alternatives (saving for retirement, eating certain types of food, etc.) in ways that are, indeed, distinctly paternalistic in form or even, when extended into notions such as neuro-marketing, intentionally manipulative-cum-coercive (Lee et al., 2007). 'Nudges' (as the name suggests) imply creating a preconscious desire for a proposed ('better') alternative to the current behaviour of individuals. Most[9] proposed nudges thus lack the point of 'stoppage' (in a chain of actions) that is central to the process seen in Figure 1. Put simply: iPER demands *a* choice, yes, but it need not prescribe it.

To conclude, it is clear that one strong objection to introducing ergonomics and design theory to IR rests on questions of scale. Is it possible to 'internationalize' schools of thought that focus on individuals? The same question, naturally, troubles practice-theorizing and behaviouralism in their explanatory discussions: "the actors in most IR models are not individuals – they are aggregates like states, ministries, interest groups, political parties, rebel groups, etc." (Powell, 2017: S265). Within behaviouralist IR, indeed, work connecting individual behaviors to international outcomes "has barely begun" (Hafner-Burton et al., 2017: S21). However, useful work in this regard has long been pioneered within practice theory, feminist theory, and beyond.[10] But, to stay specifically within ergonomics, we can note that the field possesses well-developed approaches focused on the interface between individual humans and the collectivities they comprise, producing a 'macro-ergonomics' (Hendrick and Kleiner, 2002) that works towards "achieving large-scale organizational improvement" and "culture change" (Ibid: 273-279).

Take the example of air-traffic safety. In the early days of commercial air-travel, accidents were frequent and, it became apparent, often due to pilot error. However, the organizational culture of airlines gifted pilots a great deal of autonomy based on their cultural status: many early airmen had been fighters during World War II and thus keenly guarded their expert status, often acting on instinct more than technical knowledge. Ergonomic interventions against these biases, which have rendered air-travel the safest form of transport, focused on training new pilots in a 'Cockpit Resource Management' system that nurtured "a less authoritarian cockpit culture… [which] encouraged a collaborative approach to flying" (Langewiesche, 2014). Key to achieving this was reforming mandatory working practices through the inclusion of extensive check-lists, cross-check procedures (e.g. between pilot and co-pilot) and designing "deeply considered minimalistic cockpits that encourage teamwork by their very nature, offer excellent ergonomics," and beyond (Langewiesche, 2014). With the eventual retirement of the older generation of pilots who tended to act on gut instinct, these procedures slowly came to transform the culture of pilots at large.

Now, air-traffic safety seems distant to politics. So, let me offer a different macro-ergonomic example. The drafting of global (i.e. UN) sanctions policy is typically dominated by an elite group of powerful states, even where these sanctions are more likely to impact the regional politics of less powerful states. As Biersteker (2018) shows, these difficulties are largely about inequalities in the relative effects of transaction (mainly search and information) costs in policy-making, with less-wealthy states unable to hire a staff with the resources to adequately examine past precedent or case-relevant data in detail. The result is often a habitual reliance on precedent (however irrelevant) and/or a meek acceptance of the policy preference of powerful states. To change this cultural-pragmatic situation, Biersteker and his colleagues have developed the online *SanctionsApp* programme, accessible via smartphone devices, which provides an authoritative source of data on the use of sanctions, filterable by way of analogy to cases being considered, and materially embodied within the decision-making rooms of the UN. This object is now used, particularly by less powerful states, to augment their decision-making capacity: disrupting their past marginalization. In doing so, this means of materializing knowledge has (macro-ergonomically) altered the decision-making and collective bargaining culture of one body core to world politics by encouraging a cascade in behavioural change that transcends the scale of any one individual.

iPER In Action

What might we actually do differently by embracing iPER? To answer this question in depth, I now outline the application of iPER to the challenge of reducing political violence, war crimes, and state repression at length. To begin, it is notable that there is a long history of resistance movements and other emancipatory political groups perceiving a 'liberatory' potential within the material and technological (c.f. Diamond, 2010). These efforts have their roots, to some degree, in the Marxist view that harnessing the technological is central to human emancipation. However, their more recent manifestations have focused on how non-violent forms of resistance do or do not succeed and, for our purposes, the focus of these approaches on the global diffusion of communication technologies is indeed especially interesting (Chenoweth and Stephan, 2011).

The value non-violent resistance groups find in (novel) communication technologies is commonly related to the ways they facilitate "the creation and maintenance of independent sources of media… that allow nonviolent actors to communicate internally and with the outside world" (Chenoweth and Stephan, 2011: 537). Efforts like this fit within the contours of iPER, broadly conceived, given they work to reduce information problems and/or transaction-costs, potentially allowing an improved quality of collective action or decision-making among (oppressed/protesting) groups. However, the role of the material and/or technological described in these studies is typically exogenous, with the goal being the promotion of the diffusion of pre-existing technologies into particular settings, rather than actively working towards an (ergonomic or not) (re)design of socio-technical relations. Additionally, the focus of these interventions is oppositional, dividing the world between 'rulers' and 'subjects' based on a general assumption that violence, conflict, and state-repression occurs primarily through rational planning. Hence, technologies are conceived as forming part of a broader form of "social defense" that would enable "nonviolent community resistance to [state] aggression" (Martin, 1997: 440).

