1 Risk, Responsibility, and Their Relations

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1.1 Introduction

Risk and responsibility are fertile topics of philosophical investigation. Often, but not always, they are considered separately. While responsibility has a long and varied history, risk as a topic of philosophical focus, in ethics at least, is not as longstanding (Erman and Möller 2018, 207; Hayenhjelm and Wolff 2011, E27). This volume examines risk and responsibility as continuous topics. That is, in its broadest formulation, the volume's contributions consider some of the many ways in which risk and responsibility relate to each other and combine in philosophy. Such combination, as this book shows, is not limited to a single account of risk or responsibility, nor is it applied to just one issue or within a lone context.

The contributions to this volume examine responsibility and risk by addressing issues that arise out of their interplay within various contexts, whether conceptual, legal, bioethical, technological, or environmental. As such, they raise new and challenging issues across a multitude of philosophical areas of investigation and, ultimately, scrutinize the complexities of the modern world through the lens of risk and responsibility. This points to why risk and responsibility merit such special attention: risk and responsibility, often but not always formulated as responsibility for risks, are at the heart of many central problems of the modern age. Moreover, discussions of how risk should be incorporated into moral and political theories, in which responsibility is a central concept but the concept of risk is less often addressed, are of central and growing interest in philosophy. Such academic interest is supplemented by the fact that risk management with its attendant responsibilities has become a topic of increased public concern (e.g., pandemic risks). Thus, a foray into the topic of risk and responsibility, examined in different contexts and applications, has now become crucial for understanding much of our present world and for guiding its future.

The spectra of topics and themes considered by contributors to this volume represent areas of research that continue to generate intense discussion. Part I problematizes the idea of control within both responsibility and risk conceptualizations. Part II addresses problems related to risk and responsibility that arise within the law in pre-trial detention and in the statistical use of probabilities in courts. Part III tackles considerations related to risk and responsibility in bioethics by examining luck egalitarianism, responsible risking, and public health risks. Part IV considers issues of risk and responsibility across the technological field by examining the role of emotions in the responsible innovation of risky technologies, artificial intelligence (AI), and radioactive waste management. Part V addresses the topic within environmental ethics by examining a host of considerations pertaining to individual climate risks and resilience.

Regardless of the perspective adopted on the topic at hand, exploring the relationships between responsibility and risk requires clear notions of each. This introduction focuses on doing just that, analyzing risk and responsibility separately and allowing their synthesis and application to come out primarily in the volume's constitutive chapters. This introduction does, however, identify the concepts and topics explored and elaborated in the respective chapters. In this way, the introduction helps to contextualize and explain the concepts of risk and responsibility, and it also helps to make sense of the relationships between them as discussed in the rest of the volume.

The rest of this introduction starts with an examination of the concept of risk, detailing some of its definitions, dimensions, and conceptualizations. This is followed by an exploration of the concept of responsibility, which outlines some of its senses and dimensions. As noted, these sections are not meant to be exhaustive treatments but rather introductions to the topic by way of outlining its constituent parts. Finally, an overview of each of this volume's contributions highlights the ways that this volume brings together the concepts of risk and responsibility.

1.2   Risk

Philosophical interest in risk has been intensifying. This is understandable, in part, because of the pervasiveness of risks. Consider, for example, that most of our decisions are made under conditions of risk or uncertainty about the possible consequences of our actions or omissions (e.g., what career to choose, whether to cross the street). Moreover, growing interest in the topic seems also attributable, at least partly, to relatively new concerns, such as the risks posed by anthropogenic climate change, new, emerging, and future technologies, as well as the use of preemptive legal measures. This diversity of interests has meant that, similar to responsibility (as we

will see), risk has accrued many senses (Bradbury 1989; Hansson 2004; Renn 1992; Shrader-Frechette 1991; Thompson and Dean 1996).

1.2.1 Definitions

There is not one definition of risk; there are many. This is because the concept of risk is used in a variety of disciplines with different specialized meanings but also in everyday life where the meaning of risk tends to be much looser (i.e., non-specialized). Both the specialized and non-specialized understandings of risk are important, and any precedence of one over the other seems to depend on, *inter alia*, one's context and aims.[1] The following section will provide an overview of some definitions of risk as well as detail dimensions of risk that can illuminate the concept.

In everyday life, in non-specialized contexts, risk usually refers to something undesirable that is possible but not certain to occur. For example, a parent might tell their child to wash their hands after playing outside because they might get sick otherwise. The risk in the example is the risk of sickness, which is an undesirable outcome that may or may not occur.

In specialized or technical domains, risk admits of many perspectives depending on the area of investigation (e.g., psychology, economics, engineering, sociology, philosophy).[2] Categorizing risk conceptions across various disciplines is a challenging task; however, Hansson (2004, 10) provides a list of conceptions of risk that is a useful guide to the more prominent uses of the term:

1. Risk as an *unwanted event* that may or may not occur
2. Risk as the *cause* of an unwanted event that may or may not occur
3. Risk as the *probability* of an unwanted event that may or may not occur
4. Risk as the fact that a decision is made under conditions of *known probabilities* (this is a decision under risk, which is usually contrasted with a decision under uncertainty)
5. Risk as the statistical *expectation value of unwanted events* that may or may not occur

Hansson's example of the risks associated with cigarette smoking can help clarify the differences in the meanings of risk mentioned above. Consider, then, that:

> Lung cancer is one of the major risks (1) that affect smokers. Smoking also causes other diseases, and it is by far the most important health risk (2) in industrialized countries. There is evidence that the risk (3) of having one's life shortened by smoking is as high as 50%.

> The total risk (4) from smoking is higher than that from any other cause that has been analyzed by risk analysts. The probabilities of various smoking-related diseases are so well-known that a decision whether or not to smoke can be classified as a decision under risk (5).
>
> (Hansson 2004, 10)

Hansson's list of risk conceptions is not exhaustive. Moreover, there is no consensus over either the definition or conception of risk that is best suited for philosophical investigation. Some philosophers (Buchak 2014; Pritchard 2015; Shrader-Frechette 1991) criticize the specialized definitions as being too narrow, and the non-specialized everyday sense of the term risk is sometimes favored.

