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The Scientific Status of New Security Studies: A Critical Search for Epistemic Identity of Homeland and Civil Security Research

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Introduction

This chapter puts the contributions to this volume into perspective, focusing on the status of homeland and civil security as a field of research. It argues that the epistemic identity of this field can be provided by the overarching academic discipline of *new security studies.* The conceptual radical shifts from *security* as defense and war studies, military, grand strategy, and geopolitics to comprehensive *new security studies,*[1] including *homeland and civil security,* require an epistemological inquiry (i.e., a study of the nature and grounds of the knowledge in the field) to help evaluate their scientific status. An evaluation of the scientific status of a research program and its theoretical core assumptions should be differentiated from the epistemology of the evolution of the discipline to which the research program relates. *New security studies* and their novelty are defined by the following four pillars,[2] each of which have been addressed by chapters in this book:

- *"New security concepts"*—hybrid threats (see Chapter 1), human security, civilizational security, comprehensive approach, resilience (see Chapter 4 and also Chapter 12), etc.;
- *"New security subjects"*—biopolitics of security, financial security, security as ethics (see Chapter 10), etc.;

- *"New security objects"*—environmental security, food security, cybersecurity, health and pandemic security, border security (see Chapter 2), etc.; and
- *"New security practices"*—migration and insecurity, security technologies (see Chapter 7), commercial security practices, including management of industrial accidents (see Chapter 3), professional security practices such as leadership (see Chapter 9), intelligence (see Chapters 5 and 6), risk management (see Chapter 8), etc., as well as academic teaching practices (see Chapter 11).

Thus, new security studies are being discussed mainly through their ontological entities, with valuable contributions to the state of the art, though sometimes at the risk of confusing security ontology (what the nature of security is) with questions of its epistemology (how we can gain knowledge about security).

Any inquiry into the scientific status of new security studies as an overarching discipline for scientific inquiry into homeland and civil security should acknowledge that security belongs to hermeneutics, which is the study of society rather than of nature or built environment. In our field, this is probably best exemplified by "securitization" theory, which assumes that security issues do not appear and dissolve because the threat environment changes, but because dominant discourses transform.[3] The securitization of the European Union's external border and the creation of FRONTEX, for example (see Chapters 2 and 12), have been interpreted in this sense.[4] Further, when pursuing the evolution of a discipline or field, its conceptualization in ontological terms is crucial. This involves both theoretical and practical reasons. However, if the aspect of practicality that dominates security as a branch of knowledge is the reason for inquiring on its scientific status, its ontological entities might be used mistakenly to identify science as equal to practice.

This is of special relevance when referring to *new security studies* as an overarching frame of reference for *homeland and civil security research,* which itself is multidisciplinary. Therefore, the chapter will first discuss distinctions made in the evolution of security studies elaborating ontological entities. A discussion of new security studies in the context of classical and anti-classical epistemology will follow in order to determine its place in different epistemic contours. The evaluation of the scientific status of this branch will be carried out through the examination of different "demarcation criteria," as discussed in the study and philosophy of science and to be addressed below.

Beyond One Discipline

Questioning the scientific status of a discipline cannot be detached from the *epistemic culture* its branch of knowledge belongs to. When raising this question in new security studies, the relevant concept of epistemic culture is associated with relativism, constructivism, and securitization.[5] Security is no longer limited to the traditional policies and military tools of the nation-state, and is no longer considered dependent primarily on geopolitics and military strength. Security has expanded into a broad, comprehensive field that encompasses social, economic, environmental, and ethical models of analysis and tools of action. This comprehensiveness exposes the security-cultural *epistemic relativism* to intersubjective levels when different entities differ in the *ontological* concept of *security* and the balance between models of tools and actions. It increases the relevance of different approaches to *constructivist analysis* of how security threats, policies, and strategies emerge within the *securitization* of everyday life across borders.

There is no reason to suspect that homeland and civil security as a specific subject matter and field of study should be exempt from those implications of the postmodern condition. Issues acquire a security status and become securitized as a result of an intersubjective process involving a particular discursive and political force that, once established, enables policy makers to immediately adopt whatever means they deem appropriate to curb the threat.[6] Informed by Popper's critical approach to historicism,[7] new security studies need to explore the linkage between the ontology of disciplines, the scientific methods they use, and their political implications.

