"IN GOD'S POCKET": ACCIDENTS, INJURIES, AND PERCEPTIONS OF RISK AMONG CONTEMPORARY NEWFOUNDLAND FISH HARVESTERS

SANDRA LEE BRENNAN

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ACCIDENTS, INJURIES, AND PERCEPTIONS OF RISK

AMONG CONTEMPORARY NEWFOUNDLAND FISH HARVESTERS

by

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Abstract

As research in provincial, national and international contexts has shown, commercial fishing is one of the most dangerous occupations. Different approaches to risk and perceptions of risk (such as biophysical, structural, cultural, and human capital) often examine safety from a single perspective, resulting in partial understandings of the causes of accident and injury. This thesis presents fish harvesters' observations on safety at sea through their descriptions of risky events, accidents and near-misses, and their views on the effectiveness of recent safety initiatives, in an effort to create a more multi-dimensional understanding of risk and accidents at sea. Major findings include insights about the cascading effects of risk factors seen through the eyes of harvesters and their perceptions of the unintended safety consequences of conservation regulations. Torner and colleagues' (1999) participatory safety intervention process is proposed as an effective way to address the interactive nature of such risk factors and improve prevention.

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Chapter One: Introduction

Fishing is an occupation plagued with extensive injuries, near-misses, and fatalities. In an international comparison of workforce injury and fatality rates, Roberts (2004) found fishing to be one of the most hazardous occupations. Research done in the 1980s on Nova Scotia's deep-sea groundfish and scallop harvesting found it to be one of the most dangerous and physically demanding occupations in Canada: "each year more workers in the deep sea fishery die or sustain injuries from work-related accidents than in any other industry" (Binkley, 1995: 4). Wiseman and Burge characterize the marine environment in Newfoundland and Labrador as having a "higher than normal range of risks" (2000: 3), due to the combined impact of weather, distance traveled to fish, vessel stability, and fatigue. Pelot's work confirms the high rates of risk in the Newfoundland fisheries (2000).

Risk is mediated by external forces that also shape, enable, and constrain perceptions and choices. There are five main approaches in existing research on risk. The biophysical approach concentrates on the human body and the physical environment as the primary sources of risk. The human capital approach locates risk in the characteristics of the individual, such as gaps in training or experience. The structural approach focuses on the contribution of regulatory and organizational factors to risk, and the cultural approach

emphasizes the social construction of risk and the factors that mediate what is selected for mitigation and what is considered to be a "normal" part of the job. Some recent studies have called for a fifth, integrated approach to risk that incorporates elements of each of the other approaches and pays particular attention to interactions between biophysical, human capital, structural and cultural factors.

This project investigates Newfoundland and Labrador fish harvesters' accident and injury experience and perceptions of risk in order to explore their first-hand knowledge about safety at sea. The research for this thesis was carried out between 2003 and 2005. The study draws on first-hand information from fish harvesters collected primarily through phone interviews but with input from focus groups and discussions with fish harvesters during a subsequent component of the project involving boat tours. The research seeks to explore with fish harvesters their experience with accidents and injuries over the previous decade; their perceptions of the causes of accidents; their experiences with injuries and near-misses; their sense of whether and how the risks associated with fishing have changed over the past decade; and perceptions of the relative importance of regulatory, technological and other changes in determining risk. Careful attention to these harvesters' observations on risk and safety supports the call for an integrated approach to understanding risk and promoting safety with related attention to how factors cascade, interact, and change over time. Fish harvesters' unique views from the deck of the vessel highlight the need for a

comprehensive safety strategy which can address biophysical, human capital, structural and cultural factors and account for the interactivity of these factors as well as the dynamism of the industry.

Overall research on risk in fishing has typically distinguished between occupational risk and perceived danger. Researchers often base this distinction on a comparison between perceived levels of risk and patterns of risk indicated in occupational statistics (Jermier, Gaines & MacIntosh 1989; Rousseau & Libuser 1997). This comparison provides an indication of the extent to which worry, trivialization and fatalism are employed by fish harvesters to deal with risky situations (Murray, Fitzpatrick & O'Connell 1997; Binkley 1994, 1995; Roberts 1993). Such research has found high levels of reported anxiety among fishermen and that those who reported the most anxiety reported more injuries and fewer safety precautions (Murray, Fitzpatrick & O'Connell 1997: 292).

When comparing levels of perceived danger to levels of statistically determined occupational risk in different work environments, it is essential to account for factors that mediate risk and perceptions of risk. Working across multiple occupations, researchers have identified the following important mediating factors: gender (Grzetic 2004; Jermier, Gaines & MacIntosh 1989); level of education or training (Gaba & Viscusi 1998); social influences (Slovic 1987); type of enterprise (Eakin, Lamm & Limborg 2000); and whether or not other work is available (Roberts 1993: 81). It is also important to examine how

official injury and accident statistics are compiled to discover if regulators are missing part of the picture.

Research on risk and perceptions of risk in fishing has traditionally focused on either behavioral (human) factors (Murray, Fitzpatrick & O'Connell 1997; Pollnac, Poggie & VanDusen 1995) or non-behavioral (structural and environmental) factors (Pelot 2000; Wiseman & Burge 2000). Research on perceptions of risk tends to be carried out by anthropologists and psychologists, and emphasizes the role of human, behavioral factors in contributing to risk. Valuable information has emerged from this approach. For example, researchers have gathered information to help create new ways of encouraging safety equipment usage. Authors of a psychological analysis of danger and safety among New England commercial oceanic fishermen argued that the low rates of use of personal safety equipment occurred simply due to fish harvesters' failure to "take interest" in the use of safety equipment (Pollnac, Poggie & VanDusen 1995: 153). However, this approach presents only one aspect of the relationship between attitudes and safety behaviors, as there are other mediating factors that may be involved as well. Some such factors include the affordability and availability of safety equipment, the training needed to use the equipment, and the fish harvesters' level of conviction that the item will actually be useful in an emergency. Thus behavioral factors, measured through psychometric tests, are only one part of the complete safety picture.

Other researchers and policymakers have focused their attention more on non-behavioral factors. Van Noy (1995) suggests that the Coast Guard, in its routine analyses of accidents at sea, tends to emphasize structural factors such as vessel safety and Search and Rescue operations. Her research collaborated with harvesters to examine incident reports closely, and found that harvesters believed individual actions contributed to the occurrence of 51 percent of accidents, as compared to the Coast Guard, which attributed behavioral causes to only 18 percent.

While Wiseman and Burge (2000) acknowledge the role of individual behavioral factors in mediating risk, they argue that structural or non-behavioral factors have been neglected in safety discussions. Their study of 1990s trends in the under-65' sector in the Newfoundland and Labrador fishing industry focuses primarily on non-behavioral factors, arguing that dynamism and related structural changes need to be addressed in efforts to reduce risk. For example, changes in this fishery resulted in smaller vessels fishing further from shore (17). The authors, addressing industry regulators and others, argue that other stakeholders must act with harvesters to reduce risk: "[w]ithout absolving fishermen of their responsibility to adopt proper safety measures for the safe operation of their vessels, other players must recognize their responsibility and act decisively" (18). Wiseman and Burge also recognize the extensive economic constraints on access to safety equipment among these fish harvesters

suggesting that government provide grants or tax rebates to help harvesters purchase safety equipment (C4).

Some recent research emphasizes the importance of integrating the two frameworks. For example, Jensen, Christensen, Larsen and Soerensen (1996:14) advocate safety promotion through both a behavioral approach – such as increasing motivation for injury prevention and finding new ways to prevent slips and falls – and a non-behavioral approach, such as vessel design and the availability of safety equipment. Researchers agree that such integration is challenging, particularly within the framework of a single study. Roberts reinforces this view, and adds:

> ...safety measures should be developed through dialogue with fishermen and the fishing industry. This should be achieved by the use of multidisciplinary teams of experts, including fishermen, who are most able to develop safety solutions that are both practicable and economically affordable to the fishing industry (2004:22).

Other researchers have proposed similar techniques for developing safety measures. A selection of these techniques, such as a model for promoting implementation of safety measures, will be presented in the next chapter.

Some researchers approach risk from the perspective that human factors have been an under-represented variable in this overall, integrated picture of fishing safety. This is not to say that those who seek to attribute incidents to behavioral or structural factors exclusively are wrong; rather, it is to say that a complete picture includes both. As mentioned earlier, the United States Coast Guard is responsible for safety at sea and its attention has traditionally been

focused on vessel safety and on search and rescue operations, not on injuries. Van Noy (1995) worked with fish harvesters to modify a Coast Guard study in order to identify human factors associated with risk, and this type of comparative work can be very useful in identifying gaps in our knowledge. Van Noy utilizes a theoretical framework which incorporates the concepts of health education and injury control, reflecting the distinction between behavioral and non-behavioral factors. Users of the framework can assess the impact of multiple determinants on the injury problem, choose effective and feasible interventions, and evaluate various intervention strategies (1995: 20).

Some authors see the distinction between risk and perception of risk as false, arguing that the study of "objective risk" is less useful than creating new deliberative decision-making processes (Tansey & O'Riordan 1999:88). A corollary of this is that it is important to investigate to what extent the representation of "risk" by fish harvesters is shaped by their perceptions of risk as opposed to other factors. For example, Joffe (1999) has argued that we need to examine how the coping mechanisms of people who work in dangerous industries (such as fatalism or dismissal or trivialization of risk) might undermine the implementation of safety practices and the regulation of the industry. This approach points to potential interactive effects among perceptions of risk, regulations that might influence actual levels of risk, and responses to that risk among fish harvesters and others. Similarly, research has shown that while fish harvesters consider rough weather to be an important risk factor in accident and

injury, most incidents happen in bright, calm weather (Jensen, Christensen, Larsen & Soerensen 1996:14). However, the relationship between risk and weather can be mediated by a range of other factors including harvester familiarity with a particular area and sea conditions in that area under specific weather conditions; harvester familiarity with their vessel and how it handles in different sea conditions.

An integrated approach, which accounts for both behavioral and non-behavioral factors and draws our attention to such mediating factors as economics, regulation, culture, and the dynamism of fisheries, is needed to develop a more complete understanding of sources of risk and injury, perceptions of risk and injury and potential ways to influence these. Contemporary fisheries are often highly dynamic with changes driven by ecological and regulatory changes as well as technological innovations and other factors. This dynamism needs to be taken into account when we seek to explore the relationship between perceptions of risk and actual risk levels (Pelot 2000; Jensen, Christensen, & Soerensen 1996; Dolan et al. 2005; Binkley 1995).

This thesis contributes to academic knowledge about fishing safety including patterns and sources of risk associated with commercial fishing, as well as potential ways to reduce accidents and injuries. The framework that guides this research begins from the assumption that all knowledge is partial and mediated by social-ecological processes (Neis & Kean 2003). From this perspective, exploration of fishery-related risks, accidents, injuries, and

perceptions of risk can benefit from input from a variety of practitioners including not only fishing safety experts but also fish harvesters as well as researchers from different disciplinary backgrounds. We treat harvesters as experts in the field of fishing safety recognizing that knowledge or expertise related to fishing safety varies among harvesters and over time and, when combined with insights from other groups, can contribute to a fuller and more effective understanding of experience and risk, as well as perceptions of the latter. Actively involving fish harvesters and their representatives in fishing safety research can contribute to the likelihood that such research will reflect complex realities, will be understood and accepted by harvesters and can help promote discussion among different groups responsible for fishing safety.

It is often the case that "expert" or technical knowledge is valued more than experiential knowledge (Neis & Kean 2003). Fish harvesters stand at the point of interaction of all the factors that influence risk, accidents and injuries, and are well situated to observe their interactive, cascading effects. These factors include the ocean environment (weather, navigation, working on a moving platform), vessel design (harvesting technologies, stability), the safety and fisheries management regulatory framework (season length, vessel size restrictions, gear-removal deadlines), and human factors (training, experience, skipper and crew relations, crew dynamics) (Windle et al. 2008; Bornstein et al., 2006). Their insights are particularly important in a dynamic, changing industry where it is important to anticipate risk and seek to mitigate it. Their expertise,

combined with that of technical, social and other scientific experts, can produce a fuller understanding of the factors that can be meaningfully affected to help reduce risk of accident and injury. A careful examination of harvesters' observations about risk and safety at sea highlights the importance of the view from the deck.

This study is one part of a larger project called SafeCatch, one of nine research initiatives carried out by SafetyNet, a Community Research Alliance on Health and Safety in Marine and Coastal Work at Memorial University funded by the Canadian Institutes for Health Research, and the National Search and Rescue Secretariat New Initiatives Fund (for summaries of research completed, please see http://www.safetynet.mun.ca/projects1.htm). The ultimate objective of SafeCatch was to identify means of reducing injury and fatality in the Newfoundland and Labrador fishing industry. This thesis reports on some of the findings from the Perceptions of Risk component of SafeCatch. In that component, a series of 17 focus groups with expert fish harvesters explored their perceptions of factors that make fishing safer or more dangerous. The focus group discussions helped to identify areas in need of further research, such as the differences in risk associated with harvesting different species, issues related to changes in weather forecasting, and the safety implications of various government policies. The focus group data informed the design of a phone interview schedule. The schedule questions explore harvesters' fishing and accident history and their experience with safety training and equipment. Other

questions inquire about their perceptions of the role of technology, social relations, natural environments, state regulation and other factors in enhancing or reducing risk. Forty-six phone interviews were completed. Subsequently, researchers designed and carried out boat tours which involved a tour of the workplace – the vessel (Power, In Press; Bornstein et al., 2006). At the end of the boat tours, risk mapping identified particularly hazardous places and jobs on the boat using diagrams created by the interviewed harvesters. The size of participants' vessels ranged from under 35 feet to 65 feet. Activities reported as most dangerous included shooting and hauling gear, and operating heavy machinery.

