Chapter 3: Epistemic[1] Communities of Practice

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Introduction

The epistemic community research program, which in the last generation helped frame International Relations (IR) understandings of the relationship between knowledge/expertise and power, has so far been overwhelmingly and singly conceptually driven, focused on policy making, and theoretically restrained. Its main focus has been on whether, how, and why epistemic communities help affect, cause, or constitute international politics in fields where scientific and technical expertise are required. A mostly overlooked alternative path is conceptually pluralistic, driven to explain international politics more broadly, and thus theoretically expansive. This alternative may conceive of epistemic communities, most likely together with other concepts, as part of mechanisms aimed at explaining international politics more generally. This chapter argues that both paths stand to gain from opening their respective research programs to explaining knowledge and power in and by practice. With this goal in mind, we introduce the concept of communities of practice. Because practices are at the core of what epistemic communities are, do, and aim to achieve, the concept of community of practice helps to understand conceptually epistemic communities from a practice perspective. By identifying epistemic communities as a special and heuristically important case of communities of practice, we will open new and exciting avenues of theory-making and empirical research. To this end, the implications for adopting this heuristic regarding the establishment of a nuclear arms control verification practice during the Cold War and the recent spread of a populist 'post-truth' epistemic community of practice[2] will serve to illustrate its potential. Regardless of the epistemic community research path we choose to take, from now on we should talk about 'knowledge, power, and practice'.

[1] Because all communities of practice are based on a domain of knowledge, the word 'epistemic' is to some extent redundant. It is used, however, to convey the message that epistemic communities are special kinds of communities of practice.

[2] Pointing to the domination purpose involved in post truth, Adler and Drieschova (forthcoming) call the phenomenon 'truth subversion'.

Epistemic Communities and Its Discontents

The implications of this approach are far from being strictly theoretical. First, by changing our understanding of how knowledge helps to construct social reality, it promises to change the focus from scientific and non-scientific 'ideas' people 'possess' in their minds, to knowledge that is practiced. The epistemic community literature equates knowledge with inter-subjectively held beliefs. Initially defined as 'the communicable mapping of some aspects of experienced reality by an observer in symbolic terms' (Haas 1992: 21), knowledge amounts to a set of consensually held propositions (i.e. causal and normative beliefs) about a particular domain of reality. We take knowledge as a product of epistemic communities, which amount to 'cognitive baggage handlers as well as gatekeepers governing the entry of new ideas into institutions' (Haas 1992: 27). Despite Cross' (2013) expansion of the kinds of knowledge that can be transferred to non-scientific claims and Dunlop's (2009) more nuanced and elaborated modeling of the learning mechanisms at play between decision-makers and epistemic community members, the knowledge transferred still amounts to a set of beliefs. From a pragmatist perspective, however, which we will follow, knowing requires active participation in social communities and knowledge is not a product but is bound with action (Wenger 1998). The focus shifts away from the transfer of beliefs, as in the epistemic communities' research program, toward the ongoing practical activities of interpretation, deliberation, and judgment, as in communities of practice.

Second, returning to epistemic communities' roots (Foucault 1971, Ruggie 1975), a practice-oriented program on epistemic communities will explore practices not only as enacted by agency but also as being intertwined with social structures or 'epistemes' (Ruggie 1975). What distinguishes epistemic communities from other groups is not solely a consensus surrounding a particular set of scientific beliefs, but also their claim to be socially relevant and have recognised expertise, which confer them with authority (Adler and Haas 1992; on authority see Dumouchel in this volume). Epistemic community scholars have made attempts to account for how this authority arises, either from internal dynamics (Cross 2013), or as a result of their interaction with broader sources of what constitutes legitimate knowledge (Adler and Bernstein 2005; Antoinides 2003). By using an epistemic community of practice approach, it is possible to incorporate

Ruggie's initial insights with recent articulations of how broader epistemological approaches construct epistemic communities' authority.

Third, a focus on epistemic communities as a subset of communities of practice will change how we think about political diffusion and the institutionalization of knowledge.[3] Departing from classic constructivism's concepts, such as persuasion and socialization, a practice-oriented approach will help explain the adoption of knowledge-generated practices by the very nature of practicing and joining communities of practice (Adler 2005, 2008, 2019; Wenger 1998). Importantly, this follows from rearticulating knowledge not only as a product that is packaged or framed, but particularly as knowledge-making, and knowledge carrying practices, which highlight participation, learning, and contestation within and between communities of practice.

Finally, our practice-oriented approach will encourage researchers to study epistemic communities not only as explaining policy-making and policy coordination, but also of developing IR theories that, rather than assuming a dichotomy between change and stability, such as this volume's editors do, explain international politics as simultaneously involving change and stability of social orders (Adler 2019). An epistemic community of practice approach also allows the analyst to shift the 'seat of action' to a wider array of sites that are relevant to understanding international political phenomena in a much broader sense. As will be evident in the illustrative sections, international arms-control agreements crucially depend upon ongoing verification practices performances. while the concern with post-truth is not primarily focused on altering particular policy decisions (although it inevitably entails shifts in these outputs), but on the implications of post-truth practices and knowledge for liberal democratic regimes and the epistemic foundations of a post-WWII liberal international order.

While the adopted interpretation of epistemic communities (Adler and Haas 1992; Haas 1992;) did 'catch' aspects of what goes on, it was ultimately insufficient because it failed to place a larger emphasis on the social construction of knowledge (Adler 1997; Guzzini 2000), and its ontology was relatively narrow. Thus, to understand the epistemic foundations of international political life

[3] Our chapter builds on and contributes to the literature of epistemic communities. There are, however, other rich approaches on the role of knowledge in IR that deserve scholars' attention from a practice perspective. See, for example, Allan (2018), Bueger 2014, and Sending (2015).

we need to go beyond strands of social theory that place culture solely in people's minds (psychological approaches), intersubjectivity-building interactions (classic constructivism), and discourse (critical theory and post-structuralism), and focus instead primarily on practices, which are culture in motion (Reckwitz 2002). Culture is not only in people's minds (it is there), about discourse (it is too) and interaction (plays a crucial role), but also in the very performance of practices. Practice rests on intersubjective 'background knowledge' (Adler and Pouliot 2011a, 2011b; Searle 1995), which it embodies, enacts and reifies all at once; it is bound up in performances and can only be expressed as such.

Pragmatism, Practices and Communities of Practice

Next, we ground the concept of social practices[4] on philosophical pragmatism's arguments[5] and define and describe the concepts of social practices and communities of practice.

One of pragmatism's most important conceptions is the primacy of practice (Hellmann 2009; Putnam 1995: 52). We know and understand through action and practice (Amin and Cohendet 2004: 64; Dewey 1922). Knowledge means active involvement in the world, not just communicating something but producing a physical change in the world. On one hand, knowledge is a by-product of activity (Menand 2001: 322), while on the other, it is an instrument of successful action (Dewey 1988: 180; see also Menand 2001: 361). Dewey (1916: 334) considered practices as helping to turn thinking into knowledge.[6] William James concurred: 'It is far too little recognized….how entirely the intellect is built up of practical interests…..Cognition, in short, is incomplete until discharged in act' (cited in Richards 1987: 447).

Second, we owe to pragmatism the view that both dispositional and reflexive knowledge does not precede but is bound up in the execution of practices. Scientific and social reasoning, therefore,

[4] It is imprecise to interpret the 'practice turn' in IR as being influenced by two opposing orientations, one critical and Bourdieu-oriented and the other pragmatist oriented (Bueger 2015). Bourdieu's concept of 'habitus' is essentially pragmatist.

[5] The literature is extensive. Important overviews of pragmatism include: (Bernstein 1985; Haack 2006; Menand 1998, 2001; Misak 1999; Putnam 1995).