From the perspective of iPER, as conceived herein, the potential of these interventions is limited by two omissions. First, the reality that political repression or any other problematic phenomenon cannot be solved solely by the emergence of any new technology. Novel communication technologies, for example, are regularly and rapidly co-opted by states across the world in ways that neuter their radical potential, while – for further example – technologies that would mitigate climate change are readily available but, simply, go widely unused. Second, the counter-political framing of technology as a 'liberating' force sets aside the emerging understanding that state repression, violence, and related phenomena do *not* emerge solely through rational planning but also through the automatic forms of behaviour described above. Indeed, phenomena like torture or the targeting of civilians – however extreme they might seem – do frequently emerge non-purposefully.[11] By way of example, take the words of one US commander who admitted *almost* torturing a detainee in US-occupied Afghanistan:

> I felt the bile of hatred rising... inside of me. I slowly realized what I had wanted to do all along. I was tired of playing by the rules. He was in my grasp… My interpreter and I could find a way into the home with the suspect, and he could either tell me everything… or he could bleed… The bold words that I had long ago spoken to my soldiers about the importance of morality in combat were forgotten… I scrambled for the right reason to make a decision. Torture. Don't torture… It would be wrong to say that I made a choice (Bell, 2011: 43).

In this case, the possibility of torture emerged without choice. The operation saw "everything happen so quickly" that the commander in question was relying on 'quick' types of thinking, rather than deliberative reflection. And innumerable other examples stress that many – perhaps *most* – instances of torture and related political violences occur in this non-reflexive manner due to the combination of group dynamics, emotions, affect, material deprivation, and other factors constitutive of practical or systems 1 behaviour.[12] In fact, this view is increasingly influencing the strategic content of studies of non-violent resistance. For example, Bramsen (2017) has studied how state or police violence against protestors often emerges not solely due to "perpetrator domination" but, rather, due to a 'rhythmic' back-and-forth between protestors and security forces that creates a situational form of entrainment fed by mutual fear and emotional disquiet. As she continues:

> This perspective is useful in violence prevention, as it implies going beyond normative condemnation of violence (as is common in nonviolent resistance), and emphasizes the importance of training people how to react when attacked and to resist the tendency to mirror the attack of the other (Bramsen, 2017: 10).

Effectively, Bramsen advocates that the pursuit of non-violent resistance must move away from an oppositional (subject/ruler) dichotomy by recognizing the frequent non-reflexivity of violence and crafting tactics that avoid unintentionally trigger an escalation in repression. This suggestion fits closely with the principles of iPER described earlier: altering the socio-technical constitution of a particular situation has the potential to *avoid* the emergence of automatic behaviours in the first place, rather than simply strategically/tactically attempting to circumvent them. To cement and extend this point, let me go back to the example of that US commander in Afghanistan. The problem of police and/or military abuse is an age-old one. But it is also one that has been ameliorated significantly in Euro-American states through the introduction of surveillance equipment (i.e. cameras) into domestic policing systems (National Defense Intelligence College, 2006). Indeed, strong evidence confirms that being observed (directly by other humans or through electronic means) promotes socially-desirable and/or norm-concordant behaviour.[13]

The effects of behavioral surveillance are, crucially, not only related to an awareness that deviant behaviour might be captured and thereafter punished. Individuals are known, for example, to follow ethical, legal, and other rules more closely even when only "subtle eye-like stimuli" (e.g. images containing eyes and/or faces) are present in a situation (Nettle, 2013). This effect is linked to the ways in which the perception of being observed increases our "objective self-awareness" (i.e. a greater consciousness of our effects on the world) (Wicklund, 1985). In this regard, surveillance cameras can thus also be seen to operate as somatic markers that disrupt automatic sequences of action and compel greater deliberation among our minds based on our learned experiences of what these devices signify: the possibility of being caught doing wrong, the importance of societal norms, the dangers to the ontological security of the self in engaging in certain acts, etc.

Several practical difficulties, however, have prevented the introduction of surveillance devices to the police forces of less-wealthy nation states, as well as the military operations of all states, rich and poor alike. Firstly, detainees are most at risk of abuse at or quite soon after their point of capture during military operations. Typically, this occurs in situations of extreme material deprivation: in remote areas or temporary detention facilities established near forward operating bases, etc. This often means that adequate electricity, construction equipment, and/or personnel to operate surveillance equipment are unavailable. Second, the strict security requirements underlying military operations mean that the use of surveillance equipment is more complicated than in policing operations: surveillance undertaken in military facilities must not risk gifting adversaries an unwanted advantage to exploit, for example. Thirdly, the use of detention surveillance technology in less-wealthy nation states is often problematical. For example, the implementation of Security Sector Reform (SSR) programmes in Lebanon has involved the provision of similar surveillance systems to those found in Euro-American states to the Beiruti police forces. In conversations I once had with those implementing these programmes, however, it became clear that these devices were not used because of a lack of stable electricity supplies and personnel to man them: their use was simply not practical.[14] In all these contexts, the risk of abuse emerging in an 'unthought' (i.e. automatic) manner is therefore heavily augmented.