Following Popper's demarcation criterion between science and pseudoscience, new security studies will only be a science if they are open to be disproven, or "falsified," by the facts. As the following example from homeland security shows, this is not a theoretical construct but of direct practical relevance. In order to protect against potential terrorist threats, it may be legitimate to take preventive measures when there is a valid threat, yet insufficient evidence of an impending terrorist attack. This must be distinguished from taking measures against an alleged terrorist threat that may be a theoretical possibility, but for which there is no valid evidence present. Therefore, decision-makers in homeland security must be able to distinguish between scientific and pseudoscientific claims.

Security acquires a particular discursive and political force as it becomes concept related to action—securitizing (or de-securitizing) something—rather to an objective (or subjective) condition.[8] This consensual assumption risks being accused of using epistemology as a normative political force to criticize security

governance and the political management security problems. New security studies however entail much more than securitization studies. They as well reach beyond critical analysis of *"riskification,"* that is, how risk assessment is politically and socially managed rather than being threat-based, directly addressing causes of harm.[9] Rather, in broad terms, new security studies can be considered *holistic*: Within a particular research program, they are subjective, objective, and discursive; use different methods; address different levels and units of analysis; as well as use multi-method and multi-level analysis. New security studies are also *cross-disciplinary* in that perspectives from a variety of disciplines are actively involved. For example, security can be viewed through economics—as a perceived threat, like extreme energy-price volatility, global imbalances and currency volatility, infrastructure fragility, and regulatory failures. It can also be viewed in relation to national security and national power. In addition, new security studies have *multidisciplinary* characteristics because they involve people from different disciplines working on the same security topics to address them comprehensively, each contributing their specific disciplinary knowledge to the common effort.[10]

This is particularly relevant in homeland security practice and civil security research, which both are based on an all-hazards approach. Using the study of *vulnerability* as an example, the following Table 13.1 illustrates a holistic view on this topic by summarizing different relevant disciplinary perspectives and the practical recommendations that follow for vulnerability-reducing measures:

Table 13.1. Vulnerability in Multidisciplinary Perspective.

Discipline	View(s) of Vulnerability	Recommendation(s)
Geography	Vulnerability is determined by the use of hazard-prone areas	Land-use planning that takes into account hazards to reduce risk
Meteorology	Vulnerability is due to a lack of advanced warning of severe weather	Acquisition, creation, and effective use of warning systems
Engineering	Vulnerability occurs when structures and infrastructure cannot withstand the forces of hazards	Design and construction of buildings and infrastructure that promotes disaster resistance
Anthropology	Vulnerability emanates from constraining values, attitudes, and practices	Alter attitudes to discourage risk-taking practices and susceptibility

Discipline	View(s) of Vulnerability	Recommendation(s)
Economics	Vulnerability is related to poverty and results in an inability to prevent, prepare for, or recover from a disaster	Improve the distribution of wealth and purchase insurance to minimize losses and promote resilience
Sociology	Vulnerability is a product of inaccurate assumptions about disaster behavior and is related to race, gender, age, disability, etc.	Understand behavioral patterns in disasters and pay attention to needs of special populations
Psychology	Vulnerability is a function of overlooking or minimizing risk and not being able to cope emotionally with stress and/or loss	Help people to recognize risk and provide crisis counseling to enable resilience
Epidemiology	Vulnerability is susceptibility to disease or injury and is related to malnutrition and other health factors	Improve provision of public health/emergency medical care before, during, and after disasters
Environmental Science	Vulnerability is proneness to environmental degradation, which may change weather patterns and produce long-term disasters	Conserve natural resources, protect green space areas, and ensure that debris management is performed in an environmentally conscious manner
Political Science	Vulnerability is produced by the political structure and incorrect decision making	Alter structure of political system and educate politicians and legislators about disasters
Public Administration	Vulnerability results from misguided laws, the failure to implement policies effectively, and an inability to enforce regulations	Strengthen response and recovery capabilities through preparedness measures, improved policy implementation and increased code enforcement
Law	Vulnerability results from negligence, which is a failure to act as reason or legal statutes dictate	Understand the law, alter statutes, and ensure compliance to widely accepted ethical practices in emergency management