[6] 'Knowledge as an act is bringing some of our dispositions to consciousness with a view to strengthening out a perplexity, by conceiving the connection between ourselves and the world in which we live' (Dewey 1916: 400).

are not ‘causal’ forces antecedent to practice, but rather are its ‘laborious achievement’ (Dewey 1922: 198). Contrary to the classic view, therefore, that individual mind and intersubjective collective understanding form social groups’ habits, customs, and most importantly, practices, it is rather habits, customs, and practices that form and nurture minds and collective understandings (ibid: 63).

Third, according to pragmatism, thinking, deliberation, judgment, and interpretation can only be understood as taking place within and by communities whose members learn from each other by and through practice; the fixation of belief results from a limited local convergence by a particular community at a particular time (Hausman 1993: 216). Dewey and George Herbert Mead (in Gronow 2011: 68) thought that ‘sociality does not crush individuality and is not restricted to particular “topics”’. Dewey, argued that “individuals grow to a sense of self-consciousness *through* the communities in which they live, not simply *in* them” (in Gronow 2011: 68).

Pragmatism’s fourth legacy is taking social learning as a communal and practical endeavor. Practitioners learn by becoming a community of practice’s active participants in which ‘newcomers’, by learning the community’s practice from ‘old-timers’, adopt the background knowledge that constitutes such practice (Wenger 1998). Within communities, practitioners not only learn competent skills but also adopt identities, artifacts and related practices, and immerse themselves in a type of rational persuasion that must aspire, but cannot always be assimilated, to models of deductive proof or inductive generalization (Bernstein 1985). Communities, ‘characterized by conventions of meaning and communication and the cultures of action and interpretation…act as learning environments in their own right’ (Amin and Cohendet 2004: 66).

Finally, pragmatism takes individuals’ habits, as well as patterned and structural social customs and practices as what is being transmitted within and between communities (Adler 2019), sometimes unimpaired and most often with an increment of meaning that becomes the baseline for the next step in the process of constructing social worlds (Dewey 1922). As such, communities, as vehicles of practice and of the background knowledge on which they nurture, account *simultaneously* for the social world’s stability and transformation (but see Drieschova, Bueger and Hopf in this volume). On one hand, social action relies on habitual dispositional knowledge and

expectations that are embedded in social practices. On the other hand, endogenous and exogenous factors awaken and stir human reflexive creativity, which lead to the transformation of practices and the knowledge bound with them (Joas 1996).

Moving to practices, it is in and through practices that the key dimensions of social and political life take shape: structures, agency and subjectivity, material resources and meaning, stability and change, rationality and rules, morality and interests, and more. Practices are socially meaningful patterns of action, which, in being performed more or less competently, simultaneously embody, act out and possibly reify background knowledge and discourse in and on the material world (Adler and Pouliot 2011a: 6). Specifically, practices are patterned actions embedded in organised contexts and, as such, are articulated into specific types of action and socially developed through learning and training. Practices not only organise the social world but are the raw materials that comprise it.

The relationship between practices and the social world is constitutive. Institutions, systems of governance and social orders are constituted not only by material power and organised violence, or exclusively by ideas, norms, values, and discourses, but primarily in and by practices. Practices, in turn, are contained in and carried by communities of practice. The communities in which practices become embedded, however, 'dissipate' their collective understandings beyond their original boundaries and via social and political processes, lead to their selective retention and institutionalization (Adler 2019). This last statement needs to be unpacked.

A practice approach prioritises knowledge, as much as the epistemic community does, but it puts knowledge where it belongs, as practices' background knowledge, which includes the knowledge required to execute certain practices and the knowledge that emerges from the execution of practices. Background knowledge, including scientific knowledge, which consists mainly of intersubjective expectations and dispositions, is not only located behind practice, as in ideas, beliefs and reasons, but is also bound up in the very execution of the practice. Background knowledge, however, is far from being tacit. Rather, it depends on individuals' reflexive, normative, and instrumental judgments to remain effectively institutionalised.

The attributes of practice acquire concrete and workable theoretical and empirical meaning in the concept of communities of practice (Brown and Duguit 1991; Coe and Brunell 2003; Lave and Wenger 1991; Wenger 1998; in IR see Adler 2005, 2008; Adler and Pouliot 2011a). Practices develop, diffuse, and become institutionalised in such collectives. According to Etienne Wenger, who together with Jean Lave first developed the concept, a community of practice is a configuration of a domain of knowledge that constitutes like-mindedness, a community of people that 'creates the social fabric of learning', and a shared practice that embodies 'the knowledge the community develops, shares, and maintains' (Wenger et al. 2002: 28-29). The knowledge domain endows practitioners with a sense of joint enterprise, which 'brings the community together through the collective development of a shared practice' and is constantly being renegotiated by its members. People function as a community through relationships of mutual engagement that bind 'members together into a social entity'. Shared practices, in turn, are sustained by a repertoire of communal resources, such as routines, sensibilities, and discourse (Wenger 1998: 75-85, 209). Interaction between practitioners in communities of practice gives rise to emergent properties, which means that we cannot reduce communities of practices' properties to those of their individual and corporate practitioners.

Communities of practice are learning communities, where learning means participation in and engagement with the meanings, identities, and language of communities of practice and their members (Wenger 1998: 55). As a source of social structure, learning is 'what changes our ability to engage in practice, the understanding of why we engage in it and the resources we have at our disposal to do so' (ibid: 95–6). Communities of practice thus consist of people informally as well as contextually bound by a shared interest in learning and applying a common practice.

Membership in communities of practice entails a shared identity, which is constituted through the forms of competence it entails. Thus, communities of practice are not about 'habits mechanically reproducing themselves', [but] are 'a matter of investment of one's identity and thus of negotiating enough continuity to sustain an identity. From this perspective, practice is different from a physical system, because people do not merely act individually or mechanically, but by negotiating their engagement with one another with respect to their shared practice and their interlocked identities'

(Wenger 1998: 97).[7] Moreover, the community of practice concept encompasses the conscious and discursive dimensions and the actual doing of social change. Communities of practice are intersubjective social structures that constitute the normative and epistemic grounds for action, but they are also agents, made up of real people, who – working via network channels, often across national borders and organizational divides, and in the halls of government – affect political, economic, and social events (Adler 2008, Adler and Pouliot 2011a).

We can grasp communities of practice primarily analytically and relationally, as social spaces that are organised around practices and 'are known only in one very limited respect and . . . may *never* be encountered face to face' (Urry 2004: 116). Still, communities of practice are grounded in places and represented in the material world (Sassen 2000). They differ from the oft-used concept of 'network' (Castells 1996), mainly because they involve not only the functional interpersonal, inter-group, and inter-organizational transmission of information as networks do, but also processes of social communication and identity formation through which practitioners bargain over and fix meanings, learn practices, and exercise political control. Akin to field theory (Bourdieu 1977; Fligstein and McAdam 2011) and network theory (Castells 1996), relational factors play a major role in the way communities of practice structure social order change and stability. But while Bourdieu's (1977) and Fligstein and McAdam's (2011: 17) relational factors are subservient to power relations as hierarchies, in the case of communities of practice, material and social power is subservient to relational processes both within and between communities of practice. In this case, power also means 'horizontal accountability', which is 'associated with engagement in joint activities, negotiation of mutual relevance, standards of practice, peer recognition, identity and replication, and commitment to collective learning' (Wenger 2010: 13).