Despite differences, all the definitions have in common the fact that they regard risk either to be or involve something undesirable about which there is some lack of knowledge regarding its occurrence. With regard to knowledge, the first two definitions of risk are non-probabilistic, while the last three refer to probabilities. In other words, we can say that the last three, as opposed to the first two definitions, seek to quantify the degree of knowledge an individual has over the possible occurrence of the unwanted event by employing the notion of probability. The question then becomes what probability is.

1.2.2   Probability

Probability interpretations seem to be no less abundant than those of risk. The complexities of understanding probability are so challenging, in fact, as to prompt Bertrand Russell to state: "Probability is the most important concept in modern science, especially as nobody has the slightest notion what it means" (Stevens 1951, 44). Interpretations of probability are varied (e.g., classical, logical/evidential, subjective, frequentist). However, it bears noting that all probability interpretations agree on at least the fact that probabilities are numbers between zero and one that can attach to certain types of propositions and subjected to a probability calculus (e.g., Kolmogorov's Probability Calculus, Bayes' Theorem).[3] If an event cannot occur, then its probability is zero; while if an event is certain to occur, its probability is one.

In line with the current philosophical literature on the topic, the following will focus on the objective and subjective interpretations of probability, which give us the objective and subjective understandings of risk. Briefly stated, the subjective interpretation views risk and probability as, fundamentally, a matter of some kind of belief; the objective interpretation regards them as features of the world that exist, in a relevant sense, independently of human belief.

To the former, the subjective Bayesian theory sees the probability of a proposition as someone's degree of belief, credence, or confidence in that proposition.[4] For example, for Jane, the probability that it will rain tomorrow is her degree of belief that it will rain. If her degree of belief is 1/3, then her degree of belief that it will not rain is 2/3; her degree of belief that it will either rain or not rain is 1. We might say, then, that probabilities in the Bayesian theory are numerical measures of particular individuals' confidence in some proposition(s). These measures can be arrived at in different ways depending on one's version of the theory (e.g., on the basis of agents' betting behaviors).[5]

Some versions of the subjective theory posit that objective probabilities (e.g., frequencies, propensities) do not exist and that the only measure of probability is individualistic. One difficulty with such a view is that probability judgments can vary widely from person to person, especially in the absence of constraints on what ought to count as a rational belief. Consider Gillies' version of the subjective theory in order to see this:

> Probability is […] defined as the degree of belief of a particular individual, so that we should really not speak of the probability, but rather Ms. A's probability, Mr. B's probability or Master C's probability.
>
> (Gillies 2000, 53)

Such an interpretation of probability would give rise to as many estimations of risk as there are beliefs with potentially no way of privileging one over the other (Oberdiek 2017, 22). Such an extreme version of a personalist account can be tempered by constraints of what counts as a rational belief, by coherence demands or by referring to the evidence for one's beliefs. It should be noted, however, that the latter would still depend on one's subjective evaluation of the support that the evidence provides to one's beliefs (Oberdiek 2017, 22). Nevertheless, versions of the Bayesian theory that posit, *inter alia*, norms requiring that degrees of belief respect the axioms of probability, empirical norms that require an agent's degrees of belief to be calibrated with her evidence, and logical norms that require degrees of belief underdetermined by evidence to be as equivocal as possible can rein in the pitfalls of subjectivity.

In turn, objective accounts of risks typically rely on frequentist interpretations of probability.[6] Frequentists view a risk of an event, E, as the frequency with which E occurs in the general population or some other reference class that is selected. The frequency with which the risk manifests in the reference class is taken to be an objective and scientifically verifiable fact. For example, the probability that a man over the age of 60 is

diabetic equals the proportion of men over the age of 60 (the reference class) who are diabetic.

In spite of differences between versions of the frequentist theory, probability can be defined in accordance with a frequentist view as relative to a reference class that must be general, infinite, or at least very large (Gillies 2000, 88–112). Thus, probability in this theory is conceived in general terms. Reference is made to general attributes (e.g., diabetes) and general reference classes (e.g., men over 60), which raises the reference class problem and the problem of the single case. The former appears because probability for the frequentist is, basically, the long-run frequency of repeatable experiments. For example, the probability that a fair coin will land tails is 0.5 because were we to flip the coin enough times, we would get tails 50% of the time. However, singular, unique events are not repeatable by definition. To capture the problem of the single case for the frequentist theory, consider Reichenbach's take on it:

> I regard the statement about the probability of the single case, not as having a meaning of its own, but as representing an elliptical mode of speech. In order to acquire meaning, the statement must be translated into a statement about a frequency in a sequence of repeated occurrences. The statement concerning the probability of the single case thus is given a fictitious meaning, constructed by a transfer of meaning from the general to the particular case.
>
> (1949, 376–7)

Then, we also have the problem of the reference class. This is associated with the fact that the probability of an event occurring can change depending on how it is classified, and the same event can be classified in a variety of ways on the basis of it belonging in different reference classes.[7] The reference class problem appears in Venn (1876, 194), where he writes: "It is obvious that every individual thing or event has an indefinite number of properties or attributes observable in it, and might therefore be considered as belonging to an indefinite number of different classes of things." There is yet no established solution to the above problems for the frequency theory (Oberdiek 2017, 27).

1.2.3   Risk and Uncertainty

Having outlined some of the main interpretations of probability and some of their problems, we can return to the "lack of knowledge" aspect that was present in all of the definitions of risk stated earlier. To this, it bears to note that, in decision theory, lack of knowledge is categorized into two main types: risk and uncertainty. Thus, a distinction between risk and

uncertainty is drawn, and this can be said to follow the probabilistic/non-probabilistic divide mentioned before. Knight draws the distinction in the following way:

> To preserve the distinction [...] between the measurable uncertainty and an unmeasurable one we may use the term "risk" to designate the former and the term "uncertainty" for the latter.
>
> (Knight 1921, 233)

In decision-making under risk, possible outcomes and their probabilities are known; while in decision-making under uncertainty, probabilities are either not known at all or known with insufficient precision (Hansson 2004, 11). It is not often that probabilities are known with certainty; however, when data is available, it becomes possible to determine probabilities that can be called objective in the frequentist sense (Möller 2012, 63). Often, frequency data will have to be supplemented or perhaps even supplanted by expert judgment (Ibid, 63). Such expert judgments cannot be construed as objective fact, but it is not merely subjective (in the classical sense) either because, as noted before, subjective probabilities measure a person's degree of belief that may need to satisfy various norms (e.g., probability axioms, logical norms) but need not correlate with objective frequencies (Ibid). Thus, such expert judgments might be better described as subjective estimates of objective probabilities (Ibid).