Discipline	View(s) of Vulnerability	Recommendation(s)
Journalism	Vulnerability is a result of insufficient public awareness about hazards and how to respond to disasters	Dispel myths about disasters, foster increased media capabilities, and educate the public about hazards
Emergency Management	Vulnerability is the lack of capacity to perform important functions before and after disaster strikes (e.g., evacuation, search and rescue, public information, etc.)	Foster public awareness about disasters and build capacities through hazard and vulnerability analyses, resource acquisition, planning, training, and exercises
Homeland Security	Vulnerability is due to cultural misunderstandings, permeable borders and fragile infrastructure, and weak disaster management institutions	Correct domestic and foreign policy mistakes, enhance counterterrorism measures, protect borders and infrastructure, and improve WMD capabilities

Source: David A. McEntire, "The Importance of Multi- and Interdisciplinary Research on Disasters and for Emergency Management," FEMA Emergency Management Institute, last accessed May 3, 2015, 15, https://training.fema.gov/HiEdu/docs//EMT/Chapter%20-%20Introduction.doc

In an ideal stage of evolution, new security studies would be *interdisciplinary,* integrating knowledge and methods from different disciplines by synthesizing approaches: for instance, integrating political science in homeland security decision-making thought, processes, and institutions (see Chapter 11); or integrating computer sciences and information management in cybersecurity strategy and cyber preparedness. That way, new security studies could become an overarching academic discipline for homeland and civil security research.

New Security Studies between Classical and Anti-Classical Epistemology

Classical epistemology that is concerned with the pursuit of truth with rationality or epistemic justification cannot serve the security researcher. This approach relates to an *individual* engaging in cognitive activity to arrive at a true belief and to avoid false belief. However, security studies cannot be described as a branch of an epistemology in its *individualistic* guise restricted to truth or justification.

In homeland and civil security research that rests on the vision of providing scientific knowledge to improve the creation of security as a public good and its delivery to the whole community of citizens, social epistemology—the study of the social dimensions of knowledge or information—is an important framework for security knowledge to be evaluated. New security studies thus belong to the branch of *social epistemology* that studies the evolution of security knowledge within social contexts and practices, such as securitization.

Social epistemology does not have a long history of systematic use. However, Plato, in his dialogue *Charmides,* can be seen as one who made a brief foray into the social dimensions of knowledge or rational belief. Plato posed the question of how a layperson can determine whether someone who purports to be an expert in an area really is one. The seventeenth and eighteenth century British philosophers John Locke, David Hume, and Thomas Reid used the term "testimony," asking, "When should cognitive agents rely on the opinions and reports of others?" and "What must a listener know about a speaker to be entitled to trust his assertions?" Locke's intellectual self-reliance doubted giving authority to the opinions of others. Hume took reliance on factual statements of others for granted only when there are adequate reasons for thinking that these sources are reliable. Hume's empiricism was grounded on personal observations that establish the veracity of human testimony. Reid, by contrast, related to our natural attitude of trusting others as reasonable even if little is known about their reliability.[11]

These epistemological positions are all practically relevant when describing the communicative profile of security knowledge. Threat detection and threat perception involve intersubjective relationship between experts/authorities/testimony and laypersons/listeners. Threat detectors differ in threat perceptions. Their audience might either doubt their assessment due to their intellectual self-reliance, might reject/accept the empirical observations that support their assessment, or even trust without proof.

Security knowledge also seems to fit into a different tradition, which focuses on aspects of knowledge that are *social* in a sociological or political sense. Karl Marx's theory of ideology could well be considered a type of social epistemology in which "ideology" is a set of beliefs, a worldview, or a form of consciousness that in some respects is false or delusive. These beliefs and their delusiveness derive from the social situation and interests of the believers.[12] In contrast, many approaches have focused on security as constituting something that needs to be secured: the nation, the state, the homeland, the infrastructure, etc.—almost to the extent of necessitating the conclusion that none of those would even exist if they did not need to be secured.