It is important to underscore, however, that practitioners may have different interests, authority, institutional resources, and innovation and interpretive capabilities. But 'the power that institutions … or individuals have over the practice of a community is always mediated by the community's creation of its practice' (Wenger 1998: 80). Crucially, one should take contestation as one of the most important attributes of communities of practice. Contestation is necessary for learning to take

[7] Pragmatists, such as Dewey, while referring mainly to individuals' habits, considered them as social, rather than merely individual attributes.

place in communities of practice; it is a process through which practitioners dynamically define their practice, adapt to environmental challenges, and adopt a common identity.

Because the boundaries of communities of practice are determined by people's knowledge and identity and by the discourse associated with a specific practice, communities of practice are not necessarily 'congruent with the reified structures of institutional affiliations, divisions and boundaries' (Wenger 1998: 118–9). As boundaries form in and around practice, communities of practice link up with their social environments and with other communities of practice to form community-of-practice constellations (ibid: 129); e.g. diplomats, security analysts and financial consultants. Several communities may share objects and meanings; Wenger (ibid: 106-108) calls these 'boundary objects'. While communities of practice are not international actors in any formal sense, they coexist and overlap with them. What states do vs. other states, the moves they make, the signals they give, and the language they speak, are constituted by the practices they share.

Epistemic Communities as Communities of Practice

Peter Haas' (1992) widely accepted definition correctly captures the knowledge and power components of epistemic communities. However, a practice interpretation of epistemic communities may conceive them as consisting of:

(1) A domain of background knowledge, which, bound-up in the performance of practices, is validated in and through practice.

(2) An emergent community of practitioners where learning takes place and practices are created.

(3) Shared practices that embody the consensual knowledge the community develops, shares, and maintains. Epistemic communities have a sense of shared enterprise, which results not only from abstract shared knowledge, but primarily from the practical application of their knowledge for solving problems in the world. Their shared practices are sustained not only by collective knowledge, but also by material and organizational resources, and by shared routines and discourses.

From a community of practice perspective, therefore, what explains how practical epistemic authority takes hold is not only scientific consensus and not merely bureaucratic politics, persuasion, lobbying, imitation, and agenda setting, but primarily the adoption of the competence of doing and practicing something by a growing number of practitioners across space and time (Adler 2019). International cooperation takes place, in turn, when state and non-state actors adopt the same practices across functional and geographical borders, namely, when communities of practice expand in space. When practices are learned and adopted by future practitioners, communities of practice also expand in time, thus keeping social order institutionalised (Adler 2019). Also important in making knowledge authoritative is – using Mary Douglas' (1986) apt term with regard to institutions – the naturalization of practices, at which time alternative knowledge, identities, and power relations are set aside, both collectively in communities of practice, as well as in individuals' minds.

At the micro level, communities of practice acquire their influence when practices stabilise changing social structures and fix subjectivities in people's minds (or determine the dominant ideas that corporate actors focus on at a given point in time), thus constructing agents and agency. Practices structure and congeal thought and language into regular patterns of performance and turn contexts or structures into (individual and corporate) agents' dispositions and expectations.

As vehicles of individual and collective practices, communities of practice play a role not only in what practices are adopted by nation-states and societies, but also in the preferential evolution of some practices over others (Adler 2019; see also Pouliot in this volume). As such, they are a source of social order, though not the only one. At the micro level, they constitute international social order when their practices socially empower individuals, as well as corporate actors and their elites and leaders, to act in one way rather than another. At the macro level, however, international social order emerges from configurations of practices, which become routinised and taken for granted. According to this account, an epistemic community of practice may consist of scientists and technical experts, whose practices and the knowledge they produce expand across functional and geographical boundaries.

Recently, the authority of and trust in scientific expertise has been lately undermined. Moreover, scientific expertise must compete with other kinds of knowledge and epistemic communities of practice, which may consist of configurations of domains of social knowledge, law, ethical understandings, and religion (Sandal 2011). As Hajer (2003: 185) writes, 'a positive way to understand this is to see that it is essentially a democratization of knowledge that has created the *social explosiveness* of many contemporary practices'. This raises the question, as we begin exploring in relation to 'post-truth' in this chapter, what difference does it make to political and social reality, and the evolution of international practices, that background knowledge that constitutes epistemic communities of practice is scientific and enjoying people's legitimacy?

Science, Practice, and Communities of Practice

The recent emphasis in Science and Technology Studies on science as a practice opens another window through which we can observe knowledge as inseparable from action (Dewey [1929] 1984). An approach to science that focuses not only on abstract scientific theories, but primarily on science as a set of practices (Kuhn 1962), enriches the ontology of the social construction of knowledge and our understanding of the construction of social and political realities. Such an approach is less an alternative to social-constructivist interpretations of scientific knowledge, as it is sometimes viewed in science studies (Rouse 2003), than a means of strengthening and enriching social constructivism. From the perspective of science as activity or practice we want to know how epistemic communities, as 'factories of practice', motivate certain political moves through the adoption of new practices. We also want to know how scientific practices help to at least partly construct not only what experts consider to be 'consensual knowledge', but also what political actors consider to be most politically viable.

A practice-based science should thus be understood not simply as 'an intimate encounter between a research problem and a problem solver' (Friedrichs and Kratochwil 2009: 710-11), but more as a socially collaborative and communal activity (Hagstrom 1965; Latour 1987; Knorr Cetina 1981), 'taking place in communities of practice' (Friedrichs and Kratochwil 2009: 710-11). The lesson drawn from Cultural Studies of Scientific Knowledge – that there is a constant 'traffic between the establishment of knowledge and those cultural practices and formations which philosophers of

science have often regarded as "external" to knowledge' (Rouse 1993: 4, 1996) – also suggests the notion that scientists and experts move within and between communities of practice:

> Our ability to know is shaped in…landscapes of practice. For instance, the body of knowledge of a profession is not merely a curriculum. It is a whole landscape of practices – involved not only in practicing the profession, but also in research, teaching, management, regulation, professional associations, and many other contexts….The composition of such landscape is dynamic as communities emerge, merge, split, compete, complement each other, and disappear (Wenger 2010: 183).

Focusing, as Wenger proposes, on scientists' and experts' knowledge as emergent social structures, which are sustained and transformed by means of practice rather than merely as ideas scientists and experts carry in their heads, suggests treating epistemic communities as domains of background knowledge that constitute the like-mindedness of their members, a community of people that creates the social fabric of learning, and a repository of shared practices that embodies the knowledge the epistemic community develops, shares, and maintains.

Epistemic Communities and, in Combination with, or Instead of, Communities of Practice

Since Lave and Wenger (1991) suggested the concept of communities of practice, it has generated a vast literature. A quick search with Google Scholar shows 694 million entries (8 March 2020). The product of collaboration between a Xerox computer scientist (Wenger) and an anthropologist (Lave), communities of practice was first and foremost conceived as referring to local small communities at the level of organization, firm, school, and the workplace, where in most cases practitioners know and are in contact with each other. In his 1998 book, Wenger used the example of insurance claim processors. Soon enough, organizations like the World Bank deliberately began setting up communities of practice (Adler 2005). From a disciplinary perspective, the concept was mainly adopted in management science, business administration, education, and economics, and soon took a prescriptive direction aimed at improving learning in educational settings, organizations and firms. It also became related to the efficiencies and strength of communication between organizations and firms (Bueger 2011). Wenger (1998) was careful to argue, however,

that nothing prevents applying the concept to a larger, perhaps even global level, and that there is nothing intrinsically progressive or regressive about communities of practice.