Knightian uncertainty refers to cases where we lack probabilities, but it should be noted that some theories seek to measure uncertainty by reducing it to probability.[8] For example, for subjectivist theories, probability represents all aspects of a decision-maker's lack of knowledge (Ibid, 65). Bayesians conceive all rational decisions as admitting of probabilities because for them rational decision-makers always assign a probability value to each potential outcome be it implicitly or explicitly (Ibid). Faced with new information, agents may also change their probability assessments (in accordance with Bayes' theorem), but they always assign determinable probabilities to all states of affairs (Ibid).[9]

1.2.4 Disvalue

The above sections sketched out some of the ways in which we might come to understand the lack of knowledge aspect that is present in all of the definitions of risk provided at the outset. There is yet one other aspect that is common to most interpretations of risk, be it in an implicit or explicit manner; namely, risk refers to something negative, unwanted, which is to be avoided. It is actually this feature of risk that most easily connects to responsibility questions in virtue of its normativity. If something should be

avoided, then questions about whose responsibility it is to avoid it (prospective responsibility sense) and questions about whose responsibility it is if it is not avoided (retrospective responsibility sense) can arise.

In order to avoid charges of triviality, the negative dimension of risk is usually construed as some kind of harm. This construal has the added advantage of providing a unique currency that can be measured and compared. Nevertheless, this is easier said than done. The concept of harm might be basic, but it is not devoid of controversy when it comes to its conceptualization. Harm can be defined as a setback to interests, but this popular conception is not without problems. For example, some critics have pointed out that defining harm in terms of interests is defining one unclear concept in terms of another unclear concept (Miller 2010, 119). Furthermore, although some cases of harmfulness might be easily compared (e.g., losing two arms is worse than losing one, a severed spine is more serious than a headache), many harms are exceedingly difficult to measure and/ or compare (e.g., how do we measure psychological harms, how many headaches equal a severed spine, how do we conceive of the harm of a species becoming extinct). Even when you restrict harm to just one kind – the harm of death – questions remain, such as: Is death a harm (not for the Epicurian)? Is the harmfulness of an 80-year-old's death the same as that of 19-year-old's? Is the harmfulness of the death of a cancer patient who is in severe chronic pain the same as that of a healthy 21-year-old? Measurements that consider both the quantity and the quality of life, such as HALY (health-adjusted life years) with its types, QALY (quality-adjusted life years), and DALY (disability-adjusted life years), are controversial and measuring and comparing the severity of harms remains a contested area.

1.2.5   *Multidimensional Conceptions*

The two dimensions of risk considered above, lack of knowledge and adverse consequences, can be found in many risk conceptions and are constitutive of the most common definition in risk analysis, which equates risk to the expected value of unwanted events. However, there are other interpretations of risk, which introduce new dimensions. Typically, conceptions of risk in psychology, social science, and moral theory are sensitive to contextual factors as well, and they include different aspects within their risk conceptualizations besides the two that were mentioned, such as who runs the risk, whether the risk is imposed or voluntarily incurred, or whether the risk is natural or human-made (van de Poel and Fahlquist 2012, 881). The following will highlight some of these conceptions, albeit in brief, in order to exemplify the rich diversity of views on the topic.

The psychological literature on risk, which has been developing since at least the 1960s, has shown that lay people include a variety of elements

in how they perceive and understand risks (Slovic 2000). Such elements include fear, perceived benefits, time delays, voluntariness, familiarity, controllability, catastrophic potential, and exposure (van de Poel and Fahlquist 2012, 881). Studies have found large differences between so-called real or objective risk and perceived risk in some cases. To exemplify, Lichtenstein et al. (1978) found that bad outcomes that were easier to recall tended to be thought of as more likely to occur. This phenomenon is described as the availability heuristic (Tversky and Kahneman 1974). Risk assessment is also driven by affective states. Lay people tend to exploit the so-called affect heuristic, which refers to the fact that people make judgments based on representations of objects or events that are marked with valenced affect (Slovic et al. 2002). Sometimes the fact that lay people employ different views and estimates of risk than experts is seen as a sign of their irrationality (van de Poel and Fahlquist 2012, 881). However, this interpretation presumes that the technical conception of risk is the right one and that lay people should be educated to comply with it and that, were they to be so educated, they would come to understand risk in line with its objective understanding (van de Poel and Fahlquist 2012, 881). However, many authors have argued that the elements included by lay people in their risk conceptualizations are relevant (e.g., for risk acceptability and management) and provide richer and sometimes more appropriate conceptions of risk than those of the experts (e.g., Roeser 2006, 2007; Slovic 2000).

Other richer conceptions of risk come from the literature on risk ethics. Traditionally, ethical theories have dealt with assessing moral problems in contexts of certainty where actions were assumed to have determined outcomes. This may have been because of the benefits of keeping at least some things relatively free from complicating factors, as well as the assumption of a division of labor between ethics and decision theory. Contending with problems associated with a lack of knowledge was seen as a task belonging to decision theory (Hansson 2003, 291).

Moreover, the major ethical branches, such as deontology, utilitarianism, and contractualism, suffer from particular weakness when it comes to considering risk within their respective frameworks due in part to their theoretical commitments and to the fact these were adopted with the implicit assumption of certainty vis-à-vis outcomes.[10] Still, contemporary philosophers have recognized that risks are pervasive, introduce genuine ethical dilemmas, and so they must be dealt with in spite of the many challenges they bring.

The diversity of ethical views on the topic is great, but with regard to assessing the moral acceptability of risks, many agree that this depends on more factors than those allowed by the standard technical definitions (i.e., the probability of harm combined with the severity of harm). Relevant factors include voluntariness, justice considerations, rights-based

considerations, risks/benefits distribution, responsibilities (e.g., role responsibility), justifiability, and the availability of alternatives (Asveld and Roeser 2009; Caney 2009; Hansson 2009; Kermisch 2012; Shrader-Frechette 1991; Thomson 1986; van de Poel et al. 2012). Interestingly, Jonathan Wolff (2006) develops a new model of the anatomy of risk, which integrates several other factors, including responsibility-related ones, in the definition of risk besides probability and magnitude of harm. Wolff argues that to provide an adequate account of the factors that must be included in order to decide how to manage particular risks, attention must be given to cause, hazard, probability, fear, blame, and shame. In this way, Wolff explicitly connects factors from public perception and responsibility within the definition of risk itself. With regard to the latter, different human-made risks may be different in acceptability depending on whether they were caused by culpable or non-culpable behavior and on the type of culpable behavior (e.g., malice, recklessness, negligence, or incompetence) that caused them.