Harvesters have practical knowledge about the safety implications of policies and regulations, and can add to our understanding of the complexities and intricacies of a system often painted in black and white by the media and public figures. For example, fish harvesters argue that some policies enacted for economic or conservation purposes actually increase the risk they face. It is important to understand what makes them think this is the case and to understand the organizational factors that contribute to the risk of such interactive effects (Windle et al., 2008). Along with others, I think that an integrated approach to injury prevention must include personal, social, economic and regulatory factors (Jensen, Christensen, Larsen & Soerensen 1996; Van Noy 1995; Wiseman & Burge 2000), as well as account for the interactivity of such factors and the dynamism of the fisheries. Incorporating fish harvesters'

experiences and perceptions into our safety research can help us move more rapidly and effectively towards such an approach.

The remainder of this thesis explores how harvesters' knowledge can be incorporated into this integrated approach. Chapter Two reviews relevant international, national and regional research on the level of risk associated with fishing, explanations for risk and the literature on perceptions of risk. Chapter Three deals with the research methods employed, primarily the telephone interviews for this portion of the project and briefly covering the focus groups that preceded the phone interviews and the boat tours that followed. It also discusses the sampling process and the sample's demographics. Chapter Four presents the research findings on safety, beginning with a demographic overview and moving to harvesters' views on things that affect safety, such as training, regulations, and the importance of various external actors. Chapter Five begins by presenting the biophysical, human capital, structural and cultural aspects of the data, and then synthesizes the overall findings into an integrated framework to examine the interactive effects of the factors that influence accidents and injuries. Chapter Six concludes the thesis by returning to the general themes outlined here and in the literature review, discusses the strengths and weaknesses of the study, and identifies areas for further research. Appendices A to C include copies of the documents used to advertise the study, recruit participants and obtain the consent of respondents in the phone interview study component.

Chapter Two: Literature Review

> There exists a notion that the sea can "get into a man's blood," drawing him again and again to pit himself against the temperamental, uncaring, ceaseless roll of the wave. Many will say, quite correctly, that economic necessity keeps men returning to the sea. But there may be another fundamental lure, whether it be a yearning for the sensuous roll of a ship at sea, the camaraderie, the need to take a risk in an unpredictable environment, or something more mysterious. These are romantic and amorphous qualities, but they are part of a set of motivations that keep men returning to the hunt (Wright 1984: 87).

High-risk work can have both positive aspects, such as high pay and high satisfaction, and negative aspects, such as the increased likelihood of stress, injury, disease, and death (Jermier, Gaines & McIntosh 1989: 20). Earlier research in this area often aligned itself with one of five main theoretical approaches to explain what risk is, how it is measured, and how it can be reduced. This chapter reviews the five main theoretical approaches to risk and perceptions of risk in the literature on work, including biophysical, human capital, structural, cultural, and integrated. I then review previous research on accidents, injuries and risk perception in fishing, particularly in Newfoundland, paying specific attention to the theoretical orientation underlying this work and to the findings. The chapter concludes with a discussion of the theoretical approach adopted in this thesis and in the larger Safe Catch project with which this work is associated. The integrated approach used here begins to fill in gaps that exist in fisheries research by acknowledging the dynamism, interactivity and complexity

of the causes of accidents (Van Noy 1995), while taking into account perceptions as well as behavioral and non-behavioral factors.

Occupational Risk and Perceptions of Risk

Definitions of occupational risk often refer to the parameters of risk, or the external risk that exists around people at work (Jermier, Gaines & McIntosh 1989: 16). However, there has been considerable debate over the nature of occupational risk, including to what extent it is "objective" and external, subjective and socially constructed, or a combination of the two. Risk analysts often begin by quantifying accidents and injuries and ranking the risk associated with particular occupations based on injury and fatality rates for workers (see Jin et al. 2002, for an example). Such studies generally rely on official statistics, measuring occupational risk factors by examining statistics gathered on the average number of injuries and fatalities, usually through agencies such as worker compensation commissions. Statistical patterns are often used to develop preventive measures that employers and workers can take to enhance safety.

Bartel and Thomas (1985) define the occupational risk terms "health" and "safety." Occupational *health* concerns, they argue, are characterized by ongoing, cumulative exposure leading to illnesses, while *safety* is a term reserved for the prevention of accidents which result in immediate injury or death

(25). Immediate injury and fatality rates are generally better captured in official statistics than physical health risks that develop over longer periods. Jermier and colleagues (1989: 16) break down occupational risk into the following components: physical harm (accidental and incremental) and emotional harm, as well as occupational risk and perceived danger. The distinction between accidental and incremental physical harm is comparable to the terms "safety" and "health" as defined by Bartel and Thomas (1985). However, this approach adds two new layers: a focus on emotional in addition to physical harm and attention to the distinction between occupational risk and perceptions of risk. Some researchers argue that safety, as opposed to health, is typically the main priority of those concerned with risk (Van Noy 1995). Risk, then, can be viewed as having a political dimension, including the decision process surrounding the identification of risk, what risk is considered to be "natural" rather than preventable, the selection of risks to be reduced or eliminated, and who is responsible for reducing such risks.

The distinction between "objective" and "subjective" risk sometimes takes the shape of a debate over the difference between "risk" and "perceptions of risk" (Rousseau & Libuser 1997). Those concerned with subjective risk argue that it is important to discover what people mean when they say something is "risky," because "those who promote and regulate health and safety need to understand the ways in which people think about and respond to risk" (Slovic 1987: 236). For example, sometimes danger may contribute to the excitement felt by workers

for their job resulting in workers viewing attempts to reduce risk with indifference. Similarly, risk sometimes enhances dignity; therefore workers may resist efforts to decrease risk (Jermier, Gaines & McIntosh 1989: 29 - 30). Risk researchers need to take into account the existence of multiple interpretations of risk so that safety programs are as meaningful and practical as possible for their targeted audiences.

Theoretical Approaches to Risk

There are five main approaches to risk in the occupational health and safety literature as it relates to the fishing industry. They are: 1) the biophysical determinist approach, which highlights the physical characteristics of the worker and the work environment; 2) the human capital approach, which emphasizes the individual's experience and attitudes; 3) the structural approach, which focuses on organizational influences on health and safety; 4) the cultural approach, which places emphasis on how perceptions and realities differ among groups; and 5) an integrated approach, which combines insights from the other four and adds interactivity and dynamism. This section will explore relevant points about each of the theoretical approaches, and demonstrate how an integrated framework could combine strengths from each.

Biophysical Determinist Approach

The biophysical determinist approach tends to treat risk as objectively measurable and the larger work environment and human bodies as relatively constant or fixed. Researchers in this paradigm tend to locate risk in physiological or mental health or in the natural environment, rather than a worker's experience, for example. From this perspective, certain types of work are inherently more risky than other types of work (mining or fishing, for example) and particular types of people – such as men versus women, or big men versus small men – are biologically more suited for certain jobs (Messing 1998). This view is reflected in approaches to work involving heavy lifting, as in firefighting and police work, which often require a strength or fitness test as part of the application process. A similar approach can be found in research on the causes of work-related mental health problems: "From the perspective of person-environment fit theory, job stress signifies a poor fit between the demands of the work environment and what the individual is equipped to handle" (Kirschenbaum, Oigenblick & Goldberg 2000: 632). Such a definition of job stress may accurately describe some situations, but it glosses over the dynamic nature of work in many occupations.

While it is true that biological and environmental characteristics differ between workers and worksites, the biophysical approach is most usefully understood as an entry point into risk research. Messing (1998) uses a

metaphor to describe the biological determinist approach to occupational health and its underlying assumptions:

> The theory of natural selection (square pegs in square holes, round pegs in round holes) would say that men and women have very different biological make-up and are "naturally" suited for different jobs. According to a crude version of this theory, men are stronger physically and more stable mentally. Being put into men's jobs is therefore dangerous for women, the more fragile sex (24).

As Messing indicates, there are a number of shortcomings with biological determinist approaches to occupational health. These are illustrated by multiple shortcomings with fitness tests: 1) they often include tasks that do not resemble those usually performed on-the-job; 2) tasks and processes are typically designed around an average male form; 3) such tests do not measure other skills that may help in emergency situations (Messing 1998: 38-40). While women are sometimes excluded from jobs based on their gender, and on related assumptions about their fitness and strength, Power (2005) argues that not all men are able to perform such jobs either. This demonstrates that gender, and therefore related biophysical factors, are clearly not sufficient conditions on which to include or exclude workers from particular jobs. Similarly, a comprehensive view of safety requires attention to more than biophysical factors.

Human Capital Approach

A second theoretical approach to occupational risk, human capital, is one of the most popular and has been adopted by many safety regulators. From this perspective, risk is clearly quantifiable and the primary cause of injury at work is human error linked to such factors as the employee's fatigue, stress, or lack of training. According to this theory, individual safety training designed to promote individual awareness is the most appropriate way to reduce risk. Iverson and Erwin (1997) tend to individualize risk in this way:

> ...a large proportion of accidents can be attributed to human error. Add to this the finding that similarly large proportions of accidents are experienced by a relatively small percentage of the work force. This leads to the conclusion that the focus of research on accidents should be to identify those personal characteristics which predispose some individuals, rather than others, to be injured at work. This type of disposition is called accident proneness (Cited in Kirschenbaum, Oigenblick & Goldberg 2000: 632-633).

This quotation illustrates the importance of individual characteristics and accident experience in risk research. Some researchers have noted the presence of trivialization or fatalism as ways of dealing emotionally with risky situations (Binkley 1994, 1995; Roberts 1993), and argue that such coping strategies can interfere with the safety training process by preventing at-risk workers from taking appropriate safety measures. It is important to note that *perceptions* of risk can have an impact on workers' health, as well as affecting their likelihood of being involved in an accident. Heightened perception of risk (of being in a dangerous

environment) can lead to health problems such as heartburn, stress, and depression (Roberts 1993).

From the human capital/human error perspective, the relationship of risk to perceptions of risk is similar to focusing a lens in order to see an image more clearly: there are risks 'out in the world' to be measured, and the necessary task is to bring the perceptions of the worker into alignment with the 'real world' through training and experience (Pollnac, Poggie & VanDusen 1995). Individuals are often identified as either "risk averse" or "risk seeking" (Weber & Milliman 1997: 123), although some researchers have argued that this split is explained by the individual's perception of the riskiness of the choice. To this end, Gaba and Viscusi (1998) demonstrate that perceptions of risk are mediated by level of education, with the results of their research supporting the claim that those with less education are less likely to consider a particular job risky. Their findings suggest effort should be concentrated on how people define risk, as well as what factors they feel contribute to risky situations. Some researchers have attempted to explain why people have different levels of anxiety and why they use different coping mechanisms to deal with it (Murray & Dolomount 1994; Joffe 1999). From this perspective, coping mechanisms like denial or trivialization of risk can interfere to some degree with enhancing safety, and raising awareness is the key to increasing safety.

While useful to understand part of the picture, the human capital approach to occupational risk has some important limitations. An exclusive focus on

personal characteristics and individuals obscures some of the broader structural factors that also contribute to the occurrence of accidents, and pays insufficient attention to the role of regulators, employers and employer-worker interactions in influencing risk and its outcomes. To address such structural factors, human capital factors like perceptions of risk can be studied in a way that meaningfully links the perceptions with the circumstances in which they are generated:

> The beliefs people hold about risk are typically used in social science to explain behavioral outcomes, such as the actions people take to protect themselves against hazards. However, such perceptions might more usefully be studied as dependent variables, that is, by focusing on where ideas about risk come from in the first place (Tierney 1999: 227).

This approach can be considered structural, and is explored in the next section.

Structural Approach

A third approach focuses primarily on structural and organizational risk factors such as economic pressure and regulation as a source of risk (Clarke & Short 1993, Tierney 1999, Wiseman & Burge 2000). The roots of this approach lie in political economy. "Risky systems, from this perspective, have structural features that discourage safe operations, independent of the inevitability of normal accidents" (Kirschenbaum, Oigenblick & Goldberg 2000: 632). Researchers using this framework are interested in things like support services, emergency and long-term health and safety facilities, and in examining how contextual factors shape and are shaped by human actors. Tierney, for example,

emphasizes "the broader organizational, institutional, and societal factors" (1999: 228) that contribute to the occurrence of accidents. Clarke and Short push this emphasis further, arguing that "human error" may sometimes be a superficial explanation of underlying systemic safety problems:

> The analytic procedures of the National Transportation Safety Board (the United States' major investigator of transportation accidents) prevent investigators from going much beyond attributions of human error in final reports. NTSB investigations focus mainly on the types of human error responsible for accidents, rather than possible underlying causes of the errors (1993: 387).