During the last twenty years, an interdisciplinary literature began comparing communities of practice with other knowledge-based communities, including epistemic communities. Usually strongly reifying the epistemic communities and communities of practice concepts, scholars began arguing not only about which concept best helps to explain policy-making in a variety of fields, learning in the workplace, good management, and communication across communities, but also whether these communities co-exist and co-evolve within organizations, firms, laboratories, and universities. We cannot cover this genre's large quantity of publications here. To illustrate, however, based on ethnographic fieldwork among quantum information physicists, Hansen (2015) identifies scientific communities of practice and argues that in science and education, they "have existed in various forms for more than a century, but have only recently been formalised into practice". By comparison, however, Créplet et al. (2003: 1-2) consider that epistemic communities are truly oriented toward new knowledge creation, whereas communities of practice are oriented toward the achievement of an activity; nonetheless, these communities 'might populate diverse organizational contexts'. Håkanson (2010: 8) also distinguishes between the two communities and argues that epistemic communities bear strong resemblance to communities of practice but prefers to study firms as epistemic communities. Writing about medical knowledge, Akrich (2010: 13) argues that collectives emerging from communities of practice came to form an epistemic community. Meyer and Molineux-Hodgson (2010: 4), in turn, argue that 'the notion of epistemic community proves most fruitful when combined with other concepts, such as communities of practice'. Cohendet et al. (2001: 9) add that the core of the formation of organizational learning resides in interaction between epistemic communities and communities of practice. Amin and Cohendet (2004: 77) reach a similar conclusion, arguing that while 'epistemic communities may be established explicitly as knowledge communities, the sociology of their knowledge practices is not radically different from that of communities of practice'. And Meyer (2010: 2) argues that 'scientists move in communities of practice … that very often don't have clear boundaries'. He shows how amateur and professional scientists meet through a journal or conference, thus building an epistemic collective through weak ties.

Regardless of the type of arguments cited above, their authors refer to epistemic communities and communities of practice mostly as reified entities, which exist and work in organizational contexts, side by side, sometimes overlapping in either symbiotic, hybrid, parallel, or subordinated relationships, and to which some organizational, economic or political benefit can be attributed. These and other studies neglect, however, perhaps with some outstanding exceptions, such as Amir and Cohendet (2004), to use these concepts analytically and heuristically with the goal of understanding broader social phenomena. To this end, we turn now to illustrations of nuclear arms control verification practices and the recent phenomenon of post-truth's wider implications for liberal democracy and post-war international institutions.

Verification: Epistemic Communities of Practice and Nuclear Arms Control

For any arms control agreement to effectively limit the testing, use, or reduction of nuclear weapons requires establishing the techniques and procedures necessary to monitor and verify compliance with negotiated conditions. Monitoring capabilities (e.g. the use of satellite, aircraft, mobile and stationary sites) are necessary but alone insufficient; they must provide a precision and accuracy of data such that each party can confidently verify whether a violation has occurred (Hafemeister 2016: 137-138). Early attempts to establish verification practices to compliment the first nuclear arms control agreements between the United States and the Soviet Union – the Threshold Test Ban Treaty (TTBT) and the Peaceful Nuclear Explosion Treaty (PNET) – were important for arriving at a consensus not only over their implementation, but also their very possibility. Thus, they played a decisive role in initially inhibiting and subsequently allowing for the treaties' ratification. When we focus on epistemic communities as communities of practice, the construction of the nuclear testing verification regime was more than the innovation-diffusion-adoption of a set of ideas by the rival superpowers (Adler 1992). Rather, it hinged on the active participation of a group of transnational physicists and seismologists in the production of new technologies and practices in and through which the knowledge required to sustain the arms control treaties could be maintained. By first examining the initial failure to establish an effective nuclear testing ban, the practices necessary for the ongoing stability of the arms control regime are put into higher relief and suggest why there may be cause for concern regarding the future of US-Russian nuclear cooperation.

Establishing a Ban on Nuclear Testing: 'Trust, but Verify'

Shortly after the end of World War II and the devastating effects of using nuclear weapons on Hiroshima and Nagasaki, calls emerged from within the United States and the Soviet Union to limit their use while also recognizing the immense civilian potential that nuclear power afforded. While President Eisenhower's Atoms for Peace speech at the UN on 8 December 1953 signalled to the world that nuclear energy could be harnessed for non-violent purposes, it was not a foregone conclusion that the control, or even the limiting and reduction of nuclear weapons would emerge as a constitutive feature of Cold War international relations (Miller 2006). Indeed, there were those advocating nuclear superiority, against which an arms-control epistemic community had to compete both intellectually and politically (Adler 2005b: 154). Even throughout the process of establishing the logic of US-Soviet nuclear cooperation, any suggestion of arms control eventually confronts the problem of verification.

As early as 1946, with the Soviets advocating a ban on nuclear weapons, the US was adamant that an effective mechanism to verify violations would be a prerequisite for any nuclear arms control agreement. Despite initial opposition from the Department of Defence, the Atomic Energy Commission and various physicists, the US began diplomatic talks to create a means of monitoring secret weapons testing. Insisting that technical meetings were required to establish the basis on which the verification of violations could be achieved, experts from the US and the USSR met in Geneva in 1958 to discuss their various proposals for recording acoustic and seismic waves, radioactive debris, and radio signals, which could detect detonations in the air, land, sea, and space. While recognizing the difficulty of definitively establishing the potential to detect underground explosions (the only data available was the seismic measurements from a single US underground explosion test, 'Rainier', with a small yield of only 1.7 kilotons), it was a sufficient basis on which to begin diplomatic negotiations for a test ban on 31 October 1958. During the second technical meeting in late 1959, however, controversy arose between US and Soviet experts. The American delegation argued that in light of new data from recent tests and of the RAND corporation's publication of a theory suggesting underground explosions could be concealed (namely that detonating explosives within a cavity could render yields twenty times the size of that dropped on

Hiroshima undetectable), it was significantly more difficult than previously thought to differentiate an underground nuclear test from the thousands of small earthquakes that occurred annually. The Soviet experts responded that no renegotiation of detection capabilities was required, dismissed the new US data as irrelevant, challenged the hydrodynamic assumptions underlying RAND's theory, and rejected the American's use of 'Benioff' seismographs on the grounds that it did not meet the criteria previously agreed upon. While the US position was that verification would be a lot more difficult than they had previously anticipated and required further theoretical and technical development, the Soviets insisted that their previous agreement was enough to allow diplomatic negotiations to continue. The technical controversy went unresolved and remained an ongoing diplomatic point of contention. A lack of expert consensus deadlocked future negotiations (Barth 1998).

Eventually, a Limited Nuclear Test Ban Treaty (LTBT) was signed by President John F. Kennedy and Premier Khrushchev in 1963, no doubt partially resulting from a renewed sense of urgency triggered by the Cuban Missile Crisis (Fischer 1997: 94). However, LTBT only limited testing in the atmosphere, outer space, and underwater. When the TTBT and PNET were signed to regulate underground testing, in 1974 and 1976 respectively, establishing some means of verification was still required. While agreements were signed, which in itself was a significant feat given the stakes involved, performing nuclear arms control involved much more than the emergence of an ideational consensus. We argue below that through mutual learning and contestation, an epistemic community of practice consisting of US and Soviet scientists designed the practice of effective verification (a necessary but insufficient condition) that made the 1998 Joint Verification Experiments (JVE) agreement feasible. Rather than looking at how an epistemic community achieved scientific consensus on arms-control verification and persuaded decision makers to adopt it, we explore how the epistemic community of practice made the practice of arms control verification possible. The latter helped to constitute a social order that became key for stabilizing US-Soviet relations at the end the Cold War, survived the collapse of the Soviet Union, and may still play a role in future arms-control verification treaties.[8]

The Joint Verification Experiments

[8] Here we are referring to constitution as creating conditions of possibility (Adler 2019: 43).