The *critical theory* of the Frankfurt School proclaimed, "[c]ritical theory aims at emancipation and enlightenment by making agents aware of hidden coercion in their environment, enabling them to determine where their true interests lie."[13] Jürgen Habermas, one of their exponents, introduced the concept of "ideal speech situation," a hypothetical situation of absolutely uncoerced and unlimited discussion between completely free and equal human agents, and described this speech situation as a transcendental criterion of truth. Though this notion of perfect cognitive symmetry is a valid epistemic standard, it cannot be applied to security knowledge, or to the assessment of its scientific quality. While critical thinking is important in all fields of security studies, based on its own set of research methods,[14] the generic properties of security knowledge cannot be reduced to the universal standard posited by critical theory, judging all knowledge on the basis of symmetry of power between speaker and listener. The reason for this is that security is about leadership (see Chapter 9) and involves differences in professional power and expertise reflected in the social epistemology of knowledge. Again, the argument is not that there is no place for critical thinking when it comes to security, but that the absence of the "ideal speech situation" does not preclude security knowledge being able to be formulated as scientific knowledge.

New security studies therefore have an anti-classical, social epistemology that rejects the classical concerns of epistemology with truth, justification, and rationality and seeks to understand a selected community's norms of rationality. It also rejects the notion that this discipline of knowledge has universal or "objective" norms of rationality, or criteria of truth, that it could appropriately invoke. Security studies are neither context-free nor do they establish norms of rationality without cultural roots and limitations. At the same time, the epistemic effort of new security studies cannot be isolated from disciplines in which rationality is a natural objective norm. For instance, analyzing security threats that stem from environmental disciplines might involve molecular biology, genetics, chemistry, etc., that do evoke rationality as a legitimate objective norm. Another example is the theorizing process in cybersecurity that integrates different technology disciplines to various problematic fields of security. Homeland and civil security research cannot be detached from its transdisciplinary profile, and the question of the scientific status of a research program in security studies, in this case, is the scientific status of a transdisciplinary set of knowledge.

A crucial challenge for new security studies as a transdisciplinary research process relates to the complexity of the problems it seeks to understand: the diversity of life; scientific perceptions of problems it takes into account; the link to abstract and case-specific knowledge; and the development of knowledge and

practices that promote what is perceived to be the common good.[15] In this process, engaging research and collaboration between disciplines are the means of meeting all these requirements. Thus, if the evaluation of scientific status were to be made according to the demarcation between *science* and *pseudo-science,* through *informal logic* and *rational argumentation*, this challenge could possibly be overcome. Due to the practical implications of the transdisciplinary study of security, the demarcation criterion is important for decision support and we need to distinguish its scientific knowledge from its look-alikes. Because of the high relevance of security in today's societies, the need for demarcation is not only important for the validity of the social epistemology of security research, but also of high practical relevance.

However, although the demarcation criterion could be applied to evaluate the scientific status of a research program in security studies on the grounds of practical benefits one may gain, such an approach is opposed to Popper's demarcation based on empirical falsification. According to Popper, a theory—or in a broader sense the validity of knowledge—in the empirical sciences can never generally be proven, but it can only be falsified on a case-by-case basis, meaning that it can and should be scrutinized using specific experiments. Falsifying a theory that has reached its transformation to practical applications could add to the challenge of evaluating a transdisciplinary research program for homeland and civil security and its underlying assumptions. Therefore, a careful analysis of the status of new security studies through the demarcation criterion is necessary.

New security studies cannot be reduced to a single branch of knowledge, due to their comprehensive and transdisciplinary profile, and its proximity to practice and co-evolution with real-world security policies and programs raises the question of its scientific status. This needs clarification. The English word "science" is primarily used for the natural sciences and other fields of research that are considered similar to them. Hence, political economy and sociology are considered sciences, whereas studies of literature and history are not. The corresponding German word "Wissenschaft" covers all academic specializations, including the humanities, and has the advantage of more adequately delimiting the type of systematic knowledge that is in dispute in the conflict between science and pseudo-science. New security studies, like the natural sciences, social sciences, and the humanities, are part of the same human endeavor, namely, systematic and critical investigation aimed at acquiring the best possible understanding of the workings of nature, people, and human society.