From a structural standpoint then, human error should not necessarily be the sole focus of research and intervention; "...judgments about risk and safety should... be viewed as the by-products of decisions made on economic and political grounds" (Tierney 1999: 225). Other contextual factors, such as the type of enterprise in which a worker performs his or her duties, can impact risk and perceptions of risk as well. For instance, "small workplaces are very challenging to reach and change in terms of prevention and health promotion, through either regulatory or voluntary approaches" (Eakin, Lamm & Limborg, 2000: 228).

The structural approach adds an important component to the study of occupational risk, and serves to deepen our understanding when combined with the human capital approach. The cultural approach discussed next furthers understanding of risk again, by identifying how risks come to be addressed and acted upon.

Cultural Approach

A cultural approach draws our attention to how various groups identify and seek to mitigate risk, and how certain understandings of risk and safety become accepted as 'true'. This approach sees risk as a social phenomenon that is defined differently by various groups of social actors (Douglas 1986), and focuses attention on the social processes that influence risk perception, definition, and mitigation. The aim of cultural theory "is to criticize the apparent depoliticization of risk issues – the subtle process of taking for granted the link between hazard identification and the normative choices that follow" (Tansey & O'Riordan 1999: 72). While regulation can reduce risk, it can also generate controversy over the allocation of the costs of safe production (Douglas 1986: 20). Cultural theory can help to identify who is 'responsible' – or liable – for particular risks, and how this came to be.

In this approach, the relationship of risk to perceptions of risk is mediated by cultural context. Cultural theorists argue there is no objective risk out in the world waiting to be discovered and measured; rather "risk" is moral and perceptual, and the critical task of researchers is to explain how certain patterns of risk are selected for attention while others are not (Douglas 1986: 55). In a similar fashion, Slovic claims that perceptions of risk are "mediated by social influences transmitted by friends, family, fellow workers, and respected public officials" (1987: 281). A human capital approach often obscures the creation process, treating risk as an obvious, external phenomenon; cultural theory, in

contrast, permits us to sociologically examine how specific sets of risks are named and acted upon.

From the cultural perspective, coping strategies or mechanisms are not seen as 'interfering' with safety – they are important social variables which shape the way people act in the world. "The wrong way to think of the social factors that influence risk perception is to treat them as smudges which blur a telescope lens and distort the true image. ... A better kind of analysis might treat such transformations of the image not as distortions but as improvements: the result of a sharper focus that assesses the society along with its assessments of risks" (Douglas 1986: 18). Similarly, Power (2005) describes social factors like coping strategies in critical, sociological terms: "Coping strategies are also sites in which to create meaning and a sense of self or identity, and they can become sites of resistance and accommodation. Coping strategies are not simply about meeting physical needs; rather, they are about both access to and the distribution and control of resources *and* ideas" (27). Thus, rather than attempting to distribute attention equally to all risks, groups in society tend to emphasize some risks while others are neglected. Joffe explains why all people are not equally subject to intense feelings of anxiety:

> The 'risk society' does not necessarily leave people with a heightened state of anxiety, as Beck's and Giddens' work may suggest. Nor do humans rely exclusively upon surveillance and insurance systems to control this anxiety, to 'colonize the future'. Humans possess defensive mechanisms which protect them from unwelcome emotion. These defenses are reflected in their representations of risks, which serve to control the anxiety evoked by the danger (1999: 7).

The representations of which Joffe speaks are those of the 'Other.' She argues that risk is typically conceptualized in terms of "it happens to others, not me" and that, as a consequence, we actually do not suffer from substantial levels of anxiety. Similarly, Douglas (1985) introduces the notion of subjective immunity: "In very familiar activities there is a tendency to minimize the probability of bad outcomes" (29). These statements have interesting implications in occupations where brave or fatalistic attitudes meet dangerous work.

Integrated Approach

A fifth, 'integrated' approach emphasizes the need for a broader framework for understanding risk that takes all of these elements into consideration (Jermier, Gaines & McIntosh 1989; Messing 1998; Torner, Cagner, Nilsson, & Nordling 1999). An integrated theoretical framework combines the benefits of the previous four approaches, including: the physicality of the worker and the job; the physical and intangible resources of the person; and the social, economic and cultural context in which the work occurs and the person lives, as well as interactivity between these factors and changes over time.

Messing suggests that the best way to think about of the issue of person-environment fit is in terms of the metaphor "clay pegs in clay holes" (1998: 24). This metaphor reconciles both the human error and structural approaches to risk, illustrating "mutual adaptation" (24) between the worker and the work

environment. Her analysis primarily focuses on the relationship between sex, gender and work, but the implications extend to other aspects of occupational risk as well. "If we do not accept biological or social determinism, the gendered division of labor in poultry processing and elsewhere must be explained in more complex ways, related to interactions among social, biological, and political factors in the historical context of particular factories and services" (Messing 1998: 25). Such comprehensive explanations could take into account the dynamism and complexity of worker/environment interactivity.

Jermier and colleagues (1989) pull together the threads of the cultural and "objective" human error perspectives in a way that values both, arguing that "while it is likely that perceptions of physical danger are affected by social construction processes, they are also grounded in real injury, illness, and death probabilities" (28). The dynamism of risk is linked to the constant interaction between actors, their perceptions and structures: "risk levels are continually in flux because risk is a product of how social actors behave. ...More broadly, social change continually modifies risk and vulnerability" (Tierney 1999: 229).

A comprehensive integrated approach to risk would therefore include human (physical, behavioral and attitudinal) factors, structural (political and economic) and cultural factors, with careful attention paid to the dynamic, mutual adaptations between the person and their environment. This type of integrated approach could hold significant explanatory power in the study of dangerous occupations.

Risk and Perceptions of Risk in the Fishing Safety Literature

Fishing has a high rate of injury and fatality compared to most other occupations (Roberts 2004) and is thus a high risk occupation. It is also generally associated with high job satisfaction, partly due to "the sense of freedom, the excitement, the feeling of achievement in getting a good catch, the whole lifestyle of being a fisherman" (Murray & Dolomount 1994: 10). Research conducted in international, national and provincial contexts has examined which fishing sectors are associated with high levels of risk, as well as which factors – situated in a complex, interactive web – influence risk and safety; and how they do so (Lawrie, Matheson & Morrison 2000; Binkley 1994, 1995; Murray & Dolomount 1994). A review of the literature suggests that an integrated approach to fishing safety research that combines fish harvesters' experiential knowledge with that of fisheries scientists, safety experts and policy-makers treats fishing safety as not only an "emergency protocol," but also as an ongoing workplace issue and considers both behavioral and non-behavioral factors that contribute to risk and safety, is the best approach.

International, National, and Provincial Fishing Safety Research

Research demonstrates the high incidence of injury and loss in the commercial fishing industry internationally, nationally, and provincially. "High rates of fatalities and injuries can be partially attributed to the inherently dangerous

working conditions involved in the industry. These include: an unpredictable and often hostile marine environment; unstable work platforms; resources that are mobile, variable, diverse, often dangerous (bites, poison, allergies) and often located in remote offshore areas; moveable and often heavy equipment, and a dependence on vessels for shelter and survival" (Windle et al., 2008). Researchers in Scotland found "back injuries were the most common type of injury sustained at sea. Leg or arm injuries, cuts requiring stitches, other hand injuries and head injuries were also fairly common" (Lawrie, Matheson & Morrison 2000: 254). In the United States, Van Noy (1995) gathered a panel of fish harvesters to conduct a peer review of Coast Guard incident reports. The panel found behavioral accident causes, or "unsafe actions," to be responsible for 51 percent (n=62) of the accidents they reviewed, while the Coast Guard assigned behavioral causes to only 18 percent (n=22) (1995: 27). There may be a tendency for official investigators to stop searching for contributing factors once they have identified a direct technical cause. In addition, Van Noy argues that this difference is based on the fact that the "assignment of cause is made by Coast Guard investigators who are trained in seamanship but rarely in fishing operations" (25). The harvesters who peer-reviewed the reports, however, are much more familiar with the everyday tasks of fishing. This demonstrates the need to combine insights from regulators, investigators and practitioners to account for as many factors as possible.

In Newfoundland, a study conducted shortly before the cod moratorium revealed the most frequent injuries among participants to be cuts and bruises (42%) followed by sprains or strains (26%) and back injuries (Murray, Fitzpatrick& O'Connell 1997: 294). "Just over one-half of the fishermen reported having had at least one injury at sea in the past year. Approximately one-third of these reported that it required medical attention although only two required hospitalization" (295). The high rates of injury juxtaposed with the low reporting rates to regulatory agencies suggest a need for new methods of reporting incidents to mitigate future risk. Alternatively, there may be a need to redefine the term 'accident' or 'injury' for both groups.

Risk Approaches in the Fishing Safety Literature

Biophysical Determinist Approach

Relatively few accounts of risk in the fishing safety literature exclusively emphasize the inherent risks of working in marine environments or the fit between worker strength and fitness and the demands of fishing when explaining high injury rates. Lawrie and colleagues (2000) note high rates of smoking and obesity among harvesters, which may lead to cardiac problems. However, they also point to organizational factors as contributing to risk in this context: if a fish harvester has a heart attack on board, there may be little medical help available. Or, if the skipper's ability to navigate is compromised, the safety of all onboard

may be jeopardized because often, only certain crew members are trained in navigation. That said, some have suggested that there is a prevailing view that the physical requirements of fishing make it too challenging for women. Power argues, for example, that "physical prerequisites have been used to exclude women from fishing and to legitimate such exclusion. However, in the views of some fisher respondents, not all men could handle the hard work and long hours either" (Power 2005: 89). Thus, while the physical characteristics of a particular job are important to consider, the relationship between a person and their work safety cannot be simply explained by factors like sex or physical size.

Human Capital Approach

A human capital approach to understanding risk and risk perceptions in fishing would focus on harvesters' attitudes, training, experiential knowledge and other internal resources. This approach is particularly prevalent in the perceptions of risk literature on fishing safety and, in some cases, can be very useful. For example, research has shown that while fish harvesters consider rough weather to be an important risk factor in accident and injury, most incidents happen in bright, calm weather (Jensen, Christensen, Larsen & Soerensen 1996:14). The human capital approach would explain this as an illustration of how individuals' perceptions of risk may not match reality. In this case, training may help spread accurate information about an occupational risk.

Murray and Dolomount (1994) used a psychological approach to examine the human or behavioral factors associated with risk and injury in the Newfoundland small boat fishery in the 1990s. Their work investigated levels of anxiety among harvesters and use of coping mechanisms, ultimately finding a high level of anxiety among harvesters but also that trivialization and fatalism were not as widespread as they anticipated. Murray and Dolomount suggest that this finding may be a result of shortcomings in their research instrument. An alternative explanation might be that the shortcoming is in the approach; perhaps asking some questions from a structural or cultural standpoint might shed light on why the results were not parallel with their predictions.

Pollnac, Poggie and VanDusen (1995) use a human capital approach in their research on New England commercial fish harvesters, focusing on individual factors such as lack of safety training, a lower position in the crew, kinsmen in the crew, and more years fishing (153) when explaining the relationship between attitude and safety behavior. They argue such factors contribute to a "less realistic perception of the severity" (157) of eight types of accidents, as compared to Coast Guard data. Denial and trivialization are emphasized here, as well as in Murray and Dolomount's work, and training programs targeted at individuals who fit the above categories are suggested as a good way to reduce risk. Pollnac and colleagues argue harvesters "fail to take enough interest" (153) in learning how to use safety equipment, and suggest showing films of vessels sinking and other "'reality-inducing' techniques" to

"overcome the denial-trivialization way of thinking sufficiently to enable participants to take the safety course materials seriously" (158). Trivialization of risk should be taken seriously, and accurate perceptions of risks and how to deal with them are necessary.

The human capital approach is useful in its focus on how individuals can take steps to enhance their own safety, but it can also mask some environmental and structural influences on the decisions made by harvesters. As such, the next section explores the role of structural factors in the fishing safety literature.

Structural Approach

Wiseman and Burge (2000) share other researchers' concerns about harvesters' failure to use safety equipment. However, their approach also points to the role of structural factors in mediating risk. Thus they argue, "[w]ithout absolving fishermen of their responsibility to adopt proper safety measures for the safe operation of their vessels, other players must recognize their responsibility and act decisively" (18). Some harvesters refuse to purchase or wear personal flotation devices, arguing that there are few such safety devices that are comfortable and safe. From a structural viewpoint, then, the designers of safety devices bear some responsibility for risk; safety equipment might save many more lives if it is accessible and comfortable to wear while working. Such health and safety trade-offs are present in a variety of contexts in fishing, which makes

it important to study organizational factors that might mediate compliance with safety regulations.

Several researchers have argued that dynamism and related structural changes in the Newfoundland and Labrador fishing industry in the 1990s need to be addressed in efforts to reduce risk (Dyer 2000; Wiseman & Burge 2000). In recent years, change has become a significant factor in these and many other fisheries. Structural changes that are intended to decrease risk of accident or injuries, for example the introduction of Individual Quota systems, may or may not in fact result in reduced accident rates. Mitigating factors include the total amount of quota that individuals or organizations can aggregate (fisheries with clearly specified aggregation limits have seen decreases in fatality rates and accidents, whereas fisheries with no restrictions on quota aggregation have not), as well as the ownership and control of licenses, given the increasing tendency of small vessel owners to work for larger corporations (Windle et al. 2008).