Considerably delaying the ratification of TTBT and PNET were problems that plague almost all international agreements between states: mutual distrust and the potential for cheating (Keohane 1984). Particular concern surrounded the testing of underground nuclear devices above the 150 kiloton limit (Hafemeister 2016: 139). The verification techniques and procedures necessary to assuage the superpowers' suspicions arose from an unprecedented international scientific collaboration between American and Soviet experts, wherein US monitoring stations were setup in Semipalatinsk, Kazakhstan and Soviet monitoring systems were installed around the Nevada nuclear test site in 1986 (Barth 2006: 182). The test results from these experiments built the confidence necessary for the treaties' ratification in 1990 (Hecker 2016: 32). However, it was the extensive coordination and joint learning that led up to the JVE, the practices that emerged and were established during the JVE and the subsequent Lab-to-Lab collaboration, which sustained nuclear arms control cooperation into the post-Cold War period.

A short methodological note is necessary here. Since a focus on epistemic practices attempts to move beyond equating knowledge with mere inter-subjective belief, looking into the situated activities of knowledge making requires an examination of the sites where practices are performed (Latour 1987). When discussing international scientific collaboration, conferences are often one of these important locations, whether they serve as locations for innovation, as with the Pugwash Conferences and the initial formulation of arms control (Rotbalt 1967), or controversy, as illustrated by the deadlock over underground testing at the 1958/59 Geneva conferences described above. When the verification practice succeeded, the relevant sites were the US and Soviet nuclear laboratories and monitoring stations. With this methodological consideration in mind, the following analysis relies heavily on a recently published series of interviews with both Soviet and American experts who were actively involved and present at the JVE sites and laboratories involved in the subsequent Lab-to-Lab collaborations (Hecker 2016).

As mentioned previously, significant distrust persisted between the superpowers following the signing of both TTBT and PNET; when coupled with the Soviet invasion of Afghanistan, along with the US deployment of the Perishing II missiles in Western Europe, official diplomatic communication ceased entirely between 1983 and 1986 (Barth 2006: 187). Notably, despite

ongoing negotiations over a potential Comprehensive Test Ban Treaty (CTBT) prior to these events, President Ronald Reagan withdrew from the talks in 1982 citing the need for more nuclear testing and reiterating the lack of verification measures (Barth 2006: 188). More agreements were signed but with Cold War tensions now at their strongest, their implementation hinged on the verification issue.

Despite this breakdown of official diplomatic channels, cooperation over nuclear arms control and non-proliferation continued between various non-government organizations (NGOs), the most noteworthy being the Federation of American Scientists, the US National Academy of Sciences, the Carnegie Corporation, the National Resources Defence Council (NRDC), and the Soviet Academy of Sciences (Hecker 2016: 79). To overcome the problem of verification, Thomas Cochran and the NRDC published the Nuclear Weapons Databooks that contained information on all previous US nuclear tests. However, the data on smaller underground explosions remained difficult to collect; seismic waves caused by the nuclear devices were virtually indistinguishable from the earthquakes common in the Nevada test site locality (Barth 2006: 191). The notion of setting up seismic monitoring stations to verify whether future secret tests were being conducted was soon explored by Soviet and US officials (ibid: 192). In response to Reagan's 'Star Wars' speech in 1983, Yevgeny Velikhov and other Soviet scientists founded the Committee of Soviet Scientists against the Nuclear Threat, using the term *politicheskaya fiska* ('political physics') to describe their activities (ibid: 193). After developing a working relationship with the Federation for American Scientists before becoming part of Premier Gorbachev's inner circle in 1985, Velikhov was instrumental in warming the USSR to the idea of joint verification sites and promoting it at the Moscow Workshop in 1986 (ibid: 196). During these talks and others in Geneva, JVE came to involve each side bringing their own equipment to each other's site, and as the physicist at the head of the US delegation, Seigfried Hecker, recalls, "the principle of complete reciprocity was to be preeminent throughout the process" (Hecker 2016: 87). Security interests were accommodated at every step in the process; accuracy of measurement was balanced with the degree of intrusiveness of the technique, in order to protect any secret design information that might be gleaned in collecting the necessary data. At the fourth Washington Summit on 8 December 1987, Reagan and Gorbachev established a formal commitment to JVE (ibid: 88).

JVE was unprecedented in more than one sense: it was the largest privately-funded scientific exchange with the Soviet Union, a completely novel approach to developing nuclear verification practices, and the first time US scientists had been behind the iron curtain at the secret Soviet nuclear test sites (Hecker 2016: 90). In 1986 Thomas Cochran and James Brune flew to Karkaralinsk, Kazakhstan to set up three seismic stations roughly 120 miles from the Soviet test site, and soon after began recording earthquake signals to calibrate the seismometers to the region's geology (Barth 2006: 200). Importantly, this produced completely new data for the Americans and revealed a significant geologic difference between Semipalatink and the Nevada test site. Keith Preistly from the University of Nevada notes that '[i]f two tests, one at Nevada and one at Semipalatinsk, are identical in size, the amplitude of the Kazakhstan test will show up twice as large' (cited in Barth 2006: 201). This stands as a clear illustration of how important joint participation was when developing verification practices for arms control. While the US had previously accused the Soviets of violating threshold yields, those accusations depended on the assumption of a similar geology; working collaboratively through various technical problems that arose through joint learning allowed the two groups of scientists to ameliorate these concerns. Two examples are particularly noteworthy.

First, by measuring yields using the hydrodynamic method they recognised the potential for sensitive information about the weapon's technology to be transmitted between the sensors and registers. Nikolai Voloshin notes that to ameliorate such security concerns, an anti-intrusion device was jointly developed, autonomously fabricated, and then submitted to cross-testing (Hecker 2016: 106). Second, debates arose several times during the Soviet trip to the Nevada site concerning the interpretation of data, potentially threatening a controversy similar to that experienced in 1959. After finding marked differences between Soviet and American analyses of some initial tests and working together to find the source of discrepancy, it was found that several factors had not been taken into account when the Americans created the data processing program. Both the automated US and the Soviet 'pen and paper' methods were used jointly in order to read accurately when false pulses were recorded, or when sensors failed to respond during the actual testing (ibid: 114-116). Two nuclear weapons explosions were conducted, one at the Nevada test site on 17 August 1988 and one at the Semipalatinsk test site on 14 September 1988. The verification protocols that had been developed gave each side the right to choose from a menu of agreed verification means

when an explosion was planned, all of which had been devised and tested during the JVE (Hecker 2016: 92). On 25 September 1990 the US Senate unanimously agreed to ratify the TTBT and PNET, while the Soviet Union ratified them on 9 October 1990, with the CIS adopting the same agreements when the USSR broke apart (ibid).

For the various scientists that were part of the US and Soviet delegations, the process of closely working together to develop the verification practices had significant implications for their inter-personal relationships, as well as for the superpowers' wider diplomatic relations. Cooperatively constructing and jointly manning the three seismic stations, the 26 American experts and a larger group from the Soviet Union that travelled together during the JVE consistently noted their change in attitudes, recognizing the other as a scientist with similar ambitions and capabilities. Stephen Younger was surprised to realise that '[o]ur Russian counterparts were as dedicated to the security of their nation as we were to ours. They were committed to technical excellence and were proud of their achievements. While the physical surroundings were different, there were times when the Americans thought that they were looking at themselves in a mirror as they stared across the conference table' (Hecker 2016: 118). The JVEs helped constitute an epistemic community of practice that enabled further collaboration between Soviet, now Russian, and American nuclear scientists even as the Berlin Wall fell.