In the social sciences, we find many conceptions of risk, but perhaps the most influential has been that of Ulrich Beck (1992). In *Risk Society*, Beck writes about the many definitional struggles surrounding risks (e.g., over their scope and scale, degree, and urgency), the multitude of definitions themselves, as well as the agglomeration of misunderstandings and antagonisms given these issues (Placani 2017). Beck advances his own understanding by writing that: "Risk may be defined as a systematic way of dealing with hazards and insecurities induced and introduced by modernization itself" (Beck 1992, 21). The definition he provides ties the concept of risk to that of reflexive modernization, which is Beck's call to confront and reflect upon the uncertainties of the modern age (Placani 2017). Beck sees risk as a social construct, which is historically a recent phenomenon that is closely tied to the idea that risks depend on decisions (Beck 1992, p. 183). In Beck's risk society, all hazards are seen as depending on human choice and, hence, are, according to his definition, conceived as risks. As a result of this, in contrast to the industrial society, the principal issue in the risk society concerns the allocation of risk rather than that of wealth (van de Poel and Fahlquist 2012, 881–2).

1.2.6   *Concluding Risk*

The above section illustrated some of the more prominent conceptions of risk, but there are yet others. Whether richer senses of risk or sparser ones should be preferred remains an open question whose answer will likely depend on things such as context, aims, preferences, and theoretical

commitments. Perhaps among the many differences in risk conceptions, commonalities were adumbrated as well. Still, the concept of risk remains contested and its dimensions are not yet fully explored. Nevertheless, the above concepts should serve the reader well because all the contributions to this volume, to varying extents, rely, as well as expand, on the understandings of risk discussed. However, before we proceed to discussing the entries to this volume, we need to explicate one more piece from our theoretical puzzle – the concept of responsibility.

1.3 Responsibility

The concept of responsibility is complex and has a variety of senses as well as uses, such as liability, role, capacity, and causal responsibility (Boxer 2014; Hart 1968). Given this complexity, it becomes necessary to provide an overview of some of the more prominent responsibility senses that can illuminate the concept and that are also featured in the contributions to this book. This will provide initial clarity to the matter and lay out a conceptual framework that will carry forward.

The place to start for most discussions of responsibility is with HLA Hart's taxonomy of responsibility's various senses (1968, 211–30). Hart distinguishes between four main conceptions of responsibility, and, as these are foundational, the following will briefly outline them. However, Hart's senses do not exhaust the concept, and the following will add to the explication a separate exploration of moral responsibility, temporal views on responsibility (i.e., its backward- and forward-looking senses), as well as collective responsibility. Admittedly, this still leaves out other senses of responsibility. The diversity of views on this topic is simply too great to be captured here.

As noted, Hart identifies four types of responsibility. A slim overview of the taxonomy is (1) causal responsibility, (2) capacity responsibility, (3) role responsibility, and (4) legal liability responsibility with subtypes (Cane 2002, 29).

1.3.1 Causal Responsibility

This first sense of responsibility, causal responsibility, is concerned with identifying agents or entities that bring about events or states of affairs. Consider that "Julia broke the window" is a way of saying "Julia is responsible for the window breaking." Causal responsibility assigns an agent or entity as cause of an event or state of affairs based on that agent or entity's involvement in it. Such causal involvement could be all-or-nothing (e.g., based on counterfactuals) or admit of degrees. Whatever kind of

causal involvement is at stake it is not sufficient for inferring moral responsibility from it. This point highlights the way in which causal responsibility is neither a substitute nor a marker for moral responsibility even if the two may sometimes coincide in a single circumstance.

First, being a cause of an event or state of affairs is not sufficient for moral responsibility. Consider a slightly more detailed scenario: "Julia accidentally (without foreseeing, knowing, or intending) breaks a window." Julia caused the break, yes, but Julia accidentally broke the window because she got pushed by James. To be a cause in this respect (admittedly bracketing any further complications) is not sufficient grounds to be judged morally blame- or praise-worthy, good or bad, which are typical of judgments of moral responsibility. Julia's moral powers were not at work in breaking the window.

Second, certain causally responsible entities lack relevant moral agency for moral responsibility. Consider another scenario: "The tree branch broke the window." Yes, the tree branch caused something – a broken window – but to identify the tree branch as a moral agent would be absurd according to current science about trees. There are not, in other words, sufficient grounds for moral evaluation of the tree in ways that might apply to agents in similar circumstances.

1.3.2   *Capacity Responsibility*

Hart identifies capacity-responsibility in the following way. The expression "he is responsible for his actions is used to assert that a person has certain normal capacities [...] those of understanding, reasoning, and control of conduct: the ability to understand what conduct legal rules or morality require, to deliberate and reach decisions concerning these requirements, and to conform to decisions when made" (Hart 1968, 227). This list is not exhaustive, but it identifies capacities for rational agency.

The powers of reasoning and understanding are among the rational capacities of agents, while the capacity to control their conduct enables them to express these rational capacities in action (Raz 2010, 4). In other words, people are responsible for their conduct because they are rational agents, and as rational agents (Ibid). However, people are not responsible in this way if they lack capacity-responsibility or if the powers of rational agency constituting it are temporarily suspended or disabled (e.g., when people are asleep, under deep hypnosis, or when sensory deprivation is such that they cannot use their rational capacities) (Ibid). No doubt more can be said about capacity responsibility, but the topic will be addressed further in the discussion on moral responsibility.

1.3.3   *Role Responsibility*

Role responsibility describes an agent's responsibility due to her being charged with a duty or obligation to achieve or contribute to the accomplishment of a state of affairs. For example, "the supermarket's night manager must ensure that all newly received grocery products are stocked on the shelves." The agent has certain role-dependent duties ("responsibilities"). (There is another usage of role responsibility, which we set aside after mentioning it, as the comportment of an agent within the role they have. For example, "she is a responsible night manager who makes sure that all groceries are stocked before her shift ends." The descriptor here highlights that the agent takes the role's requirements seriously).