Cultural Approach

Cultural research on the fishery primarily examines how particular safety issues are identified and addressed, and how other risks seem to be neglected or accepted as normal. Boshier (2000) outlines a variety of theoretical approaches that are used to understand and explain risk, and illustrates why one group may locate risk solely in human error, and another may emphasize the safety culture or rapid changes in the industry. Binkley (1995), for example, reports offshore

ex-harvesters' stories about their accidents and about leaving the fishery are often presented in a personal way, which can mask the ways that management policies can cause increased safety risks, stress, and job dissatisfaction. The cultural perspective can also partially explain why harvesters use coping mechanisms like trivialization and denial. For example, perceptions of risk can be critically altered after experience with an accident or injury. Binkley suggests that trivialization is an understandable, if not necessary, response to daily hazardous work. "Ex-fishers respect and realize why fishers trivialize risks, and they discuss those risks because they will never go fishing again" (1995:141).

Prevention of accidents and injuries can be enhanced by closely analyzing the work processes in progress at the time of an incident. "Accident statistics provide an overview of the number of injuries in this industry compared with other industries, but most statistics lack details as to specific working processes and fishing methods" (Jensen, Stage, Noer, & Kaerlev 2005: 425). In other words, injury statistics presented without the work history are not as meaningful or useful as they might otherwise be. Detailed coding of injuries related to the specific working processes of various fishing methods can be used for epidemiological studies of injuries and dangerous situations on fishing expeditions, and for systematizing preventive measures (429). Safety can be increased by providing highly detailed accounts of how and why injuries happen, accounting for as many factors as possible.

Integrated Approach

Most accidents have no single, simple cause but arise as a result of many interacting circumstances (Kletz 1994). As a result there are many ways of breaking the chain of events that culminates in an accident. Effective prevention lies far from the event immediately prior to an accident, and Kletz names several factors that can reduce risk. First, he emphasizes the importance of user-friendly designs, which will tolerate departures from ideal operation or maintenance without an accident occurring. Second, the importance of and need for "hazops" (hazard and operability studies) are identified; essentially, these allow the stakeholders to maintain a comprehensive perspective on possible danger. Kletz also explains that there are several different types of human error, including: mistakes, violations, mismatches between ability and job, and slips and lapses of attention. Each of these types of error warrants a different type of reaction. He argues that no one should accept a reason such as organizational weakness for an accident, and says such a statement should be backed up by recommendations that specific people should take specific actions to prevent a recurrence. Unless this is done, he asserts, the accident is bound to repeat.

In the United States, Van Noy (1995) applies an injury data framework originally developed by Gielen in 1992 to the commercial fishing industry. This approach is particularly useful because it entails an analysis of the environmental and behavioral determinants of injury, as well as influencing factors that

reinforce, predispose, or enable such determinants (21). The framework includes three streams of intervention planning: engineering/technological, legislative/enforcement and educational/behavioral (1995: 21). As explained earlier in the introduction to the section on approaches to fishing safety, this could present a way for experts in different fields (fishing, vessel design, safety education, search and rescue, and equipment design, for example) to integrate their knowledge into a single framework. Van Noy's research demonstrates the value of such integration by encouraging one group of stakeholders to peer-review the safety conclusions of another group. In this case it was a group of fish harvesters reviewing the conclusions of the Coast Guard about assigned accident causes, which yielded deeper insights about prevention of injury; however, this model could be usefully employed in a variety of contexts. "The consolidation of risks, including those that may indirectly impact fishing, into a single conceptual framework helps to illustrate these complex interactions, and to identify types of regulations that may mitigate such risks" (Windle, Neis, Bornstein & Navarro 2006: 15).

A model to promote implementation of safety measures, developed in Sweden (by Torner, Cagner, Nilsson & Nordling 1999), could hold the key to the consolidation of multiple risks into a conceptual framework. The model begins with a cost-benefit analysis of accidents and safety measures and then illustrates how, for example, the purchase of a ladder for embarking/disembarking (cost: <$250 US) and the device for safely securing it to the vessel (cost: <$60 US)

could prevent the loss of thousands of dollars in lost time and medical expenses (97). Part of their intervention model includes a participatory safety inspection, highlighting dangers on the vessel and potential ways to mitigate them, and long-term follow-up to see which safety measures were implemented. A critical benefit to this approach is the opportunity for harvesters to identify and express issues of concern to them; for example, if a particular regulation is seen as presenting a problem in terms of safety, the harvesters can formally discuss the issue.

An Integrated Approach to Fishing Safety

An integrated approach to safety in fishing is required to prevent safety from being seen in isolated ways through the lens of only one approach at a time. Speaking from the "Integrated" point of view, individual factors such as a poor fit between physiology and work, or human error due to inappropriate perceptions of risk or poor training can be seen as potentially interacting with particular working conditions in specific organizational frameworks. Researchers exploring typical fishing accidents in Scotland (Lawrie, Matheson, Murphy, Ritchie & Bond 2003), for instance, have found bad weather (biophysical), financial pressures (structural) and lack of sleep (human capital) to be among the major contributing factors to accidents according to fish harvesters in Scotland.

Murray's earlier work on trivialization (Murray & Dolomount 1994) suggests that the severity of harm might be downplayed to some extent by harvesters. Trivialization did not, however, stand alone. "An added risk recently was the fact that because of the restrictions on fishing, many fishermen now go to sea alone. In this situation one slip could have serious consequences" (Murray 2002: 247). Fishing alone, fishing further from shore, and in vessels that are not appropriate for the distances are all rather new developments in this Newfoundland and Labrador inshore fishery that have had an impact on fishing safety. One harvester in the present study, whose comments we will revisit in the results chapter, illustrates this point by suggesting that DFO should **"alleviate regulations on boat size but not [increase quotas] – we feel unsafe, don't need more quota. Crab boats are forced offshore in 34'11"s but they should be in a 45' or 50' boat. That takes years to change and shouldn't be out there in those boats but he got to make do with what he got" (FH 39).** This relatively brief statement unpacks to reveal connections between individual choices such as where and when to fish, and structural constraints such as quota allotments and vessel length, as well as fishing seasons and regions. Regulatory changes may not keep pace with each other (boat size vs. fishing region, as indicated above) or changes in fishery conditions. An integrated framework can consider different types of factors simultaneously without sacrificing an understanding of one for another.

Strengths of an Integrated Approach

Learning more about the complex, interactive causes of accidents and injury can help inform policy-makers and practitioners alike. Increasing safety is a win-win proposition: in terms of social costs, fewer accidents and injuries mean reduced costs for search and rescue, for healthcare, and rehabilitation services. In economic terms and within fisheries, it means less lost time and unproductive fishing trips, as well as the maintenance of low insurance premiums. In social terms, it means fewer individuals and families suffering from an injury or death.

Before regulations that increase safety can be introduced, it must be determined that they do, in fact, reduce risk in some measurable fashion; and one of the best ways to do that would be to engage the experience of people who are out there, doing the work and seeing risks first hand as well as that of experts. Otherwise, the consequence may be that fish harvesters become disillusioned with an ever-changing, seemingly meaningless string of policies. Only through true collaboration with fish harvesters is it possible to gain insight into their everyday working conditions and make the implicit elements of their safety decisions explicit for the purposes of increasing safety (Van Noy 1995). In addition, such collaboration might also increase the likelihood that new regulations will be followed, if harvesters feel engaged and invested in the development of policy.

In an integrated approach like this, it is important to include the strengths and insights of biophysical, human capital, structural and cultural research, and

account for both behavioral and non-behavioral factors. Wiseman and Burge (2000), for example, argue that structural factors have been neglected by the Canadian Coast Guard. Van Noy (1995), on the other hand, suggests that the U.S. Coast Guard, in its routine analyses of accidents at sea, tends to emphasize structural factors such as vessel safety and Search and Rescue operations to the exclusion of acknowledging the role that human actors play.

One way to understand and apply harvesters' practical knowledge about fishing safety is by using the method developed by Torner, Cagner, Nilsson and Nordling (1999). The process includes: (a) thorough research on the types and frequencies of different kinds of accidents in a particular fishing region; (b) systematic visits by safety experts to identify technical shortcomings onboard vessels; (c) short-term follow-up communication with harvesters by such experts to reveal whether action was taken about identified shortcomings, as well as harvesters' reasons for compliance or noncompliance; and (d) long-term communication with harvesters about safety. The long-term communication is a key aspect of the method, as it can address the dynamism of the industry as well as the interactivity of risk factors; furthermore, such communication could present a way to incorporate information about near-misses and otherwise unreported incidents. The majority of the harvesters who completed such communications were appreciative of the 'face time' with safety experts; this interaction would permit the harvesters to add their voices to the safety discourse.

The next chapter describes the research method used in this study. We begin with a brief examination of the focus groups, information from which was used to devise some of the questions in the phone interviews. Because the phone interview was the main research instrument, I explore its creation and delivery in greater detail than the other methods.

Chapter Three: Methodology

This chapter examines the methodological approaches and issues associated with this study. First, I outline the conceptual design of the project, explaining the rationale and the overall approach. Next, I describe the development of the interview schedule and instrument, including the selection of telephone interviews as the delivery mode. After that, I will elaborate on the sampling process, ethical concerns, and the process of data collection and analysis. The chapter concludes with a discussion of the importance of the research, and the limitations of the study.

Rationale

My research privileges and also scrutinizes Newfoundland fish harvesters' knowledge. One goal of this study is to examine their beliefs about safety in a way that picks up on commonality and diversity among groups of harvesters (for example, younger and older harvesters). It makes sense to include their experience and points of view in an investigation of fishing safety because they are the people who go out to sea and have direct experiential knowledge of what

fishing involves, conditions under which it takes place (physical, regulatory, economic, social, technical), and within those conditions, things that help them to fish safely and that encourage them to take chances with their health and safety. Finding ways to enhance occupational health and safety in commercial fishing is particularly challenging because tension can exist between conservation rules, safety regulations, and the technological and training requirements for safe fishing. Added to these challenges, fish harvesters often feel targeted and misunderstood by regulators they sometimes blame for increasing risk.

My point of view as a social science researcher permits me to create a third kind of knowledge: neither practitioner nor industry regulator, I can compare harvesters' knowledge to what has been published by regulators and analyze what each group says about safety to find commonalities and differences. As outlined in the literature review, I acknowledge that notions of risk are socially constructed and not simply something obvious or 'objective' that can be simply observed. However, that criticism could paralyze efforts to analyze which factors contribute to safer fishing. Therefore, like Sjoberg, "I presume that 'there is something out there' and that some statements about that something are better than others. It is our job to improve on statements about risk reduction" (2000: 412). Examining the similarities and differences in the positions taken by different social groups, including harvesters, and combining insights from those groups can help bring us closer to that 'something that is out there' (Neis et al., 1999).

A second goal of this research is to investigate which factors may protect or endanger fish harvesters, as well as how these factors interact. For example, we want to know more about how policies that regulate fishing affect safety and, if so, which regulatory agencies are affecting safety and how. This is important because the risks harvesters face are shaped to some extent by policy-makers in various government departments, whether or not those departments have any legislative responsibility for safety.

Sometimes harvesters' resistance to particular regulations is glossed over: Dayton (1998) says "regulations often are barely tolerated" (821) by harvesters. Sociological research that draws on fish harvesters' perceptions of risk and expert knowledge can help to illuminate how and why harvesters might resist particular regulations. Research like this can also identify ways of expressing and then meeting the goals of all parties involved. Participation by fish harvesters in the risk knowledge creation process can help ensure that safety measures are pertinent and practical (Torner, M., Cagner, M., Nilsson, B., & Nordling, P-O. 1999)

Selection of Delivery Mode: Telephone Interviews

The focus groups provided a broad overview of the issues that harvesters felt are important to fishing safety. Given that the nature of focus groups is a give-and-take discussion, and that a snowball-sampling strategy was used, we felt a

telephone interview with a stratified random sample would work best for achieving findings that might be more evenly applicable within and between fisheries. It is possible that the contacts who invited other harvesters to take part only invited those who shared their point of view. A more random sample of harvesters for the interviews could ensure that we would not encounter the same potential bias in both components of the research. The information gathered with focus groups gave us a good idea of the significant issues such as regulations and training; we wanted to explore some of them more deeply in a more structured way, while making sure respondents had ample opportunity to express themselves. I was present at one focus group in which one individual dominated the conversation, raising his voice to speak over the facilitator and other participants in the focus group.

A telephone interview was an inclusive research instrument for our purposes because it permitted us to reach fish harvesters around the province. As in the case of McGraw, Zvonkovic and Walker's study, "in addition to their extremely variable schedules, the participants in our study lived hundreds of miles away from us and from each other" (2000: 71). Traveling to interview harvesters face-to-face would have required extensive commitments of time and money, without offering significant advantages compared to interviewing over the phone. Compared to mail-out surveys, completion rates tend to be higher over the telephone, and delivering it this way also helps encourage the participation of those who might be intimidated by a lengthy paper survey (Marcus & Crane

1986). This is particularly important in an industry where many of the older harvesters left school at a young age to go fishing (Fagan 1998), and where literacy skills are not considered as important as having a strong back and good work ethic. That said, for younger harvesters, as we will explore in the data chapter, education has become a kind of insurance in an industry that is becoming increasingly insecure.