Post-Soviet Nuclear Arms Control: Lab-to-Lab and Emerging Challenges

The Nunn-Lugar Cooperative Threat Reduction (CTR) program and Lab-to-Lab followed from the JVE. The US' major concern after the collapse of the Soviet Union was 'loose nukes' – 39000 were spread across eleven time zones of the Soviet republics – with the worry that nuclear weapons, materials, and experts would be exported through various channels (Hecker 2016: 35). Soviet scientists recognised that the end of the Cold War would require collaboration rather than confrontation. Discussions immediately began regarding how the US scientists could support their Russian peers. The Carnegie Corporation funded a Belfer Centre study on the impact of the Soviet Union's breakup on nuclear arms control, which recommended joint action by the US and Russia to provide financial and technical support for the former superpower's nuclear material and facilities (Hamburg 2015: 109-111). Supported by Senators Sam Nunn and Richard Lugar, the

‘Soviet Nuclear Threat Reduction Act of 1991’ passed into law on 12 December 1991, giving the Department of Defence the authority to transfer 400 million USD towards the joint efforts. This involved the dismantlement and disposition of nuclear weapons in Ukraine, Kazakhstan and Belarus, but also the US airlifting of 600 kg of highly enriched uranium from the city of Ust-Kamenogorsk to the US (Hecker 2016: 41). The execution of post-Cold War security initiatives required a considerable amount of expert participation with shared practices.

Specifically, these types of joint arms control measures required close collaboration between several US and Russian nuclear laboratories. The Warhead Safety and Security Exchange (WSSX) and the International Science and Technology Centre (ISTC) were subsequently launched by the US State Department in order to enlist technical support from three nuclear laboratories and provide the funds necessary to prevent “brain drain” of nuclear scientists from Russia (Hecker 2016: 42). Crucially, it was the epistemic community of practice that JVE fostered that allowed for the lab director exchanges in 1992, which began the Lab-to-Lab collaborations that provided not only financial assistance to Russian scientists, but also genuine research partnerships on joint projects. Hecker, who along with John Nuckolls (Director of the Lawrence Livermore National Laboratory) travelled to Sarov (a previously secret Russian city where the Soviet nuclear bomb had been created) to initiate Lab-to-Lab, recalls the effects of joint research: ‘Scientists and engineers want to create new knowledge, develop new technologies, and build things. Doing so together in early lab-to-lab projects built professional respect, which, in turn, made it easier to establish trust…We treated each other as equals, not as donors or recipients of US aid, as was often the case in government circles… Creating things together through scientific cooperation became the hallmark of our relationship’ (Hecker 2016: 42). Two main principles emerged to guide Lab-to-Lab: ‘side by side as equals’ and ‘step by step’. The former implied that the Los Alamos National Laboratory scientists were not at the Russian lab simply to pick up technology on the cheap. Rather, the US scientists were there to jointly pursue scientific advances. The latter simultaneously sought to recognise the sensitive security status of their cooperation, working quickly but always being deliberately transparent by keeping both of their governments informed (ibid: 45). Lev Dmitrievich Ryabev, who was involved through the ISTC’s existence, notes that the funds were provided for travel, publication, and attending conferences, but also crucially for upgrading storage facilities and jointly solving various problems associated with weapons,

material transports and stockpile stewardship (Hecker 2016: 58). This type of relationship did not apply across the board, with little cooperation for example relating to civilian nuclear energy, but JVE experience was a crucial precedent when cooperation over warheads began (ibid: 59). Joint participation in arms control monitoring and verification during and immediately following the Cold War suggests that the development of this epistemic community of practice was crucial for establishing the implementation and stability of international nuclear agreements. However, when looking to the future of nuclear weapons reduction, regulation and non-proliferation, this recognition provided cause for concern.

Since the early 1990s both Russia and the US have continued to develop and modernise their nuclear arsenals, while simultaneously attempting to reduce overall stockpiles and negotiate new arms control agreements. The Strategic Arms Reduction Treaty (START) signed by President Bill Clinton and Premier Boris Yeltsin in 1991 was followed by START II in 1993, which never entered into force, and the ratification of the 2002 Moscow Treaty (a shorter and simpler version of START I/II) and New START in 2010 (Hafemeister 2016: 140-141). Despite the optimism these agreements might have produced, several observers have touched upon their common concern with verification. Not only has there been a 50% reduction in the number of facilities to be inspected (ibid: 141), but inspection practices themselves have been drastically altered.

Moreover, due to ongoing technological improvements, verification procedures need to evolve and require more intrusive measures than are currently available (Arbatov 2016; Pifre 2017). Yet, while extensive and intimate scientific collaboration enabled the establishment of verification practices in the recent past, the ending of the Nunn-Lugar Cooperative Threat Reduction Program in 2013, Russia's withdrawal from the ISTC in 2010 and the closure of its Moscow office in 2015 (Kassianova 2016), along with Moscow's refusal to participate for the first time in the 4th Nuclear Security Summit in early 2016 (Arbatov 2016), all indicate a contraction of the epistemic community of practice outlined above. These developments, coupled with the supply-side limitations for nuclear proliferation as a result of overall increases in global technological capacity, access to technical information, and lower costs of industrial requirements (Kemp 2014), as well as domestic political developments in both Russia and the US, continue to constrain and challenge

future nuclear arms control efforts. At the same time, these developments also illustrate the importance of further research on international arms control epistemic communities of practice.

In sum, the concept of epistemic communities of practice improves on the concept of epistemic community in various ways. First, the concept of epistemic communities of practice concept shows how the knowledge necessary to control nuclear testing did not precede action but was generated in and by joint action. Second, verification practices, as the practitioners themselves admitted, constituted the conditions of possibility for nuclear testing to take place. Third, while the concept of epistemic communities reduces the notion of experts' efficacy to their individual, albeit intersubjective, beliefs, our short case study shows that epistemic communities of practice give rise to emergent properties, which become institutionalised in laboratories, instruments and working habits. Fourth, rather than focusing on how experts persuade decision makers, we show how mutual trust was generated in and by practice. Finally, one of the most important advantages of our approach is analytically integrating the knowers and the doers as part of the same community.

Post-Truth

In order to demonstrate the scaling potential of the epistemic community of practice concept, we now take a broader approach by outlining the relationship between the recent phenomenon of 'post-truth', the current rise of populism and its potential to disrupt aspects of a liberal international order. Since the Oxford Dictionary's induction of 'post-truth' into its lexicon, many definitions and formulations have been developed. This not only signifies the relativism of 'truth' in the public sphere, however, but also the rise of alternative epistemic authorities. Specifically, these include populist epistemologies that valorise individual experience over traditional academic and scientifically generated claims. This type of background knowledge lies at the heart of the renewal of post-truth practices performed by populist leaders across the globe, which are most visible in their challenges to, and successful removal of, independent media and constitutional legal authorities.

Sergio Sismondo (2017: 588) finds five major characteristics of post-truth: (1) emotional resonance trumps the factual basis of claims; (2) self-confirming opinions are more significant than facts; (3) public figures make statements without regard to their factual basis, coupled with the public's inability to make a fact/fiction distinction; (4) loss of public trust in traditional media; and (5) dishonesty and demagoguery, seen as distinct from merely lying, are accepted as part of public life. While most of these themes are arguably unsurprising in the context of politics, it is their increasing frequency and deliberate use as means of domination that characterise the qualitative shift in the relationship between various institutional authorities and democratic governance worldwide.[9]

As Hannah Arendt (2006: 257) argued, 'the result of a consistent and total substitution of lies for factual truth is not that the lies will now be accepted as truth, and the truth be defamed as lies, but that the sense by which we take our bearings in the real world… is being destroyed'. The rule of law, democracy, education, markets, trade, and peace – to mention some salient practices, all of which rely on tacit and/or explicit social epistemic agreement – break under the weight of post-truth, resulting in enhanced possibilities for violence, economic failure, surprises, physical harm, human insecurity, human-rights violations, and a growing poverty of imagination (Adler 2019).