How might iPER help here? Faced with this question, myself and a team of researchers made up of IR scholars and colleagues based at an engineering institution have begun ergonomically redesigning surveillance apparatuses in ways that overcome the practical challenges their use faces. This work has drawn principally on adapting emerging battery, storage, and image recognition technologies (originally developed to meet the needs of consumer or industrial electronics) to the task at hand. Figure 2 depicts the first object designed: the Detention Recording Automation Black Box (DRAB). The inspiration here derives from the 'black boxes' used for recording the activities of aircraft and other critical infrastructures: it is a 'monitoring' device. The DRAB has been designed with a series of parameters in mind, fully described in the supplementary materials to this article. The goal of the device is to provide a fully autonomous monitoring system (it draws on storage and battery technologies enabling its continuous operation without human intervention for circa two years) that can be rapidly and economically deployed to the front lines of combat zones where detainees are likely to be captured and/or installed in detention centres in less-wealthy nation states. It has been designed to be bolted or concreted-in to detention facilities with minimal effort. The device also incorporates an advanced form of image action-recognition technology that has been developed in order to automatically recognize the morphologies of abuse (without a human operator) and flag these for later review.

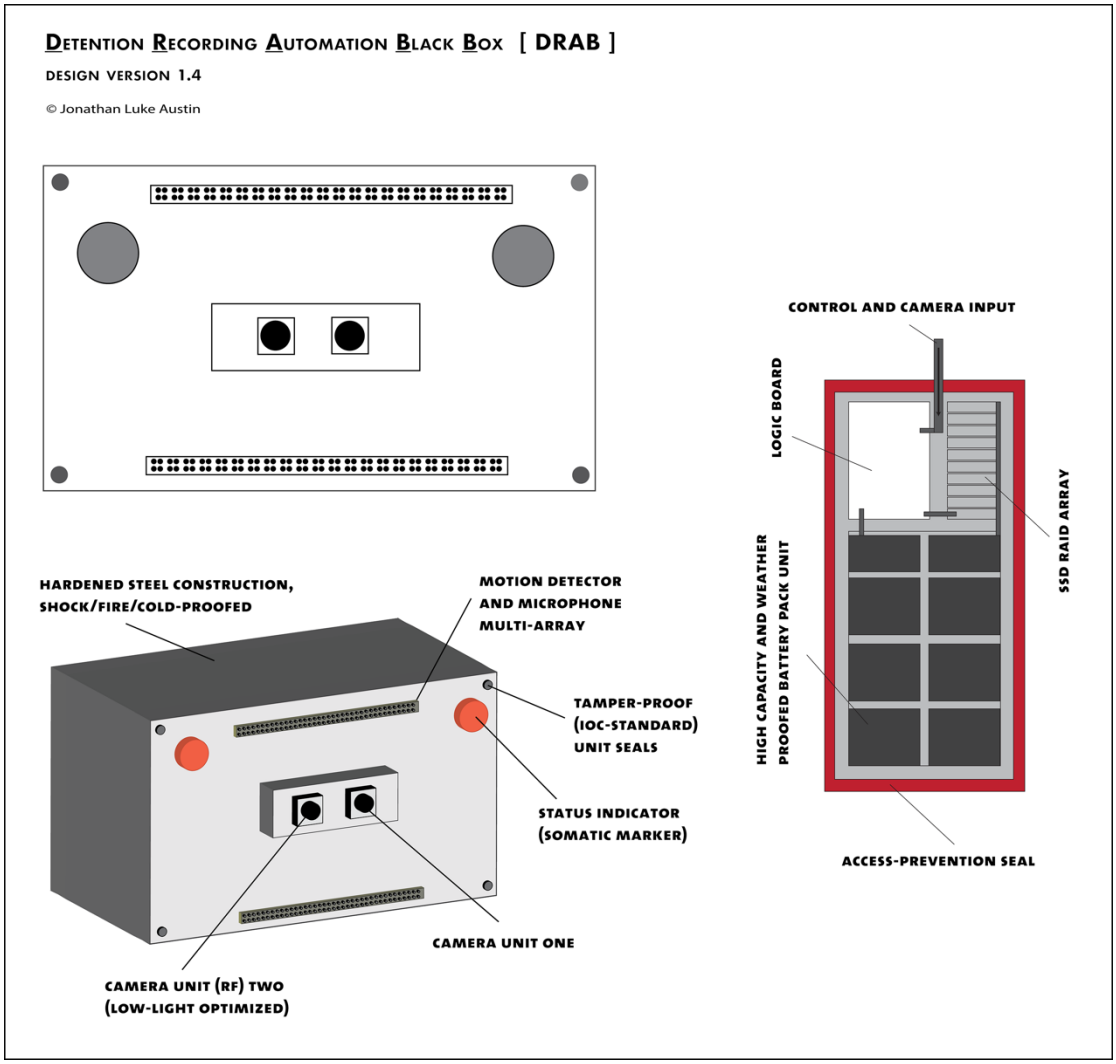


Figure 2: *The Detention Recording Automation Black Box (DRAB)*

In short, the technological elements of the DRAB overcome the normal limitations on using detention monitoring technologies, while maintaining their capacity to act as somatic markers. Notably, the DRAB is not designed to stop *all* abuse. As discussed above vis-à-vis the example of Schelling's trip-wire, interventions based on the ergonomic re-design of world political situations are not about preventing choice *per se*. They are simply about disrupting the automaticity of action. Even with the DRAB present, interrogators might choose to leave the room with detainees and carry out abuse elsewhere (Clarke and Weisburd, 1994; Tilley, 2005). The DRAB simply demands a choice (rather than accidental slippage) be made, based on the previously consciously deliberated ethical, pragmatic, and social desires of the particular subject in question.