Development of the Interview Schedule

The phone interviews that constitute the core of the data used here composed the second stage of a multi-phased Perceptions of Risk component of SafeCatch. The first phase consisted of 17 focus groups carried out around the island of Newfoundland in 2003. Contacts at the Professional Fish Harvesters Certification Board (PFHCB) and the Fish, Food and Allied Workers (FFAW) union identified members of the community they considered knowledgeable about fishing safety (typically those who were involved in offering safety courses) and gave us their phone numbers. Participants in these focus groups were asked to discuss broad questions about their experience with risky situations, whether and how risks to fishermen have changed over time, and whether things like training and regulations affect safety. Responses to these questions helped to identify specific areas of interest that we explored in a more structured way with interviews.

Interviews have the potential to add to the understanding of risk and perceptions of risk emerging from the focus groups in several ways. Interviewing harvesters in a one-on-one interview could result in different kinds of answers than we might get in a group context. For example, harvesters might not mention dangerous practices if they knew that some of the other focus group participants had engaged in that behavior. In addition, group conversations can sometimes be sidetracked by one or two individuals who are relatively more vocal than the others; one-on-one interviews permit interested respondents to express all of their comments and concerns and to have more control over the flow of the interview (along with the researchers) (see Sica 2006 for a complete review of the comparative benefits and disadvantages of focus groups, surveys and interviews). Semi-structured interviews offer some of the benefits of standardization and comparability, while still offering a way for qualitative information to be included (Marcus & Crane 1986).

Questions for the interview schedule were developed by modifying a questionnaire that had been used in Binkley's (1994) study of offshore fishing safety, as well as through insights from the focus groups. New questions and answer options were introduced so that the inshore and midshore fleet information would make sense. Our interview schedule was pre-tested with five harvesters, and adjusted and shortened after each pre-test. We changed some questions to increase respondents' comfort level and to lessen any sense of

intrusion; for example, we decided not to ask for specific information on income and enterprise value, but rather to inquire about broad categories in these areas.

Outline of Interview Sections

The questions in the final version of the schedule were broken down into several major sections including questions on work experience and job satisfaction, as well as experience with and importance ratings for various types of training and equipment. We also included a few questions about health and a number of multi-part questions on accident and injury history. The interview questions focused on the last 10 years, primarily because we were interested in changes over the last decade; this period included substantial spatial, fishing gear and technological changes as well as regulatory changes and changes in fishing location and conditions associated with the closure of the cod fishery in 1992. The effects of the subsequent shifts in effort are a central focus of the larger Safe Catch project.

To give the answers some social and economic context, we inquired about their family, their income level and their enterprise value. In terms of inquiring about job satisfaction, many factors influence harvesters' expressed levels of fulfillment. Dramatic changes in the industry over time could potentially have dramatic effects on satisfaction, so we asked how satisfied they were with their jobs compared to 10 years ago. We also asked whether they would encourage

their children to fish for a living (hypothetically for those without children) as a long-term gauge of satisfaction and hope for the future of the industry. As the final question, we asked, "If you had your life to live over, would you go into fishing again?" as one way to determine a 'bottom line' of satisfaction. The following section briefly describes each section of the interview schedule.

The first section, Questions 1 to 18, inquired about demographic and background information. Questions covered the respondents' age, marital status, the number and age of their children (if applicable), as well as when the respondent had started fishing and their region of residence. Questions 11 to 18 established the context for their work in fishing: which sectors they had worked in, licenses held, species targeted, their general level of education and their fisheries-specific training.

The second section, Questions 19 to 42, focused on the vessels respondents had worked on in 2004 (the last full calendar year before the research was carried out). Questions 20 through 36 dealt with the vessel they spent the most time on in that year. This section covered vessel length and design and the types of fishing gear used. It also inquired about navigational, communication and safety equipment onboard, as well as the frequency of safety drills. Questions 37 to 42 asked about position on the vessel, how many crew were usually onboard, and whether or not family members worked on the vessel with the respondent.

Questions 43 through 47 dealt with harvesters' perceptions of risk, and included open-ended questions as well as lists of technical, social, regulatory and personal factors ranked in order of importance to fishing safety on a scale of 1 to 5 (1 being not important to fishing safety, and 5 being extremely important to fishing safety).

Questions 48 through 51 asked about their experience with risky situations in the past 10 years (for example, whether they had been onboard when the engine failed, or fallen overboard) and whether such experiences had changed their attitude towards safety.

Questions 52 through 55 dealt with specific safety equipment, practices and regulations. Question 52 listed 29 items that may be found on a fishing vessel (items such as GPS and Life raft) and asked respondents to rate their importance to safety on a scale of 1 to 5. Question 53.01 to 53.14 asked for the same rating scale applied to regulations – gear-setting rules and vessel-length restrictions, for example – and boat factors as well (e.g., age, maintenance and design of the boat). Questions 54 and 55 asked whether harvesters perceived certain vessels or fisheries to be more unsafe than others.

The sixth section, 56 to 72, asked about accidents and injuries at sea, including what types of injury might be expected as a normal part of fishing. Question 57 asked how many accidents the respondent had experienced during the past decade, and we inquired into the context and details of the most severe accident reported (if any).

Questions 73 to 77 inquired about marine and land-based weather forecasts: how often respondents check them, which sources they use, and how accurate the forecasts have been in their area over time.

Question 78.01 to 78.20 covers job satisfaction, listing social, personal, financial and regulatory factors that we asked respondents to rate on a scale of 1 to 5 (1 being very dissatisfied and 5 being very satisfied). We also asked about their overall satisfaction with fishing as a job, and their satisfaction now compared to 10 years ago.

Questions 79 through 81 ask how the respondents were paid for their work in 2004 and into which income bracket they fit. This section also inquired about the investment and possible return from their enterprise, if applicable.

Questions 82 to 89, the final section, asked about health and family. Questions 82 to 85 inquire whether they feel they have any health problems related to fishing. Questions 86 to 89 ask how often their family worries about them while fishing, and whether/how their worry has changed over the past 10 years. The last two questions ask if their family would rather see them in a different occupation and whether they would go into fishing again if they had their life to live over.

Sample

Our original goal was to survey a random sample of 100 professional fish harvesters stratified on the basis of region and on the basis of level of professional certification. To find our sample, we asked the Professional Fish Harvesters' Certification Board (PFHCB) to generate a stratified random sample of 600 names from its list of professional fish harvesters. The stratification was based on the level of professionalization, including Apprentice, Level I and Level II harvesters. The purpose of the stratification was to ensure we got responses from harvesters who had been in the industry for many years, as well as from those who have just entered. We wanted the sample to include women as well, but we did not receive enough responses from women to make a meaningful analysis of the effects of gender. This could be for a variety of reasons; for example, women in the fishery often feel like they are under surveillance for Employment Insurance reasons (Grzetic 2004).

The PFHCB mailed a package to each of these 600 individuals containing an information sheet about the study (included as Appendix A), a letter requesting their participation (included as Appendix B), a letter of support from the PFHCB, a contact reply form and a stamped, self-addressed envelope for use by those interested in participating. The harvesters were asked to return the form to SafetyNet. We were not able to contact the harvesters directly because the PFHCB could not release its list of names and addresses of professional fish harvesters for privacy reasons. Fish harvesters who were interested in

participating returned the self-addressed, stamped envelope and were contacted by an interviewer over the telephone to schedule an interview. During the initial telephone call the interviewer read a script that asked for oral consent in addition to the written consent received via contact reply forms. The oral consent document is included as Appendix C.

Unfortunately, after the first mail-out of 600 packages, we received only 35 responses, and from these were able to complete 25 phone interviews. We attempted to increase our response rate by asking the PFHCB to send a second package of information to the same sample in September. We received 19 responses to this second mail-out and, from these, managed to complete an additional 15 interviews. The 14 harvesters who returned a contact reply form, but did not complete the interview, generally experienced some sort of scheduling conflict due to personal travel or fishing.

The Principal Investigator of the project, Dr. Barbara Neis, also discussed the research during a radio interview with the host of CBC's Fisheries Broadcast during which we issued an invitation to harvesters to participate. This advertisement generated an additional three responses (calls to a confidential toll free line) of which all three led to completed interviews. In light of the overall low response rate to these multiple initiatives, we revisited the last few pre-test interviews we had conducted using a version of the interview schedule that was very close to the final version and, with the permission of those three individuals, re-classified their interviews from pre-test to test interviews. Thus, the total

number of completed interviews for this research is 46. Selected data from these are the focus of analysis in the remainder of the thesis.

We initially attributed the low response rate to political turmoil in the industry that erupted in the snow crab fishery around the time of the mail-out, and to the fact that the mail-out took place in the spring after many harvesters were back fishing. I also believe that harvesters in Newfoundland have become somewhat wary of anything that might increase their costs, and some harvesters remarked after the interviews that they hoped their participation was not going to be used as justification to bring in more mandatory training or equipment. We also faced the challenge of getting respondents to mail in a consent form, and then set up a time to do the interview. Participation might have been much higher if we could have traveled to the communities, explained the study in person and had them sign a consent form at that time; however, time and budget constraints prevented this.

Every member of the population theoretically had the possibility of being included in the sample (Henry 1990), because the PFHCB drew our sample from its list of certified harvesters. After the completion of the study, I spoke with the Executive Director of PFHCB who said that our sample and findings appeared to be fairly representative of harvesters in his experience; however, some information about the harvester population such as their overall level of formal education, is "virtually impossible to ascertain" (M. Dolomount, personal communication, December 12, 2007). The stratified random sample for this

study is not large enough to be statistically representative of the entire harvester population, but it is a very important source of information (Dorofeev & Grant 2006) about harvesters' observations and understandings of the risks they face, factors that appear to influence these understandings, and about their job satisfaction. It also provides insight into the interactive nature of the factors that affect risk, and how such risk might be reduced.

Ethical Considerations

Full ethics approval was received on March 17, 2005 from the Human Investigation Committee in Memorial University's Faculty of Medicine. As part of the process, we agreed to obtain free and informed consent from the interview participants in the form of oral consent prior to the phone interview initiated following receipt of a voluntarily returned contact reply form.

Appropriate care is being taken to ensure that none of the participants' rights such as their rights to confidentiality and anonymity are violated. Data are stored in a password-protected computer folder and a locked cabinet in secure storage, and only approved members of the research team have access to personal information. I assigned numbers to the completed interviews, and these documents are stored separately from the master list of names and interview numbers. Names are not used in any reports and identifying details are altered where necessary so that as much anonymity as possible is retained in the work.

Data Collection and Analysis

In total, I carried out 46 telephone interviews between May 2005 and January 2006. Two researchers participated in each interview: I asked the questions and recorded the answers to the quantitative questions, and a research assistant captured qualitative answers as well as extra remarks or 'asides'. Having an assistant present helped ensure more of the information was captured, compensating for the decision not to audio-tape. It also helped the interviews flow more like conversations because I did not have to pause to write down extra comments.

Many of the questions had between 10 to 30 items that we wanted to know about, so we created 5 point psychological rating scales for these questions (e.g. "1 is not at all important, 2 is slightly important, 3 is important, 4 is very important and 5 is extremely important.") These have been used extensively in previous research on perceptions of risk (see Sjoberg 1994; 1987). My supervisory committee and I debated whether or not I could use this information in a 'quantitative' way, realizing that such scales are not interval measurements and thus calculations like mean and standard deviation are not statistically viable. However, some researchers have argued that such rating scales show similar trends to those found in more detailed, statistically sophisticated measurements, without bogging down the participants in complex details:

> In a methodological study, I investigated the properties of various response formats used for studying risk perception (Sjoberg, 1994). It was found that all formats gave essentially linearly related results, but that some of them gave data which were more efficient to discriminate among hazards. Category scales with a limited number of response categories, say 5 or 7, appear to be preferable (Sjoberg, 2000: 411).

For simplicity's sake, in the presentation of the data I will refer to the "average" satisfaction, danger rating, and importance rating, anywhere a psychological rating scale was used. The term carries with it the understanding that it is not an interval category and therefore the results cannot be considered statistically significant. However, because "psychological rating scales give close enough approximations to interval scales" (Sjoberg, 2000:410), this terminology will help streamline the presentation of results.

To make the results more vivid, I have created character composites using the template of "imaginary CVs" developed by Rickard (2001). Her work dealt with sex workers in the U.K., which at first glance may seem very different from commercial fishing work. What is similar between the occupations, and helps us present the data here in a clear way, is the attention that the imaginary CV pays to "working in different 'work sites' or settings and to those at different stages of their 'careers'" (2001:115). These are both industries where workers usually do not have traditional 9-5 workdays, and typically their worksites can change. Workers in these industries tend to be mobile and dynamic, and that's why Rickard's use of imaginary CVs is useful here. The CV helps to holistically picture the worker as a situated, social being:

> I chose this format of presentation as a novel way to conceptualize sex work as a job in the context of a whole life. The aim was to summarize the range of work experiences that each person described and to introduce people's own reflections about their working lives and their futures in their own words.
>
> The CVs are then 'imagined' and narrative-based, differing from a conventional curriculum vitae in both purpose and writing style (Rickard 2001:116).

Furthermore, the stress and potentially risky nature of the work are important common elements between the occupations. This suggests that a tool useful for analyzing work in the sex industry could be very useful in analyzing fishing.

Importance and Limitations

One of the strengths of this research lies in its ability to bring together insights from different groups; this begins to close some gaps that exist between harvesters and regulators. Furthermore, this type of research gives harvesters an active voice in the process, rather than treating them as passive yet resistant 'receptors' of safety research findings.