From an epistemic community of practice perspective, traditional epistemic authorities erode through post-truth practices with trust shifting from 'experts' to populist leaders and individuals' alternative facts, opinions and emotional reactions. In contemporary liberal democracies, epistemic authority is disaggregated and distributed across a range of institutions such as legal courts, journalism, universities, civil services, and public opinion. When post-truth challenges this disaggregation of authority and mutual contestation, democracy's stability and flexibility can falter. Rather than inter-institutional conflicts occurring within a broadly shared epistemic standard (e.g. debating the best policy prescriptions from a shared set of facts), challenges threaten the very basis of institutional authority. The most recent illustration of this is the practice of accusing media outlets of propagating 'fake news'. Populist leaders and segments of the general public no longer engage in debate over various propositions, but instead dismiss journalistic outlets as incapable of

[9] For an important distinction between belief and truth from a philosophical perspective, see Kratochwil (this volume).

making authoritative claims regarding the very facts of the matter. This practice is by no means a strictly American phenomenon, but an expanding community with leaders across the globe swiftly adopting the technique (Milbank 2018). In an environment of persistent lies, accusations of fake news and anti-science sentiment, trust in traditional epistemic authorities is eroding and shifting toward new sources of authority. The case study that follows offers insight that complements Dumouchel's chapter in this volume, particularly by showing how sources of authority and influence unravel and are substituted by alternatives.

Post-'Truth': A Populist Challenge to the Authority of Expertise

The widely recognised growth of populist movements across the globe is a crucial driver of this erosion. The definition of populism is widely contested and variously defined as an ideology, discourse, strategy, or political style (Moffitt 2016). We define populism as a set of practices that position a country's leader, whether from right or left, as the true moral representative of the people, the only person deemed willing and able to find solutions to people's problems, to the detriment of representative institutions, ruling elites, and technocratic and scientific expertise. Therefore, populism is normally conceived as synonymous with 'democratic illiberalism', at best, and authoritarianism at worst. What links the current wave of populism to 'post-truth' is the nature of epistemic authority that validates both leaders' and people's populist beliefs.

Studies of populist media outlet discourse have given rise to the concept of 'epistemic populism'. This type of epistemic authority takes individual first-hand experiences as more reliable than knowledge produced using theories and other academic methods, views emotional intensity as an indicator of an opinion's reliability, and results in the dismissal of all other modes of knowing as elitist and therefore illegitimate (Saurette and Gunster 2011: 199). Moreover, complexity is stigmatised, as complicated explanations are deemed not only incorrect but also morally corrupt (ibid: 207). We rightly recognise that these epistemic practices are intimately tied to politics. Epistemic populism calls for political knowledge to be derived from the direct experience of the 'people'. Populist political projects similarly call for the dismantling of all mediating and reflective institutions in liberal democracies that promote public reasoning and maintain a distinction between public and private spheres (ibid: 212). In sum, privileging 'post-truth practices' implies a

demand for the reconfiguration of knowledge and authority, wherein the latter is directly tied to the lived experiences of the people, to their emotions, and to the rejection of current sources of expertise.

The hollowing out of traditional epistemic authorities, which creates space for populist leaders to arise, is exacerbated by the speed and scope of communication made possible by the internet (Adler and Drieschova, forthcoming). In a recent meta-analysis of the political communications literature, Aelst et al. (2017) found that while there does not appear to be a significant increase in the relative amount or quality of political news available, there is some evidence that fragmentation and polarization is occurring, and the sheer volume of information and misinformation has created a 'crisis of verification'. There is increasing relativism toward 'facts, evidence and empirical knowledge', whereby previously established facts become open issues of public debate (ibid: 14). Part of what enables this crisis are that (1) this influx of information renders personal preferences more salient (ibid: 7); and (2) algorithmic filtering coupled with confirmation biases serve to reinforce prior beliefs based on these preferences (ibid: 15-18). There has been a general narrowing of the types of information one is exposed to through the internet, with a decline in the power of general interest intermediaries to create a wide range of chance encounters and a diversity of shared experiences (Sunstein 2008).

Leaders like US President Donald Trump appeal to people's populist 'alternative facts' in their own home base, in constituencies that are willing to believe their leader's deliberate and manipulative lies, or do not care whether s/he is lying, as long as s/he fights for the 'right' causes ('the public in my inauguration was larger than Obama's'). In so doing, populist leaders and their followers, by expanding this community of post-truth practices, sow the seeds of destruction for reasoned common-sense reality, liberal social orders and democracy, according to which rule is distributed horizontally across many individuals and institutions. When reasoned common-sense reality is challenged by a mixture of populism and post-truth practices, it erodes what Adler (2019, see also Adler and Drieschova, forthcoming) elsewhere calls 'epistemological security', namely individuals' and communities' experience of orderliness, safety, and lack of threat to their physical integrity and identities, resulting from justified beliefs and trust in the knowledge on which their 'common-sense reality' (Ezrahi 2012: 106) is based. In other words, 'epistemological security' is

based on the ‘socio-epistemological ground for determination of a public and commonsensical world of facts’ (Ezrahi 2012: 106), or on reality as a condition of intelligibility (Adler 2019).

Populism thus reflects a unique epistemic attitude, a shared background knowledge within both mobilised mass movements and their leaders. Important here is that the appeal to the ‘people’ involves the denigration of expertise as ‘elitist’, and heightens the appeal of populist alternative fact opinions relative to bureaucratic and technocratic knowledge. Populist leaders appeal to the notion that they are the pre-eminent epistemic authority. In opposition to socialist movements that sought to liberate people from ‘false consciousness’ through re-education, populist practices appeal to people’s ‘common wisdom’ as the basis for and necessary condition of all good politics (Mudde 2004: 560; Oliver and Rahn 2016).

Post-Truth Practices: A New Ghost in the Democratic Machine

As indicated above, one of the most recent and visible practices accompanying post-truth is the vocal attack on what is rhetorically called the ‘mainstream media’. Charges of fake news and accusations of using alternative facts in the US context are instances of a more widely shared practice among populist leaders, as conventional media outlets are considered part of the elite against which the ‘people’ is contrasted (Kramer 2017). Moreover, mass media becomes a process of mediation that inhibits a direct link between the people’s will and political authority. Despite the fact that direct access is nevertheless an ideal that can never be achieved in practice, the internet and in particular Web 2.0 communications technology has been the platform of choice for populist leaders to engage with their supporters under the presumption of speaking face-to-face with the ‘people’ (Moffitt 2016: 70-94).

This epistemic challenge in the media environment has not gone unnoticed. Commonly held as a skill that pervades all journalistic communities, fact-checking has emerged in the world of alternative facts as an independent practice that is quickly spreading. While journalists have always attempted to be objective observers, until the last decade this has implied restraint from taking a strong stance on either side of a dispute. Whereas previously the ‘facts-of-the-matter’ would be considered sufficient, these new practices explicitly demarcate the boundary between what is true

and what is false (Gieryn 1999; Sismondo 2010: 32). Post-truth is a prominent case of contestation between two competing communities of practice involved in the social controversy over epistemic authority: one that carries and promotes post-truth practices, the other that protects a liberal democratic order with the adoption and promotion of fact-checking practices.

What Kim Schepple (2014, 2016; Pech and Schepple 2017) has variously described as 'rule of law backsliding' or 'constitutional coups' resulting in 'democratorships' is the proverbial populist epistemic ghost in the democratic machine. These hybrid regimes, which have features of both democracy and autocracy, result from populist movements that simultaneously skirt and then remove the institutions of legal and political expertise that mediate between the 'people' and political authority: Russia, Hungary, Poland, Venezuela, Ecuador and Turkey have all experienced this process. We briefly discuss Hungary and Poland. Their relationship to the European Union is particularly useful to shows how the spreading of the populist post-truth epistemic community of practice, bound with alternative facts background knowledge, might challenge the international liberal order and the communities of practice that sustain it. Poland's and Hungary's drift to illiberal democracy, however, have potentially wider implications for current international institutions and for liberal international order more generally. This drift was explicitly promoted by Prime Minister Victor Orbán's vision of Hungary as an illiberal democracy (Toth 2014).