The disciplines that form this community of knowledge are increasingly interdependent. Integrative disciplines such as evolutionary biology, biochemistry,

ecology, the neurosciences, and game theory play a role in conceptualizing new security studies today and thus contribute to linking previously unconnected disciplines.[16] These interconnections have brought the sciences and the humanities closer to each other. Evolutionary biology theory, for instance, has been considered as evolutionary thinking in global challenges in the areas of food security, emerging diseases, and resilience. Biochemistry contributes to this challenge, to the industrial manufacture of strategic weapons and even to relevant ethical dilemmas of the Biological and Toxin Weapons Convention (BWC) and the Chemical Weapons Convention (CWC). Improving the latter cannot be done without biologists, chemists, and researchers from a variety of other disciplines whose work helps assess dual-use implications, including researchers from the humanities.

The question remains of what demarcation criteria should be applied to assess the scientific status of new security studies. Should they be evaluated through a research program, an epistemic field, or cognitive discipline (i.e., a group of people with common knowledge aims and practices), a theory, a practice, or a scientific inquiry? The answer is that new security studies cannot be reduced to any one of these levels, as argued in the following.

The Scientific Status of New Security Studies under Alternative Demarcation Criteria

Although focused on international and strategic security rather than homeland and civil security, the new edition of Barry Buzan's book *People, States, and Fear: An Agenda for International Security Studies in the Post-Cold War Era* (2009) provides a model for our discipline as well, since it offers constructivist and ethical reflections that no longer reduce security as such to positivist and rationalist epistemologies.[17] New security studies as an overarching academic discipline for the analysis of homeland and civil security in fact follow a constructivist and interpretive epistemology, with new quality criteria for its knowledge, such as being plausible; meeting social needs; underpinning values; helping to build and maintain communities; etc.—in addition to the traditional, rational(ist) criteria of validity, reliability, and objectivity. Based on this, the following four demarcation criteria are proposed to determine the scientific status of new security studies: *falsificationism*; *puzzle solving*; *scientific progress*; and *multi-criteria approaches*.

Falsificationism was introduced by Popper, who rejected, as mentioned above, verifiability as a criterion for a theory or hypothesis to be scientific, rather than pseudo-scientific or metaphysical. To be ranked as scientific, a theory should be

falsifiable and must be capable of conflicting with possible or conceivable observations. However, a theory of security is almost impossible to refute or falsify. New security studies have become a diverse branch of knowledge in which a weak and limited theory can never really be thrown away. Once *verified* under limited conditions, it will typically become part of the established set of knowledge and assumptions and be followed by researchers. It may even resist logical and practical falsification, as arguably security policy may as well.

This also applies to Thomas Kuhn's criterion of *puzzle solving*.[18] Kuhn divided the process of doing science into "normal science" and "extraordinary science." In normal science, the scientist's activity consists of solving puzzles rather than testing fundamental theories. In puzzle solving, current theory is accepted, and the puzzle is defined in its terms. Kuhn's own demarcation criterion is the capability of puzzle solving, which he sees as an essential characteristic of normal science. However, since Kuhn's view develops into paradigm shifts in which a jettisoned paradigm is atrophied when no longer useful for solving puzzles, it becomes similar to Popper's falsificationism. The only difference is in the volume of the research scope. Popper refers to the scope of a theory, while Kuhn refers to the scope of a paradigm. Since both can be invalid as different demarcation criteria, they cannot be used to demark new security studies as a scientific or pseudo-scientific branch of knowledge. A good example is the development of the different generations of dominant paradigms in security studies, such as the post-behaviorist and constructivist approaches that followed the behaviorist one. Behaviorism is still relevant to new security studies, not as a dominant paradigm but as one adapted alongside other paradigms. In homeland security and emergency management for example, assumptions on response to perceived threat (such as evacuation behavior) as well as models for societal resilience still rest on behaviorist reasoning.