We did not interview enough fish harvesters to ensure any of our findings are statistically significant or generalizable to the larger population of fish harvesters in Newfoundland and Labrador. Our results are not 'wrong' simply because we do not have a large enough sample to generalize; however, we certainly may have a tendency to highlight some issues that are especially important to the group that did participate (Henry 1990). Related to this, it is possible that the people who volunteered to do an interview may in some way be

different from those who did not. One possibility is that those who volunteered may be the ones who do everything 'by the book,' as those who deviate may have been nervous about taking part. Alternatively, the people who volunteered for a safety study may be those who felt strongly – negatively or positively – about the way the fishery is managed. Many of the harvesters expressed discontent, even anger, over some of the rules and decisions made by regulatory agencies.

When we asked the PFHCB to compile a stratified random sample, we asked them to specifically include women. Only one woman responded, so gender is unfortunately not a variable of analysis in this thesis. In future research, it would be interesting to see whether women perform the same tasks onboard, and what kinds of risks they face when they do. Grzetic (2004) has written about women's experiences in the Newfoundland and Labrador fisheries, and points out the additional pressures of performing household and family work as well.

Summary

This chapter has explained how the research was designed, the development of the research instrument and its delivery, highlighting some of the strengths as well as the limitations of the study. The next chapter begins by summarizing the demographics of the harvesters who responded. The trends and patterns in the responses to the substantive questions demonstrate where the major dividing

lines are between the different social cohorts who participated. To conceptualize these groups, I will borrow Wendy Rickard's template for "imaginary CVs" which helps to put a face to the statistics about, and quotes by, typical harvesters I interviewed. Following the presentation of the data, I will examine the links and indications of interactive effects between the factors we found in the data.

Chapter Four: Results

This chapter begins by describing the demographic characteristics of the participant harvesters, including their ages, job tenure (or years spent fishing), where they fish, their vessels, and the species they targeted in 2004. The next section presents harvesters' comments on the physical and environmental risks that make fishing an inherently dangerous job. We then look at what, at the time of the interview, harvesters had done to protect their safety: their level of training, the safety equipment they carried, and their ideas about using "common sense." The next section looks at their experience with accidents and injuries and what they had to say about what puts them at risk. The chapter concludes with three "imaginary CV's" (Rickard 2001) designed to identify clusters of harvesters with shared experiences and perceptions of risk. Chapter Five links the findings and clusters of harvesters to the different approaches to fishing safety identified in Chapter Two highlighting the importance of using an integrated framework for assessing safety and perceptions of risk.

Demographic Data

In 2001, fifty-seven percent of fish harvesters in Canada had less than high school graduation, compared with twenty percent of the overall labor force (Praxis 2005: 12). For the employment category "Fishing vessel masters and

skippers and fishermen" in Newfoundland, there were 8010 males and 1835 females (Statistics Canada, 2001 Census of Population).

For this study, I interviewed 45 males and one female, all of whom resided in Newfoundland at the time of the interview and were registered with the Professional Fish Harvesters Certification Board. Forty-one (or 89%) were married or living common-law, and only five (11%) were single. Forty (87%) had children who ranged in age from two weeks to 42 years. The average current age of the fish harvesters was 47, with ages ranging from 22 to 67 years. They had been fishing for an average of 31 years, with the least experienced respondent having fished three years, and the most experienced having fished 53 years. In terms of education, 41 percent (n = 19) had not graduated high school, 37 percent (n = 17) had graduated high school, and 22 percent (n = 10) had some kind of post-secondary education.

Harvesters ranged from inshore lobster fishermen who fish alone to officers on large offshore ships with 35 crewmembers. Roughly 65 percent of harvesters who took part (30 of 46) were skippers, with the remaining 16 working as regular crewmembers. As Figure 1 illustrates, the majority of the vessels that respondents spent most of their time on were in the 24' to 34' 11" sector, but we had at least five in each category.

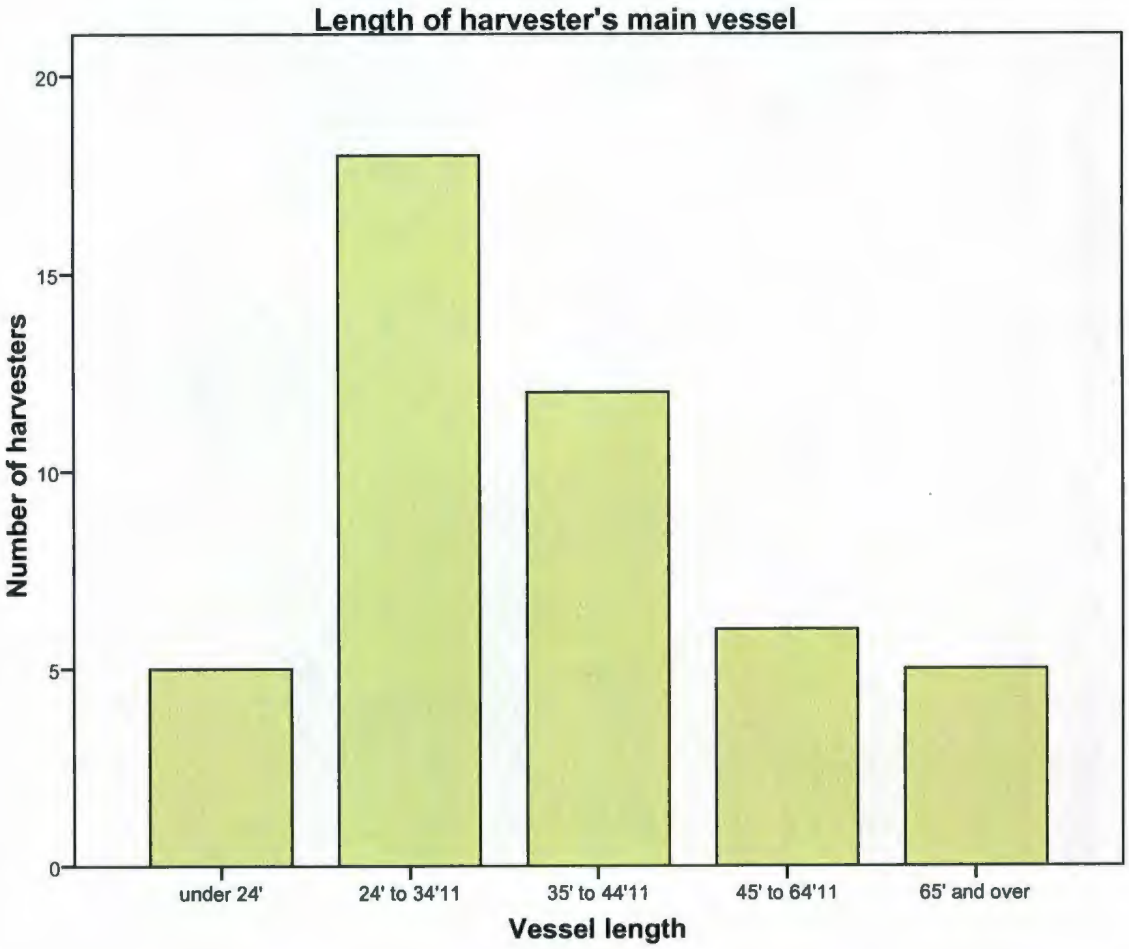

Figure 1: Number of vessels in each fleet

The length of vessel is linked to the species fished. For example, lobster is not often fished from a large vessel, and likewise it would be unusual – but not unheard of – to fish snow crab in a small boat. The species targeted in 2004 by the harvesters are detailed in Figure 2.

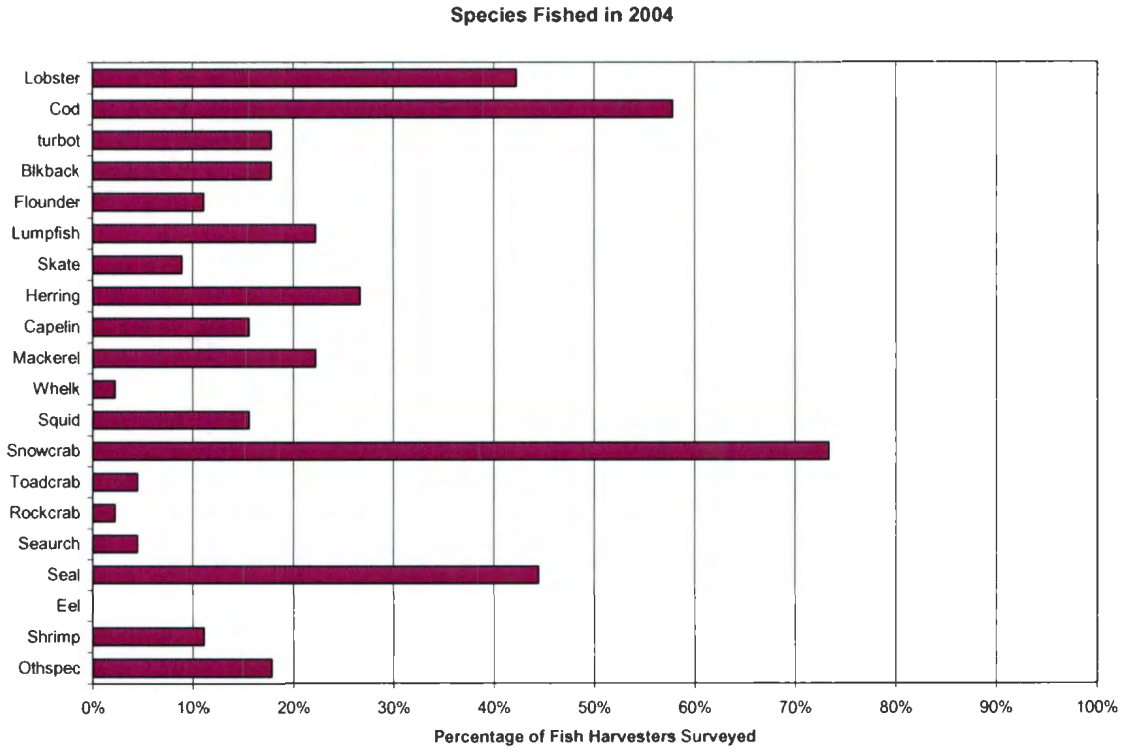

Figure 2: Species targeted by participants in 2004

Of the harvesters we interviewed, none fished eel. *"Othspec"* refers to other species, which include swordfish and tuna. The top three targeted species were snow crab (n = 33), cod (n = 26) and seal (n = 23). Over 70 percent of our respondents targeted snow crab.

Most of the harvesters we interviewed fished in the Eastern region (n = 22), and 10 fished from the Central region. Eight of the harvesters fished from Northern Newfoundland or Labrador and only four respondents fished out of the

Western region. Two harvesters fished out of multiple regions, as illustrated in Figure 3:

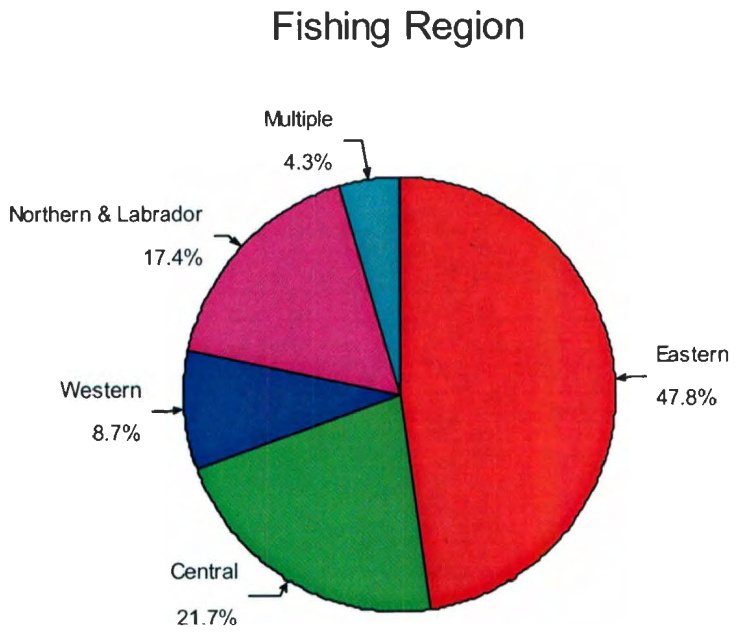

Figure 3: Fishing area in Newfoundland

The distribution of the harvesters' region of residence was the same as above, except that the two harvesters who fished out of multiple regions resided in the Eastern region.

An Inherently Dangerous Job

As explained in Chapter Two, fishing is a dangerous occupation. The biophysical approach to fishing safety emphasizes the inherent risks associated with working in remote locations, hazardous conditions, dealing with uncertainty and the possibilities of bad weather. Workers are out at sea, exposed to the elements, with nowhere to hide when the weather turns bad or the vessel is damaged. In addition, roughly 24 percent (n=11) of respondents said that they fish alone or with one other person, which can increase risk if an emergency occurs: **"I used to fish by myself – you could have a heart attack" (FH 45).** Working alone in a remote location could increase the danger faced and/or perceived by harvesters.