Now, of course, interventions like the DRAB might immediately seem "problem-solving" in form. And they are. Torture or other violences are problems that require solutions. However, the solution proposed here is *critically* problem-solving (c.f. Brown, 2013). Indeed, the design of the DRAB echoes critical proposals for the development of a '*sous*veillance' society in which representatives of political power (the military, political and economic classes, etc.) come to be publicly observed more closely than ever before (Mann, 2003). Moreover, if we are forced to

accept for the foreseeable future living in societies where the state retains a monopoly on violence then the critical question, from the perspective of iPER, becomes how we can supplement any long-term "goal of systemic transformation" by imagining "'interim possibilities' of contestation that may, eventually, 'pry open' those seams and cracks in what seemed to us be a more robust structure of power" (Solomon and Steele, 2016: 18). iPER achieves this by working to ensure that any controversial social or political decision is fully thought through in its emergence, preventing negative phenomena occurring as inevitable but somehow superfluous products of our social systems in ways that may, if we are optimistic, eventually challenge the validity of that system and so open the possibility of broader transformations (c.f. Ophir, 2005).

Of course, there remains a final question: why should students of IR take up this task? Why not leave it to ergonomists, technologists, or engineers? Well, first, the very possibility of constructing objects like the DRAB rests on the prior inquiries of political scientists into the actions of agents specifically linked to international affairs. The DRAB, in particular, only became imaginable due to the work of political scientists in studying the non-purposeful enaction of political violence by military and policing actors closely. Indeed, I must stress here that the goal of iPER is in no way to undermine the epistemic core of IR: it is only because of the knowledge created in the field that the interventions proposed become imaginable. For example, the specific design of the DRAB is intimately bound up with an understanding of the requirements of military organizations (secrecy, security, etc.) that are then reconciled with its core purpose in a way that interventions by other bodies interested in promoting these principles (i.e. IOs, NGOs, etc.) are often unable to achieve alone. The very possibility of objects like this thus rests on the participation of political scientists and social science more broadly. Indeed, as Martin (1997: 450) has written, "the bulk of science and engineering has little to offer nonviolent struggle" or, indeed, any other form of socio-political liberation *a priori*. The limitations of these fields relate to their (for the most part) apolitical orientations. Thus, despite the fact that iPER will necessarily involve deep collaboration with these fields, political scientists are "in an excellent position to provide a link between technical specialists and the social dimensions" of political change (Martin, 1997: 450). Put simply: the participation of scholars across IR in the kind of work described above is not only possible but may actually be actively required for it to ever succeed.

The Vocation(s) of IR

iPER has the potential to radically transform the vocation of IR. However, this process it not without risks. Indeed, iPER *increases* the kinds of ethical dilemmas faced by students of world politics. It does so by radically expanding the range of social interventions that become thinkable, as a shift from considering not only the ethics of knowledge production but also the ethics of *direct* (i.e. non-delegated) socio-technical intervention is demanded. iPER gifts IR an *applied* sub-field and, of course, a Pandora's box of ethical dilemmas emerges for any such applied scientific field. Most applied fields (medicine, architecture, etc.) thus maintain distance between themselves and socio-political contingencies. Any turn towards direct forms of intervention within IR would require a similar maintenance of distance and the discipline-wide development of a 'do-no-harm' precautionary principle, akin to that found in the Hippocratic oath. Naturally, this is not enough. As has been said, iPER is focused on intervening in deep-psychic behaviours that are deemed, at

one level or another, undesirable. The fundamentally political question that thus emerges is who makes judgements about desirability that might prompt any intervention: cancer is bad, we all agree. But war, dominant economic models, nuclear weapons? Not so much. The example of torture is informative here. Its appearance at any particular time is never *universally* condemned but rather the subject of extreme controversy, of one form or another (c.f. Gadinger, 2016).

However, it can be argued that it is precisely this 'controversial' status that warrants the kinds of intervention proposed within iPER. As Bruno Latour (2005: 25) has written, "controversies are not simply a nuisance to be kept at bay, but what allows the social to be established and the various social sciences to contribute in its building." Indeed, it is arguably the epistemic role of social science to keep open, rather than prematurely foreclose, controversial questions. However, as we have seen, deep psychic modes of thinking often militate against this possibility, even vis-à-vis intensely controversial behaviours. What is especially notable, therefore, is that all the examples of iPER in action described above are *not* about resolving a controversy in any deterministic way, based on the arbitrary designation of a particular ethical or moral system adjudicating what must be defined as pathological and hence shut down. Schelling's deterrence strategies never eliminated the possibility of nuclear war, which always remained a choice available to practitioners, and devices like the DRAB would never eliminate the possibility of torture. Instead, both these examples involve working to avoid the *unthought* emergence of these phenomena by introducing (material) elements that disrupt the automaticity of human behaviour.