Whereas causal responsibility describes a relationship between (past) conduct causing an outcome (e.g., "she broke the window"), role responsibility involves a future-oriented or prospective responsibility to fulfill a prescribed duty or obligation associated with the role itself. One may fail or succeed in meeting her role-dependent obligations; however, the basis of responsibility is having assumed the role (with its duties or obligations). This, in effect, means one is on the hook in virtue of occupying a role, not necessarily having caused an outcome. Some careless stock clerk, not the supermarket's night manager, may have dropped all the palettes of groceries, thereby nixing them from being stocked on the shelves, but the night manager may nevertheless be (ultimately) responsible because she is the manager.

1.3.4   *Legal Liability Responsibility with Subtypes*

Legal liability responsibility refers to responsibility-based conditions of legal liability – for instance, to pay compensation, fines, restitution, or to be imprisoned. Broadly, when legal rules require one to act or abstain from action, one who breaks the law is usually liable, according to other legal rules, to some form of punishment (Hart 1968, 215). Punishment may be issued not only for one's own offences, but also for those of others. For example, an employer may be liable and suffer punishment for some offence committed by their employee. In law, such vicarious responsibility is a form of "strict" responsibility, which is responsibility regardless of fault (Cane 2002, 39).

In the legal context, it is also worth mentioning, given the interests of this volume, that negligence law allocates risk of liability for damages by holding people responsible for negligently bringing about certain harms (Raz 2010, 7). Negligence can be defined as a failure to meet a standard of behavior or a level of care that is established by law for the protection of others against unreasonable risk of harm. Key factors that help determine whether an action falls short of reasonable care are the foreseeable

likelihood that the action will result in harm, the foreseeable gravity of that harm, and the burden of safeguarding against the risk of harm.

Moral liability responsibility is analogous to legal liability responsibility and thus may be considered a subtype. The differences between the two reside in the conditions for incurring each, respectively. According to Hart, we may define moral responsibility by substituting "liable to punishment" with "deserving blame" or "blameworthiness" and substituting "liable to be made to pay compensation" with "morally bound to make amends or pay compensation" (Hart 1968, 225). According to Hart, such responsibility depends on certain conditions that are related to the character or extent of a person's control over their own conduct, or to the causal or other connections between the person's action and harmful occurrences, or to his relationship with the person who actually did the harm (Hart 1968, 225). Given its prominence in the philosophical literature, it is more profitable to consider moral responsibility along with some of its conditions separately.

1.3.5   *Moral Responsibility*

The analysis of causal, role, capacity, and legal liability responsibility sheds light on aspects of moral responsibility. As discussed regarding causal responsibility, being a cause is not sufficient for moral responsibility, and some causally effective entities lack the requisite capacity for moral responsibility. With respect to role responsibility, although an agent may be morally responsible for failing to fulfill a duty, it is not a necessary condition of moral responsibility (Zimmerman 2016, 249). A night manager of the supermarket can be (role) responsible for a night stock clerk's failures, and she might also be morally responsible because she purposely acted to cause them. This latter conclusion is contingent on other facts and conditions. As for legal liability responsibility, as before, Hart advances a conception of moral responsibility understood as liability to blame or praise.

Nevertheless, merely asking what moral responsibility is belies the many disputes on a range of topics within subsets of the moral responsibility literature.[11] The moral responsibility literature largely thwarts attempts to describe moral responsibility using unitary, universally accepted definition (Buckareff, Moya, and Rosell 2015, 2; Fischer and Ravizza 1998, 10). Even so, there is some basic consensus and the following abstracts from various accounts to distill and examine two oft-noted conditions – the epistemic and control conditions (Ginet 2007; Haji 1998; McKenna 2008; Mele 1995; Pereboom 2014).

When speaking about moral responsibility, as foreshadowed above, something more is needed for praise or blame; namely, a capacity to

behave as an agent able to be responsible (call it responsible agency). Responsible agency consists of two conditions. One is an epistemic condition and the other is a control condition, both of which are considered individually necessary and jointly sufficient for an agent's moral responsibility. Roughly speaking, the epistemic condition concerns an agent's cognitive state when acting, and the control condition refers to an agent's control (or freedom) in acting. Moral responsibility (disputably) requires an agent to satisfy these conditions.

The epistemic condition is complex in that it consists of capacities and qualities that an agent has. That is, arguably, only an agent who satisfies these conditions is a responsible agent who can be morally responsible (Wieland 2017). In the words of Oshana (2015), the epistemic condition entails that:

> The responsible agent is self-aware, that they are rational, that they are not ignorant of the circumstances in which they act, that they are cognizant of and able to act within established moral guidelines, and that they are responsive to reasons to adjust or amend their behavior in light of these guidelines. In order to be held responsible, the moral agent must know that doing a particular act (or an act of a given type) or cultivating a particular trait of character (say, jealousy, rage, bigotry) is right or is wrong. The moral agent may be held responsible if, suffering from none of the conditions that exempt a person from responsible agency, they should have known the nature of the act or trait, and could have been motivated by the relevant moral guidelines.
>
> (Oshana 2015, 13281)

In summary, the epistemic condition involves a complex cognitive capacity or awareness that marks agents as appropriate subjects of moral responsibility (i.e., candidates for blame). Responsible agents (to be designated as such) must have a requisite mental capacity (or acted or brought about a state of affairs in light of this capacity) in acting or (disputably) omitting to act (Talbert 2016, Ch. 5).

The aspect of capacity described by the epistemic condition identifies a necessary feature of responsible agency, but it does not suffice (under the standard meaning). The further challenge is to show how capacity responsibility (responsible agency) is or may be related to moral responsibility. After all, that an agent is a responsible agent in the relevant sense does not necessarily entail her moral responsibility for an action or resultant state of affairs. As Christopher Kutz describes it, "being responsible, in this sense, simply is a matter of having the competency of self-government" (2012, 549).