The criteria based on *scientific progress* follow Imre Lakatos, who rejects Popper's demarcation criterion that focuses on the theory level and expands it to become "sophisticated" (methodological) falsificationism.[19] Instead of applying it to an isolated hypothesis or theory, he refers to this criterion as a whole research program that is characterized by a series of theories successively replacing each other. In his view, new security studies can be considered as a scientific branch if its progress is in new theories that make surprising predictions that are confirmed. In contrast, they would be considered a degenerating research program if characterized by theories being fabricated only in order to accommodate known facts:

> Progress in science is only possible if a research program satisfies the minimum requirement that each new theory that is developed in the program has a larger

> empirical content than its predecessor. If a research program does not satisfy this requirement, then it is pseudo-scientific.[20]

According to Lakatos' demarcation criterion, new security studies in general, and homeland and civil security research in particular, are scientific epistemic fields. They are far from being described as a degenerating research program. Since they possess the requirement of being adequately integrated into other sciences and are incorporated into the existing network of established sciences, they are fully in line with the criteria of a progressive research program. Lakatos's demarcation criterion can be used to identify new security studies, including homeland and civil security research, as a science when combined with the following criteria to rule out pseudo-science or pseudo-scientific practice. According to Mario Bunge, pseudo-science may be "diagnosed" using the following criteria:[21]

- *Belief in authority*: It is contended that some person or persons have a special ability to determine what is true or false. Others have to accept their judgments.
- *Unrepeatable experiments*: Reliance is put on experiments [or quasi-experiments and case studies] that cannot be repeated by others with the same outcome.
- *Handpicked examples*: Handpicked examples are used although they are not representative of the general category that the investigation refers to.
- *Unwillingness to test*: A theory is not tested although it is possible to test it.
- *Disregard of refuting information*: Observations or experiments that conflict with a theory are neglected.
- *Built-in subterfuge*: The testing of a theory is so arranged that the theory can only be confirmed, never disconfirmed, by the outcome.
- *Explanations are abandoned without replacement*: Tenable explanations are given up without being replaced, so that the new theory leaves much more unexplained than the previous one.[22]

Our research enterprise mainly is co-evolving with the mission space of the real-world homeland security enterprise, to which it seeks to offer problem solving as well as critical thinking related to policies and strategies aiming at averting harm from societies. It thus can be identified as: a scientific field that progresses through new assumptions and theories that can be confirmed by current reality, but that might not be repeated by others; might be resistant to more thorough testing as long as they seem to work in reality, with practical value; and might neglect

conflicting observations and stick to theories and assumptions that can only be confirmed, but not refuted (or falsified).

While the grant-driven and end-user needs-based evolution of security research may be seen to add to these risks of making new security studies a pseudo-science, the strong focus of security research on tangible results and consortia that are multidisciplinary by design and involve industrial research and development (see Chapter 12) certainly adds to the scientific status of the field. While on a good way, we as a community of scholars need to maintain the momentum in our effort to avail homeland and civil security research a valid epistemic identity within a field of new security studies that is consolidating its scientific status. At the same time, we need to bear in mind that while there is a set of features that are characteristic of science, every part of science will have some of these features, but not any part of science can be expected to have them all.[23]

Conclusion

The contributions to this volume have demonstrated how cross-disciplinary perspectives—including practical accounts of single cases and threat environments, as well as comparative studies of homeland security policies—can collude to foster the common goal of advancing a common epistemic field and share practices of scientific inquiry (see Part I of this book, Chapters 1–4). This chapter has discussed how the scientific status of the evolving field can be evaluated according to several demarcation criteria as they derive from major results of the study of science. The recent emphasis of transversal aspects of the field and of critical thinking (see Part III of this book, Chapters 9–10), including a critical perspective on the inquiries' own limitations and risks (e.g., ethical issues as addressed in Chapter 10), roots homeland and civil security research still stronger within the overarching discipline of *new security studies*. To further forge its epistemic identity supported by forward-looking programming (as addressed in Part IV of this book, Chapters 11–12), and maintain its scientific status and its utility (i.e., to remain practically relevant), homeland and civil security research will need to maintain multi- and cross-disciplinary approaches (as exemplified in Part II of this book, Chapters 5–8) to vulnerability assessment, to resilience enhancement, and to many other objectives, both scientific and practical. It will also need to remain open to reviewing the epistemology of the homeland and civil security field of research as well as that of the evolving real-world mission space, such as

the main assumptions about the threats that constitute the homeland security enterprise and the civil security model.