The ultimate ethical intuition underlying iPER as I have articulated it herein, is therefore that it is always troubling when behaviours which are socially controversial emerge non-reflexively. Such practices, if they are to occur, must – in some sense – be 'thought-through' in their controversial status rather than emerge as deep psychic products of human nature, social construction, ossified social practices, or any other similar factor. The goal of iPER-esque interventions is then simple: making choice possible. In this respect, the interventions we have described are about enabling or opening up the everyday 'critical capacity' to problematize (with Foucault) the ways in which one is acting in/on the world vis-à-vis particular social, political, or ethical controversies (Boltanski, 2011). As Foucault (1984: 117) continues, iPER in this sense is about recognizing that:

> Thought is not what inhabits a certain conduct and gives it its meaning; rather, it is what allows one to step back from this way of acting or reacting, to present it to oneself as an object of thought and to question it as to its meaning, its conditions, and its goals. Thought is freedom in relation to what one does, the motion by which one detaches from it, establishes it as an object, and reflects on it as a problem.

The goal of opening up reflexivity through socio-technical re-design is thus related, in one way, to returning freedom to the acting human subject in situations of controversy where deep-psychic factors seem to quite typically prevent the possibility of a fully reflexive (free) decision being taken. Here, the goal of iPER becomes "not to tell others what they *have* to do" and so to attempt to "shape others' political will" but, rather, to find ways "to question over and over again what is postulated as self-evident" by "disturb[ing] people's mental habits, the way they do and think things" and so to "participate in the formation of a political will" that is fully conscious (and so, one might continue, fully socially responsible) for its actions (Foucault, 1988: 265).

It is here that the *political* in iPER must be stressed. It is perfectly possible to imagine more deterministic design-theory inspired interventions into world politics, following the liberal

paternalism of nudge theory or otherwise. Just as ergonomists design chairs that make it *impossible* to sit in one way or another (typically for health and safety reasons), so might not this focus on the materialistic see political scientists working towards inventing objects that reduce human capacity to act in/on the world? Almost certainly. However, it is notable that these processes are already ongoing. For example, techno-utopian arguments are currently being made that the rise of Artificial Intelligence will augment (or even supplant) human decision-making processes in many areas (from driving vehicles to firing weapons-systems) in ways that will improve society. Militaries, for their part, are employing design theorizing to augment their capacity to kill and control (Öberg, 2018). Likewise, some within IR are imagining neurobiological toolkits as able to (more or less) deterministically identify which individuals will exhibit 'good' or 'bad' leadership and/or commit forms of political violence (McDermott and Hatemi, 2014). What is most notable about these interventions is that they rest on the displacement of the *social* human being and, hence, human (or animal, or ecological) political deliberation from debate. And, of course, the critique of this process is very old: it harks back most obviously to Heidegger's concern over the 'en-framing' of human subjectivity via the technological (Harman, 2002). Indeed, it is increasingly being noted that many of the automatic or practical behaviours discussed earlier are sometimes intensified through our reliance on particular technological infrastructures (Hansen, 2000).

iPER – as articulated here – cannot be about such an effacement of the human. Instead, its ethical and political core is about retaining politics, reflexivity, and deliberation. With Hansen (2000: 263), my own view is that the "crucial task" of the day is "(re)claiming a distinctly human perspective in the face of material and technological forces that for so many portend the inevitable dawn of a new, radically posthuman epoch." As I have perhaps paradoxically argued, however, reclaiming the human figure as a reflexive subject will rely on engaging with the material-technological more thoroughly than ever before. In this respect, iPER is a fundamentally political proposition, the ethical dilemmas of which are thus indeed many. But it also holds new potentials, not least because it lays out a form of intervention relevant to IR that does not rely on delegating ethical or political choices to outsiders (which most often results in the privileging of a type of methodological nationalism [c.f. Adamson, 2016]) and hence allows for the maintenance of the social autonomy described by Jahn (2016) as crucial to the relevance of science as a whole.

Beyond ethics, embracing iPER is no easy task. It means that IR departments must build both formal and informal linkages with scholars working in fields that today seem unrelated to our own: to ergonomists, engineers, computer scientists, and architects, among just a few. It would also likely mean hiring specialists in these fields within IR departments. And it would require the development of new skills among political scientists themselves: different kinds of coding, artistic skills, computer aided design knowledge, prototyping skills, controlled trials, manufacturing, etc. All that will be a difficult and very long-term feat. Cultivating an iPER, as a whole, is no easy task: its propositions are fundamentally about imagining the radical transformation of the vocation(s) of IR. It is about creating an *applied* IR. Is that task worth the effort? I shall let others decide. But, well, for those who doubt the very worth of such an endeavor, for whatever reason, then the adapted question will always remain (whether or not one agrees with the philosophy of its author): is the point of IR solely to interpret the world in various ways, or to change it?

Endnotes

[1] Marx (1978).

[2] See Gendler (2008); Hopf, 2010; Hafner-Burton *et al.*, 2017; Pouliot, 2008; Adler and Pouliot, 2011; Damasio, 2012.

[3] Latour, 1999; Clegg et al., 2013; Cunha, Clegg, and Rego, 2014; Author, 2016.

[4] There is, of course, an evolutionary counter-argument, see Hopf, 2017.

[5] C.f. Mol, 2002; Hayles, 1999; Latour, 1999.

[6] The terms 'ergonomics' and 'human factors' are used interchangeably.

[7] Somatic markers can be 'natural' in the sense of being individually or socially learned 'alarm signals' embedded within individual minds (without material prompts). An example would be learned aversions to fire etc.

[8] Israeli nuclear policy is ambiguous but is generally agreed to include the principle that nuclear weapons will be used (even against nuclear-armed adversaries) if the continued (political) existence of the state is considered to be under threat.