The control condition specifies the type or degree of control with which an agent acts (Talbert 2016, Ch. 1). An admittedly rough, but still viable, description of the requisite degree of control is voluntariness – traditionally construed as an agent being able to do otherwise (Corlett 2006; Frankfurt 1969, 11). This condition highlights that the sorts of actions or states of affairs relevant to responsible agency and moral responsibility are ones that agents accomplish through their own guidance or authorship, not coercion or manipulation, and so on (Fischer and Ravizza 1998, 12). Without this control over behavior, then attributions of blame or praise would incorrectly and perhaps unjustly target agents.

It bears noting that the bulk of the philosophical literature on responsibility has focused on moral responsibility understood as the blameworthiness of agents (e.g., Fischer and Ravizza 1998; Wallace 1994). In order to establish blameworthiness, a number of conditions have been put forward, among which we find those already identified, such as moral agency (capacity sense), causality (causal sense), freedom (control condition), and knowledge (epistemic condition). In addition, a condition that was implied, but not explicitly acknowledged, is that of wrongdoing. With regard to this, in order to elicit a justified attribution of blame, an agent must have done something wrong.

The conditions mentioned are common to many otherwise contrasting philosophical accounts, even though the relative weight and formulation that they are assigned may differ (Braham and Van Hees 2012; Cane 2002; Fischer and Ravizza 1998; Wallace 1994; Zimmerman 1988). This is not to say that they coexist in perfect harmony across accounts. Disagreements exist and tend to take one of the two forms: (1) the precise content of each of the conditions and (2) the necessary and/or jointly sufficient status of the conditions. Nevertheless, the responsibility conditions identified match well with commonsense morality and the specialized literature.

1.3.6   *Collective Responsibility*

The picture of responsibility that emerges from the above may seem to have an individualistic bent inasmuch as it asks questions about responsibility at an individual level. However, such questions may well be asked at a collective level as well. Thus, there are conceptions that seek to account for responsibility by focusing not just on individuals, but also on collectives.

Contra individualistic accounts of responsibility, collective responsibility accounts, do not restrict responsibility (e.g., causal, blameworthiness, role, liability) to individual agents. Instead, they focus on groups

or collectives. Responsibility in such cases may be traced to collective intentions and collective actions taken by groups *qua* groups and distinct from individual members of such groups. However, much debate surrounds the moral agency of groups in general and the possibility of group intentions in particular, the distribution of collective responsibility to individual members, and the attribution of collective responsibility in particular cases (e.g., climate change, wars). It is unlikely that the debates surrounding the very possibility and content of collective responsibility will be settled any time soon (Copp 2007; French 1984; Gilbert 1989; Miller 2010; Narveson 2002).

In fact, there are philosophers who argue that collective responsibility does not exist, as individuals are the sole bearers of responsibility (e.g., Lewis 1948). However, it seems imperative to recognize that there are harms that cannot be traced to individuals acting alone and must be understood in their collective dimension. Considering the impact of multinational corporations, such as banks and oil producers, that behave badly and cause harms (e.g., environmental, economic), it seems crucial to find ways to hold such actors accountable for their actions (van de Poel and Fahlquist 2012, 892). It also seems crucial to recognize that, sometimes, collective actors (e.g., states, multinationals) are in a unique position to address such impacts, at least, for pragmatic reasons related to their capacity to do so.

Moreover, it seems plain to say that many risks in society admit of responsibility perspectives that are at the same time a matter for the individual and the collective (e.g., climate change risks, health risks, traffic-related risks). Consider climate-change-related risks. It seems plausible to argue that both individuals and governments have a responsibility to address these. Collectivist accounts (Cripps 2013; Sinnott-Armstrong 2005) hold that individuals' unilateral attempts to curb emissions are futile because the individual cannot make a difference and what is needed is large-scale collective action, which is the responsibility of states and national governments. Although virtually no scholar would deny the need for coordinated state action, it also seems plain to say that if it were truly the case that individual carbon dioxide emissions made no difference *at all*, then anthropogenic climate change would not occur (Hiller 2011). Moreover, that individuals have a responsibility to reduce their carbon dioxide emissions is a powerful intuition shared by many and argued forcefully (Baatz 2014; Berkey 2014; Broome 2012; Fruh and Hedahl 2013; Raterman 2012). Finally, it seems undeniable that action is needed at both individual and collective levels at least because individuals have a role to play in securing governmental action that is crucial for curbing emissions, as well as holding their governments responsible for such action or inaction.

1.3.7   Backward and Forward-Looking Responsibility

Crosscutting the senses of responsibility mentioned above is a view of responsibility that understands the concept in terms of its temporal dimensions. That is, another way of looking at responsibility (individual or collective) is by considering it in its backward- and forward-looking senses.

As mentioned before, most of the philosophical literature has focused on moral responsibility understood as blameworthiness. This is a backward-looking responsibility sense that looks to the past in order to see who, when, and under what conditions an agent is blameworthy, should be held to blame or be blamed for some action or outcome. It should be noted that the causal and liability senses of responsibility discussed above are also primarily backward-looking as they typically refer to something that has already occurred. However, the liability sense also admits of a forward-looking dimension to the extent that an agent is supposed to do something in the future in order to account for her actions, pay compensation, fines, restitution, etc.

The traditional focus on backward-looking moral responsibility understood as blameworthiness is complemented by forward-looking notions of responsibility, which typically address responsibility either on consequentialist grounds (e.g., Goodin 1995) or by relying on virtue or care ethics (e.g., Ladd 1991; Williams 2008). As related to the preceding analysis, the role responsibility sense discussed is forward-looking because it relates to responsibility as the obligation or duty to see to it that something is or will be the case. Responsibility as virtue is also understood as forward-looking (e.g., Bovens 1998; Ladd 1991) as it relates to responsibilities an agent assumes for herself and to certain attitudes or character traits she ought to cultivate.

When it comes to risks, the two temporal dimensions of responsibility offer clear connections. The clearest way in which backward-looking responsibility relates to risks is once they have materialized. In such cases, questions such as the following become pertinent: Who is responsible for the manifestation of the risk? Who should be held blameworthy for the risk manifesting? Who should compensate for the risk? The clearest way in which forward-looking responsibility relates to risks regards their management and prevention. In such cases, questions such as the following become pertinent: Who is responsible for averting the risk? Who is responsible for minimizing the risk and its impact? Who should be held liable for compensation if the risk manifests? These questions do not exhaust the queries that can arise vis-à-vis risks and responsibility as this volume itself will show.