As seen in Figure 2, over 40 percent of harvesters said that they targeted seal in 2004; of the 19 harvesters who said one fishery was particularly dangerous, 11 named sealing. Specific risks they identified include ice damage to the vessel, lack of regulations, and the use of high-powered rifles in close proximity and low visibility. One harvester left sealing because of the danger posed by potentially untrained gunners using high-powered rifles: **"a bullet can go a long way. I gave it up because it was too dangerous" (FH 20).**

When asked, "Do you think fishing is more dangerous, the same, or less dangerous than most other jobs?" 37 (80%) of harvesters said "more dangerous," eight (17%) said "the same," and only one said "less dangerous."

Some respondents elaborated on their answer: **"more dangerous – very dangerous, but if you're trained it's not as dangerous as it could be" (FH 25)**; another added**: "more dangerous – the sea can break on you, break your neck" (FH 42)**. Similarly, another harvester replied "the same, more dangerous than a good many [other jobs] if you're careless" (FH 44). Only one harvester diverged from the consensus, saying it's "**the same or even less [dangerous]; I don't play that up" (FH 41)**. This particular fisherman had been fishing for 42 years when we interviewed him (on the conservative side of his estimate – he said he'd been fishing since he was "13 or 14") and fishes with his two grown children. This finding supports work that suggests those who have been fishing longer and fish with family are more likely to trivialize dangers (Murray & Dolomount, 1994). This harvester fishes with both his son and daughter. Out of the ten harvesters who fish with a son or daughter, the other nine said that they perceive fishing to be more dangerous than other jobs. Thus, the trivializing harvester fits with Murray and Dolomount's predicted pattern, but he does not represent harvesters who fish with their children as a whole.

Their Experience with Risky Situations Accidents and Injuries

We set out to explore harvesters' personal experience with accidents, injuries, and risky situations and the relationship between this experience and their

perceptions of risk. To open this section of the interview, we asked harvesters whether they had been in certain risky situations any time over the last 10 years. Figure 4 summarizes the results:

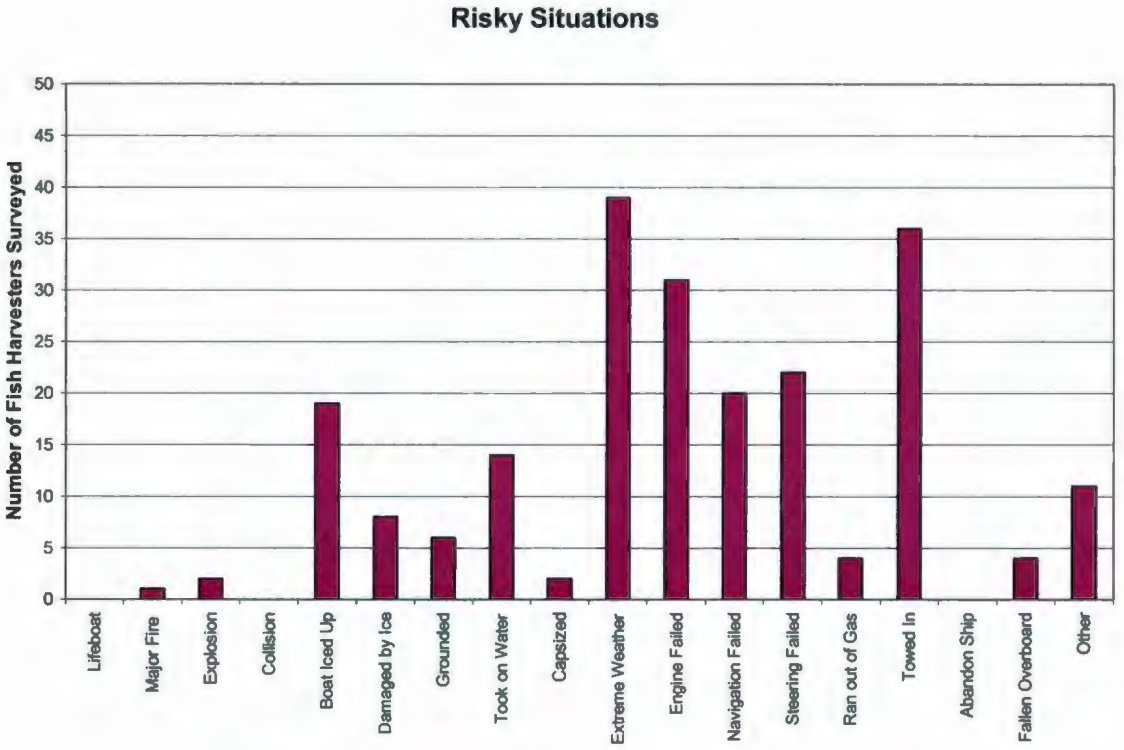

Figure 4: Risky situations experienced by participants

Many harvesters had experienced "being onboard in extreme weather" (n = 39, or 85%), "being towed in" (n = 36, or 78%), and engine failure (n = 31, or 67%). In the 10 years prior to the interview, none of the respondents had experienced a collision, the (emergency) use of a lifeboat, or had had to abandon ship.

If harvesters said that they had had an accident in the last 10 years, we asked how many accidents they had in total over that time span. Although 50 percent (n=23) of the harvesters had experienced an accident, only 4 percent had three or more accidents in the last 10 years. This may, however, reflect the tendency of harvesters to downplay the seriousness of certain incidents: one fisherman said that he'd had no accidents in the past 10 years, just **"cut fingers and broken legs every now and then" (FH 04)**! Some also mentioned incidents that had happened previous to this ten-year period, but these were not within the scope of the present study. Of the 23 accidents reported, 39 percent occurred in summer, 17 percent in fall, 9 percent in winter and 35 percent in spring. A full 91 percent of accidents happened during daylight hours, and in 74 percent of cases visibility was clear. Only 9 percent happened during high winds, while 52 percent occurred when it was calm. 57 percent of the accidents were aboard vessels less than 35', 17 percent aboard vessels 35'-44'11" and 17 percent aboard vessels in the 45'-64'11" sectors; 9 percent occurred on ships over 65'. Of the 23 accidents, four occurred while docked.

Of the 23 harvesters who held a license for snow crab in 2004, 12 of them (or roughly 52%) had experienced an accident in the past decade. Indeed, almost half (47%) of the 19 accidents that occurred at sea happened while fishing snow crab. Of the 14 harvesters who held cod licenses in 2004, seven had experienced an accident in the last ten years, and 21 percent of accidents that we heard about occurred while fishing cod. The few remaining incidents

were fairly evenly dispersed among harvesters pursuing scallop, seals and lumpfish.

In terms of the most severe accidents over the period of 1994-2004 that were mentioned by harvesters, 74 percent resulted in injuries, but none required Coast Guard or Search and Rescue assistance. Seven injured fishers, or 37 percent, had to take time off from fishing (between four days and six months) because of their injuries, and five applied for Workers' Compensation. Many incidents go unreported: a full 18 of the 23 reported in our study, or 78 percent.

What Do They Do About Safety?

The human capital approach to fishing safety focuses on improving safety training and safety equipment in order to reduce risk. According to the International Labour Organization, professionalization is necessary to provide fish harvesters with a standardized background in safety (Work in Fishing Recommendation, 2007). This process requires workers at sea to do certain courses before they can become a credentialed member of a fishing crew. In 2004, Canadian deckhands were required to have completed a Marine Emergency Duties course. The MEDA1 course is intended for those harvesters working outside 20 miles, and the MEDA3 is designed for those working inside 20 miles. The MED course had to be completed by the time the deckhand had completed six months' service. Similarly, captains could skipper a vessel up to

60 gross tons with the MED and the radio-operator certificate required by Industry Canada. Skippers of vessels larger than 60 gross tons needed Fishing Master IV, III, II, or I (Canadian Council of Professional Fish Harvesters 2006).

Thirty-one of forty-six harvesters, or 67 percent, had completed the Basic Survival Training course, which is accepted as meeting the requirements of the Transport Canada MED A1 course. Thirty-one harvesters had completed a Marine Emergency Duties course, and 16 had Fishing Master designation at the time of the interview. A few had also completed courses related to safety in areas like small-engine repair and firefighting, and three did the four-year Nautical Science program at the Marine Institute. To gauge their perceptions of the importance of such training, we asked fish harvesters "how important is safety training to fishing safety?" Their responses are summarized in Figure 5:

Figure 5: Importance of training grouped by age of respondents

The percentage of harvesters who feel training is "extremely important" decreased with age, with over half of each age group younger than 50 years old selecting that option, and only approximately one third of the 60 or older category selecting it. Similarly, no one under the age of 40 felt that training is "not important" or "slightly important," while over 10 percent of those between 50 to 59 years felt it was only "slightly important." Possible reasons for this will be explored in the next chapter.

The sixth figure illustrates the perceptions of the importance of safety training with harvesters separated into two groups: the first had not completed a Basic Safety Training or Marine Emergency Duties course, and the second group had completed at least one of those courses.

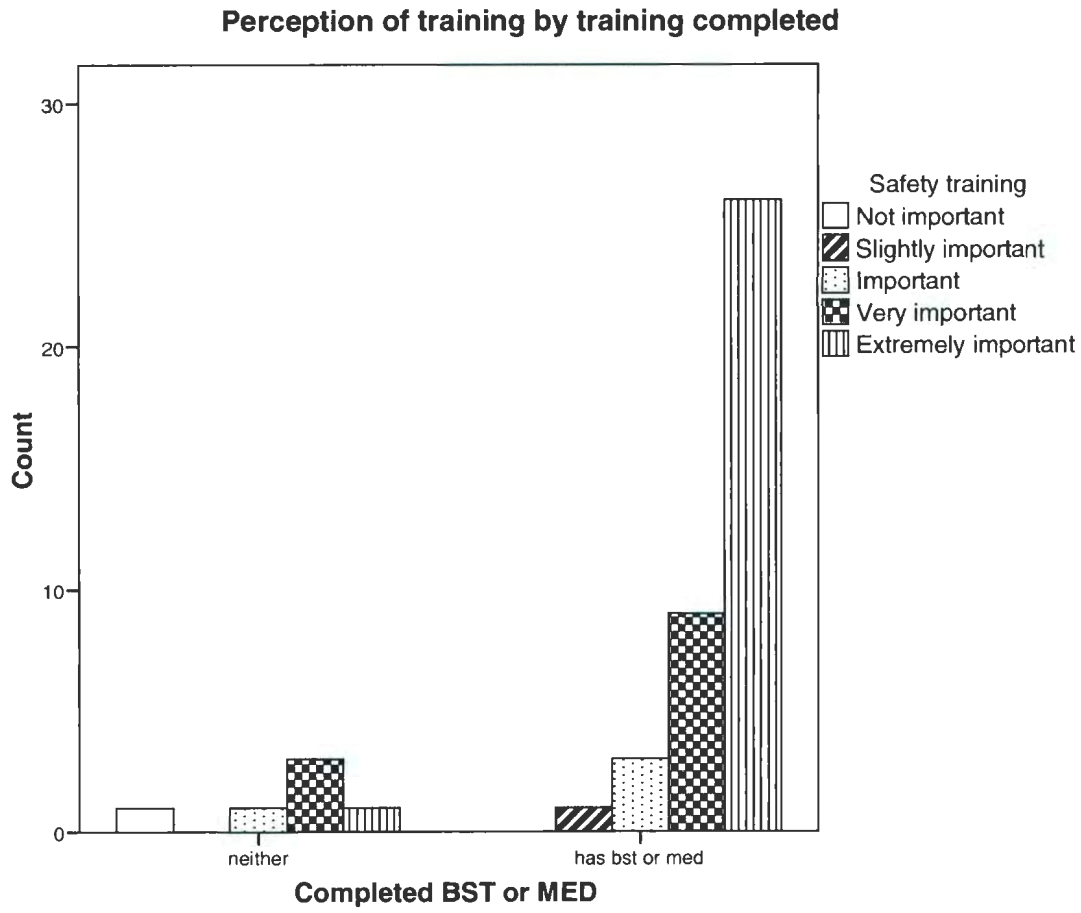

Figure 6: Importance of safety training grouped by level of training

We can see here that only one person said safety training is "not important," and that person had completed neither a BST nor MED course. On the other hand,

35 of 39 harvesters who had completed one of the courses said that safety training is "very important" or "extremely important".