[9] There are exceptions. The most obvious would be the designation of anti-smoking warning labels on cigarette packets as constituting a 'nudge' which, indeed, seeks a 'stoppage' whenever a smoker reaches for a cigarette.

[10] See, for instance, Latour (2005) and/or Haraway (1988).

[11] Author, 2016; 2017a; Austin and Bocco, 2017; Collins, 2007.

[12] See Author, 2016; 2017b; 2017a; Collins, 2007; Weenink 2014; National Defense Intelligence College, 2006.

[13] Jones and Nisbet, 1971; Sproul et al., 1996; Wicklund, 1985; Ariel, Farrar, and Sutherland, 2015, 517.

[15] Interviews conducted by the author in Beirut, Lebanon, 2014-2016.

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Supplementary Materials to *Towards an International Political Ergonomics*

These supplementary materials provide technical and practical details on the 'Detention Recording Automation Black Box' (DRAB) described in the main body of the article. These are sub-divided into a summary (list-form) list of specifications and a more detailed narrative account. Included are references to scientific literatures substantively outside IR/Political Science for the reader's reference. Unless otherwise stated all material contained herein is the intellectual property of Jonathan Luke Austin and/or the Violence Prevention (VIPRE) Initiative.

Summary of DRAB Specifications

1. Basics

- The DRAB is encased in a tamper-proof 'strong-box' (hardened steel);
    - *The box is shielded [with a lead lining] from communication signals (MIL-STD-810).*
    - *The box is entirely weather and water proof (MIL-STD-810).*
    - *The box is heavily shock and fire resistant (MIL-STD-810).*
    - *A charge point is integrated into the device (MIL-STD-810).*
    - *The device is tamper-proof, following US military Anti-Tamper (AT) standards.*

- The outer section of the device includes two permanently operational red lights when recording, designed as an additional somatic marker intended to ensure security personnel are aware their activities are being monitored.

2. *Storage*

- The DRAB contains a very high capacity (between 10-20 TB) solid-state (SSD) storage device;
    - *This provides storage for approximately two years of continuous recording.*
    - *The devices are configured in a RAID array for redundancy purposes.*
    - *This solid-stage storage device is encased in additional shock-absorbent protections (see below).*

3. *Cameras*

- The DRAB contains two surveillance cameras;
    - *Each of these cameras operates within a 'fish-eye' lens format to ensure near-360 degree viewing angles.*
    - *One camera is optimized for 'day-time' monitoring.*
    - *Another camera is configured for 'night-time' monitoring (i.e. low light).*
    - *A light meter switches between cameras when necessary (to optimize power consumption). In ambiguous situations, each operates continuously.*

4. *Battery*

- The device contains an extremely high-capacity lithium-ion battery and/or (depending on configuration) fuel cell;
    - *The implementation of these technologies is designed to ensure an entirely 'off-the-grid' system that operates across harsh environments.*
    - *The battery fulfills MIL-STD-810. Meaning it is designed to remain operable within operating temperature ranges of –40 °C and +85°C, to withstand operating shocks of 1500g based on a half-sine shock pulse of 0.5ms and operating vibrations of 10Grms random 20-2000Hz.*
    - *The solution will provide uninterrupted power for approximately two-years.*

5. *Action Recognition*

- The DRAB incorporates integrate real-time image action-recognition technologies designed to automatically identify and flag instances of violent abuse;
    - *This software component of the device is open-source.*
    - *Two variations of this technological implementation are available:*

- *The first logs and flags potential instances of abuse internally to the device, for review later.*
- *The second involves the immediate communication ('flagging') of potential instances of abuse to an external authority.*

6. *Software*

- The DRAB operates via an open source computing platform, modifiable by its user;
    - This platform ensures that all data recorded by the device is encrypted to government standards.
    - The platform also ensures the device switches between its night vision and daytime cameras depending on available ambient light, and that both cameras will record if light levels are ambiguous. This is important for reducing power consumption.
    - The storage medium for the DRAB is self-encrypting and the device integrates secure data elimination technologies, comprising both comprehensive crypto and block erase protocols (Budd 2016b, a).

Detailed Narrative Description

The *Detention Recording Automation Black Box (DRAB)* is an entirely self-contained detention-monitoring technology, powered by high-capacity batteries or fuel cells (depending on unit type), storing data on high-capacity and high-resilience solid-state mediums, and employing state-of-the-art imaging analysis to log instances of potential abuse. An early prototype design for the DRAB is schematically depicted in Figure 1 (N.B. for intellectual-property related reasons, detailed final designs cannot yet be released publicly). The goal of the DRAB can be made clear by analogy to humanitarian efforts to produce 'flat pack' shelters for refugees and displaced persons. The DRAB and the project of which it is a part seeks similarly to produce flat-pack detention monitoring systems for improvised or low-material capacity detention sites that will positively alter the behaviour of security forces.