Immediately after Orbán's Fidesz party won 54% of the vote in 2010, the constitution was changed. Couching these amendments in the name of a popular mandate, it gave the government control over constitutional judicial appointments and concentrated power in the executive (Schepple 2016). It is crucial to emphasise that these actions are not illegal. While formally in line with what a democratic system permits, by rejecting traditional epistemic authorities in favor of people's populist alternative fact opinions and fomenting a reliance on a single authority to champion this background knowledge, the nature of these activities is fundamentally altered, ultimately serving to change the configuration of practices that uphold a liberal democratic order.

Like Orbán, Jaroslav Kaczynski came to power in 2015 through a campaign employing post-truth practices that derided globalizing elites and emphasised restoring political institutions based on the will of the people (ibid: 14). More brazen than Orbán, however, the Law and Justice party of

Poland has been passing unconstitutional legislation and then simply refusing to publish the decisions of the constitutional courts (Schepple 2016: 31). With Orbán proclaiming Hungary's solidarity with Poland against an alliance that 'includes the bureaucrats and we may call it the [George] Soros empire' (Byrne 2017), the EU is under challenge. Far from suggesting that the project of European integration is coming to an end, the challenges represented by Hungary and Poland, coupled with Brexit, are indications that the spread of practices predicated upon a background knowledge that eschews expertise in favour of people's alternative-fact opinions presents unique challenges to the sustainability of EU's based expertise and science's epistemic authority. The latter, after all, enabled the verification practices and the type of knowledge transfer previous epistemic community scholarship has identified more generally. Thus, while post-truth practices challenge the expertise on which the post-World War II global order is based, the epistemic communities research program is short of tools to study it. It can study the role of science for policy making, but less what happens when science is delegitimised, which is another reason why we need to establish a broader communities of practice approach.[10]

Epistemic Communities' Two Research Programs

Embedding theory and research on epistemic communities in a pragmatist framework that links knowledge and power to practices suggests at least two kinds of programs on epistemic communities as communities of practice. The 'specific research program' follows, but can also improve, past studies of epistemic communities. As mentioned in the introduction, it is likely to be theoretically restrained and concerned with whether, how and why epistemic communities, understood as a special case of communities of practice, help affect, cause, or constitute international politics in fields where scientific, technical, and other types of social knowledge and practices are required. The short case study on verification arms control treaties has briefly illustrated this specific research program.

Alternatively, the 'expanding research program' is conceptually pluralistic, driven to explain international politics more broadly, and therefore theoretically expansive. This approach may conceive of epistemic communities, most likely together with other concepts, as part of a

[10] We thank Alena Drieschova for this insight.

mechanism or mechanisms aimed at explaining international politics more generally. The post-truth illustration briefly shows the benefits of an expanding research program. The two programs are equally useful and important; pursuing one or the other depends on scholars' research interests. Both programs, however, benefit from an epistemic community of practice perspective because they widen the ontology and stretch our understanding of how knowledge, practice and political power and authority interact.

Perhaps the most important payoff of an expanding program of epistemic communities of practice is the ability to explain world ordering from social epistemological and practical perspectives. Questions concerning the social epistemological foundations of international social orders, how and why they change, and how and why they are kept in a metastable condition come to mind. Particularly, we should study the propensity of post-truth practices to undermine the liberal international order – which is already highly contested and challenged by alternative background knowledge understandings, practices, and communities of practice – and the epistemological security of individuals and institutions around the world. A cognitive evolution approach (Adler 2019, also compare with Pouliot's evolutionary approach to practices in this volume), which focuses on collective learning and contestation within and between communities of practices, can shed light on world ordering processes and their epistemological and practical foundations.

Second, an expanded agenda on epistemic communities of practice may focus on the simultaneous change and meta-stability in global governance. Scholars have already linked epistemic communities to global governance (Cross 2013; Haas 2004), showing how problems become global thus requiring global institutional solutions. From this perspective, epistemic communities are the means by which knowledge is translated into power (Cross 2013). Scholars have also researched epistemic communities and global governance by looking at the proliferation of non-state actors and the diffusion of political authority, thus opening space for studying the roles of epistemic communities in the institutionalization of cooperation on global issues (Haas 2004). From an expanding program perspective, however, epistemic communities of practice would look at the role of practice in translating knowledge into power, and the role played by institutions and organizations in global governance. The approach would also look not only at how scientific, disciplinary and technical, but also social, legal and religious (Sandal 2011) habits of action,

practices, traditions and customs may become part of the explanatory mechanisms for the evolution of global governance at multiple levels (Enderlein et al. 2010; Hurrell 2007). Focusing on epistemic communities of practice may also help us better understand how in and through practice, norms and legal criteria acquire their normative and legal authority (Brunnée and Toope 2010). The emphasis, thus, would be less on how epistemic communities are empowered in a policy field, than on understanding how epistemic practical authority is created and maintained in and through practice (Adler 2019).

Third, we should consider expanding the scope of research on epistemic communities and social learning. The subject of learning has been part and parcel of the epistemic communities research program from the start (Adler 1992; Adler and Haas 1992; Dunlop 2009; E. Haas 1997, 2000; P. Haas 1992). An expanding program on epistemic communities that focused on learning, however, would look beyond how specific actors in specific fields learn from epistemic communities' frames and prescriptions. Such a program could take a couple of directions:

(1) There is the road already paved by Ernst Haas (1997, 2000) on the relationship between knowledge, learning and progress in international relations. An expanding program would look at how progressive practices aimed at reducing war, human misery, environmental degradation and human rights violations are generated within and between epistemic communities of practice and adopted by ever larger numbers of practitioners across geographical and functional borders.

(2) An expanding program may also focus on learning as communities of practice's core mechanism of expansion across space and time. This would mean studying learning as something that changes practitioners' ability to engage in practice, their understanding of why they engage in it, and the resources they have at their disposal to do so (Wenger 1998). Learning in this case means acquiring competence in, and knowledge about, a community of practice's meanings, and how to bargain in order to determine what these are. This would take us in the direction advocated by Cross (2013) of inquiring into the politics within epistemic communities.

(3) Finally, an expanding program may complement, and in some cases replace the study of interactive networks and fields in IR with the study of epistemic communities as communities of

practice. This would require looking at power not only from a hierarchical perspective, but also a horizontal one, as associated with negotiations of mutual relevance and standards of practice, peer recognition, identity and replication, and commitment to collective learning of practices. Such an agenda could also link the study of epistemic communities of practice to democracy, by examining not only how post-truth epistemic communities of practice undermine democratic practices and institutions, but also the epistemic and normative requirements for the promotion of democracy at national and regional levels.

An IR agenda that can explain the epistemic foundation of international relations requires theory that combines knowledge, power, and practice. Pragmatist philosophy is a fertile ground for inspiration regarding how these three concepts combine. We do not need to start from scratch, however. All we really need is to build on the fruitful research program of epistemic communities that was launched in IR more than twenty years ago. We need to embed this program's lessons in pragmatist and practice-driven social-theoretical understandings of knowledge as being inseparable from action, taking knowledge and practices as sources of authority for the construction of novel governance systems and international orders, and for the development of better understandings of learning and (albeit limited) human progress (Adler 2019; Linklater 2011).

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