1.3.8   Concluding Responsibility

The above sections illustrated some of the more prominent senses, conceptions, and dimensions of responsibility, but others remain unexplored. The concept of responsibility, just like the concept of risk, remains contested and unexhausted. Responsibility is simply too complex and the literature on the topic is too extensive to allow for exhausting summaries. With this in mind, to varying degrees and, respectively, all the above senses of responsibility will feature in the contributions to this volume. This is why the preceding should serve the reader moving forward.

   Discussion so far has focused on the topic of risk and responsibility mostly by attempting to elucidate them separately. In turn, the contributions to this volume bring the two concepts together by exploring their interplay in theories and applications. The following will sketch out the ways in which this exploration will be achieved.

1.4   Risk and Responsibility in Context

The link between risk and responsibility is evident at least in virtue of the fact that many present-day risks are construed as something that should be managed, avoided, mitigated, controlled, or, in some other sense, addressed. Thus, the idea that one (be it an individual or a collective) ought to do something with regard to risks carries with it the notion of responsibility: there are risks for which one should take responsibility, be held responsible for doing or failing to do so, or be held responsible for creating in the first place. This is far from tying risk and responsibility under one conceptual umbrella or endorsing any particular theory of the concepts, respectively. However, this opens the door toward exploring the manifold connections between risk and responsibility as achieved in this work.

   The contributions to this volume approach the topic of risk and responsibility from a variety of perspectives. They grapple with, clarify, and expand the relationships between risk and responsibility across various philosophical areas. In so doing, both concepts retain their complexities, nuances, and variations and, at the same time, manage to capture some of the most pressing and difficult moral challenges of our modern world.

   In *Part I: Conceptual Context*, the contributions focus primarily but not exclusively on broader theoretical issues associated with risk and responsibility. *Ibo van de Poel and Martin Sand's* chapter, "Responsibility beyond Control," examines the control condition of responsibility, which states that it is unreasonable to hold agents responsible for things that are beyond their control. Against the traditional view that sees control as a precondition of responsibility, the authors propose an alternative view

that preserves the strong (conceptual) connection between control and responsibility but allows for a reversal of their relation. In the authors' view, responsibility sometimes precedes control because agents can reasonably take responsibility for things that are not yet under our control. The authors also discuss under which conditions it may be reasonable to take responsibility for certain risks beyond our control, and whether it may sometimes be morally required to do so.

In their chapter "Risk Mismanagement: The Illusion of Control in Indeterminate Systems," *Benjamin Hale and Kenneth Shockley* argue that findings from social choice and game theory, which advance the view that many outcomes are not merely uncertain but indeterminate, complicate the epistemic and metaphysical picture that informs risk-oriented views. Such views imagine the future as unfolding according to a set of risks that are epistemically available through modeling and projection. However, the authors argue that approaches to risk management that ignore indeterminacy result in framing that distorts our decision options, our sense of what is feasible, and the range of our responses. Not only do the authors reveal and explain such distorting effects, but they also advance a framework that better reflects our social realities.

In *Part II: Legal Context*, the relationship between risk and responsibility as it manifests in the context of law is examined. *RA Duff's* chapter, "Risk, Responsibility, and Pre-Trial Detention," discusses the justification of pre-trial detention. Imprisoning people who have not yet been convicted but are awaiting trial is justified by preventive reasoning. Such reasoning regards pre-trial detention as necessary to avert various risks: that the defendant will fail to appear for trial, interfere with witnesses, or commit other kinds of offence if left free. The author argues that this kind of justification seems inconsistent with the presumption of innocence and the liberal principle that the state should respect the freedom and autonomy of responsible citizens. Duff rejects some current attempts to justify pre-trial detention and offers instead a plausible alternative. This is based on the distinctive responsibilities that define the role of the criminal defendant and can support imposing special constraints, even preventive detention, on those awaiting trial.

Anne Ruth Mackor's chapter, "Risks of Incorrect Use of Probabilities in Court and What to Do about Them," investigates the risks involved in the judicial interpretation and application of probability statements. Probabilities play an important role in the proof of facts in trials. However, judges are not trained in probabilistic reasoning, which leads to errors. The author argues that more education in probability theory is not enough and a more radical solution might be needed, such as the introduction of "probability-judges" in evidentially complex cases. Probability judges are experts in probability theory who sit in mixed chambers of the court

(i.e., chambers that are composed of judges and probability experts). Such a solution would not conflict with the rule of law, the fundamental right to a fair trial, nor would it open the floodgates to other expert judges and mixed chambers. Nevertheless, the author acknowledges that empirical testing is needed to find out whether such mixed chambers help to reduce the risks of flawed probabilistic reasoning.

Part III: Bioethical Context takes up risk and responsibility in the context of health and bioethics. In "The Failure of Luck Anti-egalitarianism," *Sven Ove Hansson* criticizes the so-called "luck-egalitarian" view that a person deemed responsible for her own disease or injury should be deprived of healthcare resources. According to luck egalitarianism, society should make up for misfortunes that are due to brute luck (i.e., the result of risks that are not deliberate gambles, such as misfortunes in genetic makeup), but it should not compensate for disadvantages that are down to option luck, which are a matter of one's own risk-taking. Hansson shows that conditions that would make the luck-egalitarian claim plausible cannot be fulfilled. The conditions identified and found wanting are the following: (1) that it can be determined whether a person caused her own disease or injury, (2) that blame responsibility can justifiably be assigned to her if she did so, and (3) that this is a sufficient moral reason for withholding treatment that would otherwise have been available to her. In light of such failings, and the fact that the luck-egalitarian position leaves the privileged unaffected while punishing the poor, Hansson argues that luck egalitarianism is a misnomer. This position should be called "luck anti-egalitarianism."

In "Moral Responsibility and Public Health Risks: Examples from the Corona Pandemic," *Jessica Nihlén Fahlquist* addresses the coronavirus pandemic as an example of the relevance of responsibility to public health risks. Fahlquist argues that the pandemic has given rise to a number of ethical questions. Against the backdrop of different conceptions of moral responsibility, the author investigates some of these questions. In particular, the author focuses analysis on how individual responsibility and governmental responsibility ought to be conceived, as well as on how responsibility ought to be distributed in the pandemic.