The DRAB is designed to promote norm-concordant behaviour among security practitioners much as other surveillance systems do: through the promotion of rational and reflexive thought, based on the 'prompt' (or somatic marker) that being aware one is being observed provides to all individuals. However, it achieves this in a self-contained unit that can be shipped *en masse* to relevant detention settings and be bolted or cemented into place in an improvised fashion, and which is intended to operate autonomously for several years before human intervention (for charging or data-extraction) is required. In short, the DRAB does not require the external electrical power that is so often unavailable, and neither will it require the presence of personnel to observe the recorded audio-visual content. The development of the DRAB is based on earlier social scientific research conducted by members of the consortium and the combination of innovative basic research in three main technological areas that allow the previously described specifications of the device to be achieved. Specifically, the DRAB draws on:

1. **Energy Science and Technological Engineering innovations in developing 'off-the-grid' power solutions.**

   Rapid advances in battery technologies and/or fuel-cell technologies (Sharaf and Orhan 2014, Suominen and Tuominen 2010, Chan et al. 2016), as well as energy-aware video encoding techniques (Lee and Kim 2012), have recently made the deployment of autonomous ('off-the-grid') monitoring solutions possible. These already have proven use cases in infrastructure protection systems. In the development of the DRAB these solutions have been modified in order to fulfill the MIL-STD-810 or *Environmental Engineering Considerations and Laboratory Tests* established by the United States military, which serve as a global benchmark for considering the 'reliability' of equipment used in military and other high risk settings. Specifically, the power technology utilised by the DRAB is designed to remain operable within operating temperature ranges of –40 °C and +85°C, to withstand operating shocks of 1500g based on a half-sine shock pulse of 0.5ms and operating vibrations of 10Grms random 20-2000Hz.

2. **Mass Storage Systems innovations in developing high-capacity and high-reliability (rugged) solid-state storage technologies.**

   Aside from power supply and management issues, previous difficulties in creating a sufficiently high autonomously contained storage medium for captured imagery have become more tractable due to the development of high-capacity, low-power use, solid state NAND flash storage mediums. Relatively cost-effectively, it is now possible to combine these storage mediums with 'off-the-grid' power solutions in order to create an 'all-in-one' detention monitoring system. This storage system has also been designed to meet the aforementioned MIL-STD-810. In addition, the storage device is built as a self-encrypting drive (SED), which automatically encrypts written data without user or host intervention in order to manage the encryption requirements of high-sensitivity security operations. Finally, the device integrates secure data elimination technologies, comprising both comprehensive crypto and block erase protocols (Budd 2016b, a).

3. **Computer Science and Cybernetic innovations in developing real-time algorithmic 'action-recognition' in video and audio tools:**

   As the DRAB is designed to be an autonomous and thus unmanned (i.e., in this case, 'un-observed') monitoring system, the integration of automated real-time computer analysis of video and audio data is critical. Typically, automated image analysis technologies are employed for kinetic military applications (i.e. on aircraft), for monitoring vehicle or pedestrian traffic, or within domestic CCTV surveillance systems (Wang and Schmid 2013, Laptev et al. 2008, Lieu, Luo, and Shah 2009, Liu, Luo, and Shah 2009, Duchenne et al. 2009). Within several of these applications, action-recognition technologies have been developed that focus on detecting violence (mainly street-fights) (Arceda et al. 2016, Zhang et al. 2016, Zhang et al. 2017, Sultani, Chen, and Shah , Datta, Shah, and Lobo 2002, Giannakopoulos, Pikrakis, and Theodoridis 2010, de Souza et al. 2010, Hassner, Itcher, and Kiliper-Gross 2012, Deniz et al. 2014, Bilinski and Bremond 2016, Zhou et al. 2017).

   In the case of the DRAB, this technology is being adapted (based on the database of 'real' videos of torture, summary execution, and other abuses held by the consortium) to flag potential instances of abuse. Two variations on the use of this aspect of the DRAB are envisaged. The first involves the contained logging/flagging of potential instances of abuse for later review by security practitioners (in the case of complaints made and/or for general auditing). The second involves the communication of possible instances of violent abuse to command centres in real-time. The implementation of one or the other use-case will depend heavily on operational conditions (see below). When employed in combination with motion-sensing cameras (see appendix), this tool will also allow for the reduction of power use.

The three technological components of the DRAB listed above are key to the possibility of its production. However, the successful development of the device has also been based on day-to-day interactions between those members of the research team with expertise in these particular technological developments with social scientists and designers. Specifically, the development of the DRAB has also been based on the following further interventions from fields generally seen as fitting within the social sciences.

1. **Science of Design, Political Science and Ergonomic expertise focused on converting emerging technological developments into user-centric designs for specific use-cases.**

   As Figure 1 indicates, the configuration of the DRAB has been practically and ergonomically designed with the needs of military and policing practitioners in mind. In some cases, this involves ensuring the device can be fully encrypted and sealed from transmission signals, for instance. It also requires a fully open-source operating platform. Design elements like these have been researched and continually developed by the social scientists of the consortium, in order to ensure the practicality of the proposed solution. This occurred through regular consultations with military and police practitioners in various nation states. Equally importantly, the design of the DRAB required the insights

of design science in order to ensure the base goal of the device – preventing violent abuse – has been maximized in its potential. This involved placing significant attention on the aesthetic and engaging facets of the device, to ensure that it activates certain norm-concordant 'somatic markers' within the minds of military practitioners. For example, the design of the operational indication light has undergone substantial testing and iteration. In this regard, the design principals of the device are similar to other applications where 'attention' is desired from an audience (e.g. speed signage, emergency protocols in airplanes, etc.).