Notes

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1. J. Peter Burgess, ed., *The Routledge Handbook of New Security Studies* (Milton Park: Routledge, 2010).
2. Ibid., own examples added.
3. Constructivism and the Copenhagen School's theory of securitization are particularly relevant here. A seminal source is Thierry Balzacq et al., "Forum: What Kind of Theory—If Any—Is Securitization?" *International Relations*, first published on October 21, 2014 as doi:10.1177/0047117814526606, http://ire.sagepub.com/content/early/2014/10/27/0047117814526606.full.pdf+html; see also Thierry Balzacq, ed., *Securitization Theory: How Security Problems Emerge and Dissolve* (London and New York: Routledge, 2011).
4. Andrew W. Neal, "Securitizing and Risk at the EU Border: The Origins of FRONTEX," *Journal of Common Market Studies* 47 (2009).
5. See Mike Bourne, *Understanding Security* (Houndmills, Basingstoke: Palgrave Macmillan, 2014), chapter 3: "Critical Approaches and New Frameworks," 50–70.
6. Barry Buzan, *People, States & Fear: The National Security Problem in International Relations* (Chapel Hill: University of North Carolina Press, 1983); Barry Buzan and Lene Hansen, *The Evolution of International Security* (Cambridge: Cambridge University Press, 2009); Balzacq, *Securitization Theory*; Balzacq et al., "Forum: What Kind of Theory—if Any—Is Securitization?"
7. Karl Popper, *The Open Society and Its Enemies* (London: Routledge, 1945).
8. Balzacq, *Securitization Theory.*
9. Olaf Corry, "Securitisation and 'Riskification': Second Order Security and the Politics of Climate Change," *Millennium: Journal of International Studies* 40 (2011).
10. David A. McEntire: "The Importance of Multi- and Interdisciplinary Research on Disasters and for Emergency Management," in *Disciplines, Disasters and Emergency Management: The Convergence and Divergence of Concepts, Issues and Trends from the Research Literature,* ed. David A. McEntire (Springfield, IL: Charles C. Thomas, 2007), 6 [also available in an e-book version: Emmitsburg, MD: FEMA Emergency Management Institute, https://training.fema.gov/hiedu/aemrc/booksdownload/ddemtextbook]

11. Alvin Goldman, "Social Epistemology," in *Stanford Encyclopedia of Philosophy,* ed. Edward N. Zalta, last published August 18, 2006, chapter 1, http://plato.stanford.edu/entries/epistemology-social
12. Ibid.
13. Ibid.
14. See Mark B. Salter and Can E. Mutlu, eds., *Research Methods in Critical Security Studies: An Introduction* (New York and London: Routledge, 2013); Laura J. Shepherd, ed., *Critical Approaches to Security: An Introduction to Theories and Methods* (New York and London: Routledge, 2013).
15. Gabriela Wuelser, Christian Pohl, and Gabriela Hirsch Hadorn, "Structuring Complexity for Tailoring Research Contributions to Sustainable Development: A Framework," *Sustainability Science* 7 (2011).
16. See CEUSS | Center for European Security Studies, Sigmund Freud University Vienna, "Roadmap Proposal for the Development of a Trans-disciplinary Security Research Paradigm," deliverable 8.3, EU security research project FOCUS (Foresight Security Scenarios—Mapping Research to a Comprehensive Approach to Exogenous EU Roles), March 2013, http://www.focusproject.eu/documents/14976/63ec147d-c599-4d61-b2c7-be3d4590d3ea
17. Barry Buzan, *People, States & Fear: The National Security Problem in International Relations* (Boulder, CO: Rienner, 2009).
18. See Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago, IL: University of Chicago Press, 1962).
19. See Imre Lakatos and Alan Musgrave, eds., *Criticism and the Growth of Knowledge* (Cambridge: Cambridge University Press, 1965).
20. Sven Ove Hansson, "Science and Pseudo-Science," in *Stanford Encyclopedia of Philosophy,* ed. Edward N. Zalta, last published February 10, 2014, chapter 4.4, http://plato.stanford.edu/entries/pseudo-science, http://plato.stanford.edu/entries/pseudo-science
21. Mario Bunge, "Diagnosing Pseudoscience," in *Philosophy in Crisis. The Need for Reconstruction*, by Mario Bunge (Amherst, NY: Prometheus Books, 2001).
22. Hansson, "Science and Pseudo-Science," chapter 4.6.
23. Cf. ibid.