In "Responsible Risking, Forethought, and the Case of Human Gene Editing," *Madeleine Hayenhjelm* provides an account of responsible risking. After discussing the concepts at stake, the author investigates responsible risking by focusing on various conditions that this notion entails, as well as the ethical debate on human germline gene editing. The author reveals a host of epistemic concerns, as well as a special category of potential losses that are in principle incompensable in the germline gene editing case. The author argues that responsible risking involves at a minimum the avoidance of such risking unless there are extraordinary reasons to do otherwise.

Part IV: Technological Context focuses on risk and responsibility across a range of technological applications and challenges. In "Emotions, Risk and Responsibility: Emotions, Values and Responsible Innovation of Risky Technologies," *Sabine Roeser* and *Steffen Steinert* focus on the contribution that emotions and values can make to the responsible innovation of risky technologies. The authors develop the idea that emotions can play an important role in ethical decision-making about risky technologies by expanding its range of application to the following key stakeholders: universities, industry, policy makers, and the public. They advance a position that supports the view that embedding emotions and values in the innovation of risky technologies can enhance the quality of deliberation and decision-making regarding technological risks, help to overcome stalemates, and lead to technological innovations that are morally and socially acceptable and responsible.

Sven Nyholm's chapter, "Responsibility Gaps, Value Alignment, and Meaningful Human Control over Artificial Intelligence," investigates four different kinds of responsibility gaps. A responsibility gap occurs when some event or outcome is such that it would be fitting to hold somebody responsible for it, but there is no one who could fittingly be held responsible. The author focuses on forward-looking positive responsibility gaps and relates these to the so-called value alignment problem in AI ethics. This is the problem of ensuring that advanced AI aligns with human values, interests, or aims, so that risks related to advanced AI are mitigated. Nyholm criticizes some recent proposed solutions to this problem by, *inter alia*, exposing the difficulties with implementing them into practice and in relation to real-world risks (e.g., risks related to advanced AI).

In "Radioactive Waste and Responsibility toward Future Generations," *Céline Kermisch* and *Christophe Depaus* discuss the responsibility toward future generations in light of risks from radioactive waste, which spread over long periods of time. The authors analyze institutional responses that seek to address this, such as those from the International Atomic Energy Agency (IAEA), the Nuclear Energy Agency (NEA), the International Commission on Radiological Protection (ICRP), and the European Union (EU). Deep geological disposal, which is the technical solution that benefits from international consensus, is considered. The authors criticize the implementation of retrievability in light of our responsibility toward future generations and show that, if unrestrained, retrievable geological disposal is far from the obvious ethical choice.

In *Part V: Environmental Context*, the contributors assess the risk-responsibility relationship vis-à-vis challenges and problems within the context of climate change. *Neelke Doorn* and *Samantha Copeland*, in their chapter "Resilience and Responsibilities: Normative Resilience for Responsibility Arrangements," offer a critical review of various definitions

and conceptions of resilience. The authors advance a conceptualization of resilience that, among other things, integrates responsibility. Their explicitly normative notion of resilience can account for the responsibilities of different actors in realizing resilience (i.e., their task responsibilities). The concept of risk is operative within this conception because the resilience at stake for the authors is against changing situations that represent increased risks to the functioning of systems.

In "Individual Climate Risks at the Bounds of Rationality," *Avram Hiller* discusses the moral appropriateness of disregarding small risks. This is a hugely important topic not only because it can be said that all ordinary decisions involve *some* risk but also because many mundane actions performed by individuals (e.g., driving) can be said to contribute to climate harms. Hiller argues that because our rationality is *bounded*, it is not possible for us to include every small risk in our decision-making process and heuristics may be reasonably used. However, contra some thinkers, Hiller argues that this does not violate the spirit of expected value theory but rather shows that we should adopt a so-called *two-level* view. As for individual climate-related risks, Hiller argues that the use of heuristics does *not* permit the *general* ignoring of climate-change-related risks by individuals.

1.5   Conclusion

As the descriptions of this chapter reveal, this volume's contributions engage with risk and responsibility as a theoretical and practical topic, where conceptual issues come to the fore in various contexts. The common link among the chapters is their analysis of risk and responsibility and the interplay between these concepts. However diverse and distinct the volume's contributions, they all highlight challenges, problems, and potential opportunities to address risk and responsibility as a theoretical and practical topic of philosophical analysis. The thematic unity of respective parts of the volume is drawn together as a whole through the conjunction of risk and responsibility. This conjunction underlines the relative novelty of this volume and its constitutive chapters; it explores the multifaceted aspects of risk *and* responsibility rather than aspects of risk *or* responsibility. What is more, it shows how risk and responsibility through their application in different contexts play an important role in the contemporary world.

Notes

 1 For example, a loose definition of risk is unacceptable in science, but perfectly acceptable in a friendly conversation.
 2 Renn (1992) divides risk approaches into seven categories belonging to different fields: (1) the actuarial approach, (2) the toxicological and epidemiological approach, (3) the engineering approach, (4) the economical approach, (5) the

psychological approach, (6) social theories of risk, and (7) cultural theory of risk (Renn 1992, 56).

3 For a useful introduction, see Ian Hacking, *An Introduction to Probability and Inductive Logic* 23–78 (2001).

4 For useful overviews, see Jonathan Cohen, *An Introduction to the Philosophy of Induction and Probability* (1989) and Donald Gillies, *Philosophical Theories of Probability* (2000).

5 See, de Finetti, B. (1980). "Foresight. Its Logical Laws, Its Subjective Sources." In H. E. Kyburg, Jr. and H. E. Smokler (eds.), *Studies in Subjective Probability*. Robert E. Krieger Publishing Company (Original work published 1937).

6 Classic sources are in Reichenbach (1949) and von Mises (1957).

7 The standard source is Venn (1876). However, the appellation is found in Reichenbach (1949, 374). See Hájek (2007).

8 See Aven (2003, xii), who refers to probability and probability calculus as "the sole means for expressing uncertainty."

9 See Ramsey (1931), de Finetti (1937), von Neumann and Morgenstern (1944), and Savage (1954/1972).

10 See Hansson (2003) for detailed criticism of various ethical theories' ability to contend with risk through the analysis of the mixture appraisal problem.

11 The disputes about free will and determinism will not appear in this chapter, and the assumption moving forward is that people can be morally responsible. More specifically, this chapter stipulates that moral responsibility is possible because relevant conditions of free will and control can exist.

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