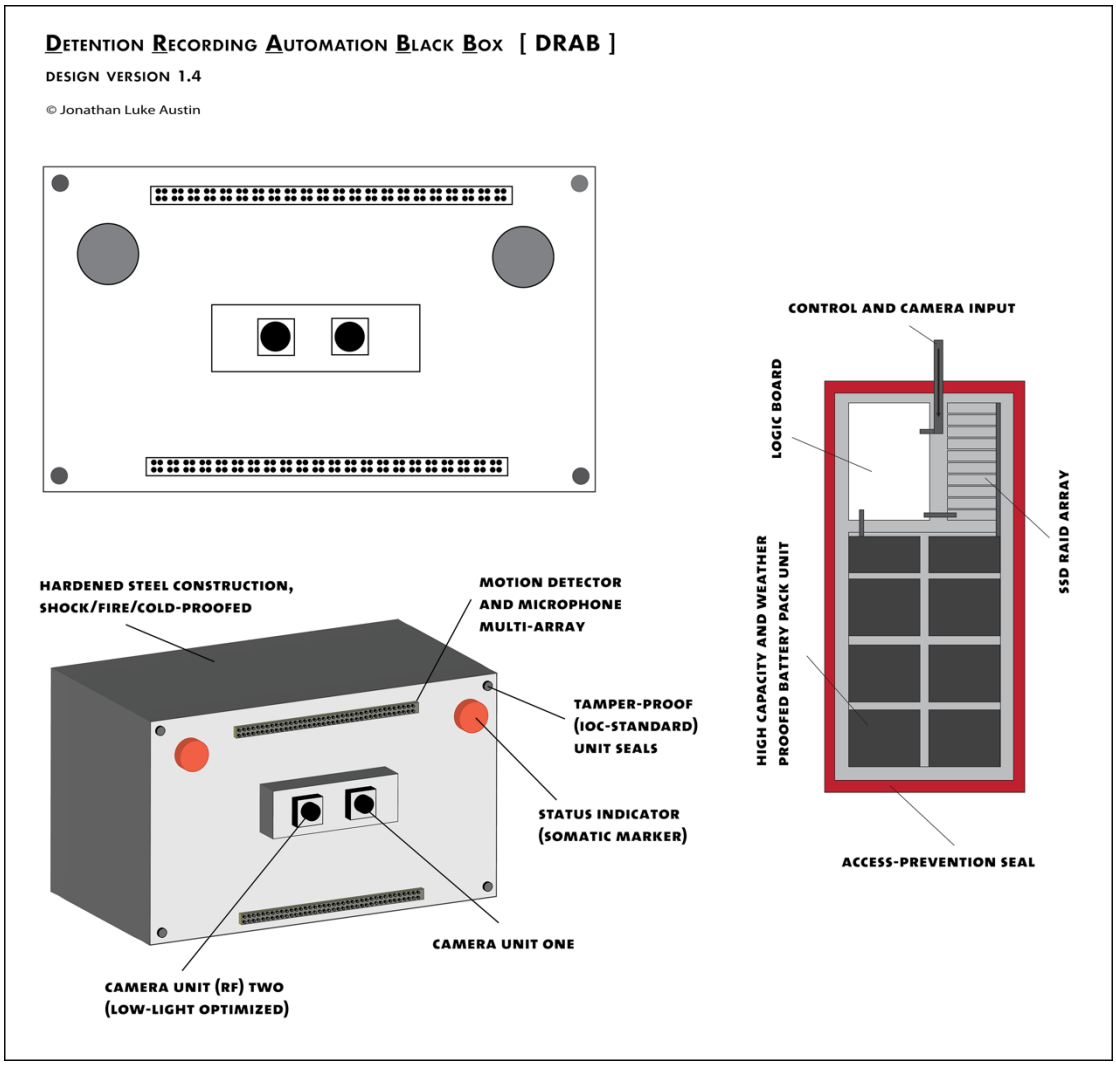
2. Political Science and Sociological expertise into the conditions of possibility of violent abuse

The basic research expertise possessed by the social scientific members of the consortium have been especially crucial to developing the software aspect of the DRAB. In particular, the social scientific members of the consortium are intimately involved in the development of violent action-recognition technologies, as discussed earlier. These rely on the expertise of the political scientists and sociologists making up the consortium who possess an intimate near-anthropological knowledge of the types, morphologies, and variations in various forms of violent abuse (torture, execution, mutilation) at a physical level. This knowledge has been vital in creating action-recognition technologies that can accurately 'flag' potential instances of abuse. This is particularly true because other work on recognizing violent actions in audio and video material has focused generally on minor civil disturbances (crime, street-fights), and not on explicitily political violence. Developing an algorithmic means of intelligently detecting the presence of possible abuse is only feasible due to the intimate quasi-ethnographic knowledge of torture held by the social-scientific team.

To summarize, the DRAB is ergonomically designed to A) most effectively deter violent abuse, and B) fit the numerous operational requirements of military and policing organisations, requirements that have previously rendered the introduction of monitoring systems impossible in many cases. The prototype created now requires to be trialed under experimental conditions in order to test its relative efficacy both vis-à-vis the absence of any detention monitoring system (as at present) and vis-à-vis the presence of traditional (manned) CCTV surveillance systems, of the kind found in prison systems with adequate financial and material resources.

Figure 1: The Detention Recording Automation Black Box (DRAB)

N.B. For intellectual-property rights reasons only basic schematics can be provided herein.



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