Figure 7 illustrates the safety equipment carried onboard as well as the number of harvesters who report knowing how to use each type of equipment:

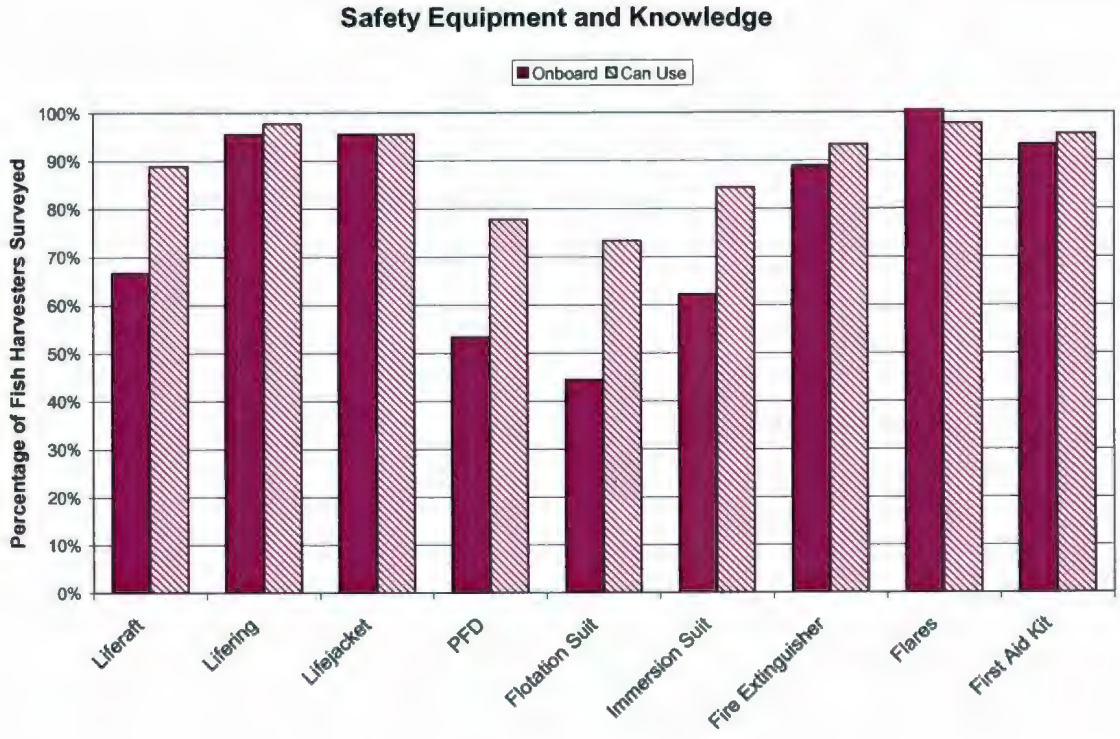

Figure 7: Knowledge of safety equipment vs. equipment's presence onboard

Overall, the majority of harvesters (over 70%) knew how to use the equipment we inquired about. Flares were the only piece of equipment we inquired about that was present on all respondents' vessels. Two harvesters reported not

knowing how to use them. With some equipment, like life-rafts, Personal Flotation Devices (PFDs), flotation suits and immersion suits, roughly 20 percent more respondents knew how to use each than had the equipment onboard. This may be explained by the use of such equipment in training courses by crew on smaller vessels, even though their vessels are not required to carry it onboard. "Lifejacket" was the only item in which the number of people who had it onboard matched the number of people who reported knowing how to use it.

Common Sense and Experience

Many of the harvesters we interviewed agreed that the individual worker has a significant effect on safety. One fisherman acknowledged that personal awareness of risk plays an important role in staying safe. While explaining how a crew member fell into the hold and injured himself, he attributed it to **"carelessness – the hold should have been closed. [There's a] person to do particular jobs on the boat, [but] we never had a hatch before. One's responsibility is checking oil, and so on. Nobody really geared in to [that] risky responsibility" (FH 44).** As this comment illustrates, safety knowledge is linked to past experience with the risk of human error going up when harvesters find themselves in new situations such as this example, where the addition of a deck to their boat introduced the new risk of falling into an open hatch.

Experience and common sense also come into play in terms of weather forecasting. Harvesters reported creating their own forecasts, either through traditional methods like watching the clouds, or by compiling satellite and radar maps from several sources and creating their own composites. All 46 harvesters reported consulting several sources for the forecast, with most sources being checked several times per day.

In terms of forecasting, one harvester expressed concern: "**when the new one is issued, you'd think it was two different parts of the world. The forecast isn't accurate until the last minute – like someone else switched shifts and interpreted the same forecast different" (FH 28).** Other harvesters vehemently agreed:

> **Throw down the piece of paper that buddy's reading off in the news room. It's been the same for the last four years. They call for east winds and we get west winds, and they call for west and we get east. They don't have anything at stake on the water so they don't care if the weather forecasts are right or wrong. It changes everything for us when we are out on the open water, everything (FH 08).**

Several older harvesters mentioned the importance of traditional forecasting methods. One fisherman indicated that the decline of traditional knowledge can increase dependence on external technology or knowledge at the expense of traditional knowledge passed down through generations: **"a lot of young people can't determine the change of clouds. Traditional ways of telling the weather are always better, it seems" (FH 42).**

Skipper Effect

Although the role of the skipper did not emerge as a primary issue, there were a few respondents who felt it was worth mentioning. For example, when we asked: "In your opinion, is there one fishery that is more dangerous than the others?" one harvester replied, **"No, I don't think one is more dangerous than the other. I think all of it has to do with who the skipper of the boat is. If you are smart about it, then it should work out fine" (FH 08).**

Having greenhorns onboard is seen as a natural, necessary procedure, as all harvesters have to begin fishing some time. However, when they are around, the skipper and other crew **"got to keep a good eye on him" (FH 23)** to make sure the new member performs relatively safe tasks and remains out of harm's way. Proper supervision can put **"a lot of pressure on the skipper" (FH 45),** and this is of particular concern if there are two or more greenhorns on the vessel.

External Actors

As explained in Chapter Two, the human capital approach seems to be the dominant worldview in fishing safety management. Regulatory agencies view training as one of the most important ways of reducing risk at sea, and from this perspective accidents are often attributed to human error. External actors, such as regulators, garnered the most attention and comments from harvesters, as

well as the lowest satisfaction scores. Most harvesters feel that certain regulations are placing substantial, unnecessary economic constraints on their safety decisions. They feel they are being forced to equip their vessels with particular kinds of safety equipment, with the consequence that they cannot afford some equipment they feel would be more useful to them. One fisherman expressed this heatedly: "**[I] don't mind safety [equipment], but there's a lot of bullshit" (FH 29)**. For example, the Vessel Monitoring System (VMS, or commonly referred to as "black boxes"), is an electronic automatic location and communication device, placed aboard a fishing vessel to manage certain fisheries; it monitors time, date, vessel position, and vessel identification number in real time through satellites. This information can be used in two ways: to respond to distress calls (safety), or to monitor if the vessel is within its appropriate fishing areas (surveillance). Harvesters question the need for such black boxes, when they already have to pay for fisheries observers and dockside monitoring: **"That's stuff put on fishermen by DFO. We don't need it because we're monitored. We have to pay for them to sit on their asses and monitor us. Feel like a prisoner, it doesn't help safety." (FH 29).** Thus, to this fisherman, some 'safety' equipment is perceived as a mechanism of surveillance.

Vessel length restrictions are also seen as having a major impact on safety. Boat owners are trying to increase the working space or hold capacity of their vessels, thus reducing the number of fishing trips they have to make and

decreasing their exposure to risk at sea, by building higher and wider. Because length restrictions prevent them from building longer as well, these modifications often result in decreased stability: **"I seen thirty last year, dozens of boats not fit to be on a lake, let alone the ocean. The style, shape of boats" (FH 07).** In particular, these regulations cause harvesters to build their vessels **"too high – too much boat out of the water, not enough in the water" (FH 16).** One respondent remarked that the size and shape of a vessel is **"important like a car – [that it's] the right width, stable" (FH 42).** Others argued specifically against government's capacity-based rationale for length restrictions, saying DFO should **"alleviate regulations on boat size but not quota increases – we feel unsafe, don't need more quota. Crab boats are forced offshore in 34'11"s but they should be in a 45' or 50' boat. That takes years to change and shouldn't be out there in those boats but he got to make do with what he got" (FH 39)**. Another said harvesters should **"be allowed a boat that's safe to fish in" (FH 40)**. Overall, most of the harvesters we interviewed felt that their input should be combined with that of external actors to prevent over-regulation, and to ensure that the regulations are practical. Many shared this man's suggestion for some kind of co-management system: **"Fish harvesters should have input before regulations are put in place – they're the ones that have to do it" (FH 39).**

Almost every harvester we interviewed felt that the regulation of the industry is somehow disconnected from their day-to-day experience of it: **"The**

way the fishery is regulated, we're struggling now with rules. If we could fish like we could 20 years ago we'd do better. No fish to handle now because we're not allowed to catch it, not because it's not there" (FH 40). The concept of job satisfaction provides a useful lens through which we can focus on harvesters' perceptions of various aspects of their work.

Job Satisfaction

Job satisfaction is a useful gauge to measure how harvesters feel about their work. As Figure 8 illustrates, overall satisfaction with "fishing as a job" is high, with an overall satisfaction level of 4.3 out of 5. Certain items scored consistently high among harvesters; for example, "the people you work with" scored 4.8, with everyone answering either "satisfied" or "very satisfied." Conversely – but as we might expect from the quotes above – the average satisfaction with "government regulations" was only 1.8. It was the only item out of 20 in which no one said they were "very satisfied." Other high-ranking factors include "working outdoors" (mean = 4.8), "being out on the water" (mean = 4.7), and "the opportunity to be your own boss" (mean = 4.4).

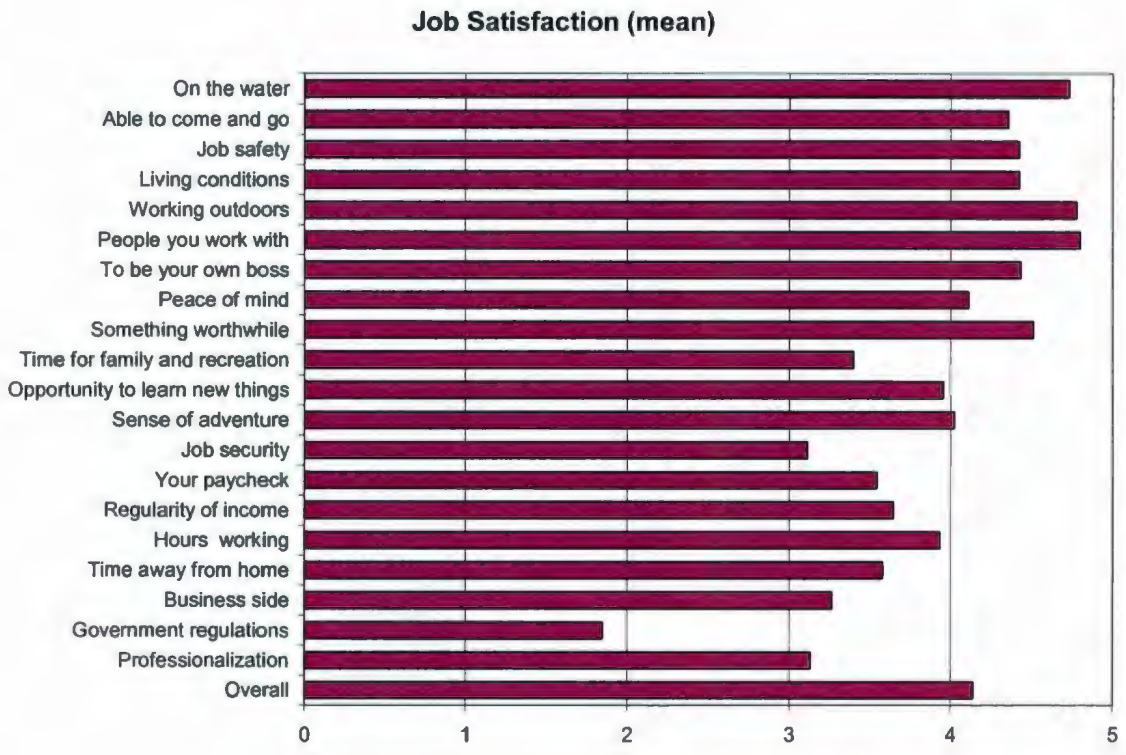

Figure 8: Participants' satisfaction with fishing as a job

High-ranking factors appear to cluster around traditional aspects of fishing work, such as being on the water and outdoors, and the people they work with.

On the other hand, lower ranking items appear to cluster around new initiatives in the fisheries; that is, regulations, professionalization, and 'job security'. Some harvesters expressed nostalgia for the days when they could choose their times to fish more freely, and felt more like their own bosses. Now they feel as though they are told when to go out and when to come back, and the corresponding lack of freedom and control decreases their satisfaction with their work: **"so many rules for what you can and can't do, it's not worth it**

anymore" (FH 32). One harvester summed up his conflicting feelings: **"lots of changes. [It's] torture now – it's in my blood though" (FH 46).**

Fishing and Family

As a way of inquiring about the social relations surrounding risky work, we asked "would your family rather see you in a different occupation?" The answers were almost evenly divided: 49 percent of harvesters said yes, while 51 percent said no. Seventy-eight percent of harvesters would go fishing again if they had their lives to live over One fisherman pointed out why it may be difficult for family to have a loved one working out at sea: **"[I've] provided well at an awful cost: peace of mind" (FH 18).** Overall, however, risks and hardship are commonly accepted as part of the fishing way of life. In response to our question, "how satisfied are you with the feeling that you're doing something worthwhile?" a harvester said that he'd **"never had a job that made me feel so proud" (FH 17).** Comments like this paint a clear picture of why such a dangerous job pulls workers back out to sea to perform the work that, in many cases, their fathers and grandfathers did.

We asked if they would, or do, encourage their children to go fishing. Only 13 percent (n = 6) would encourage their children to fish. Replies ranged from **"Jesus no!" (FH 08)** to **"not with fishing going like it is, trying to keep them**

out of it" (FH 23) to **"yes, my son is 235 miles south of St. John's on a swordfish boat as we speak" (FH 22)**.

"They never hurts like we do": Who Defines Risk?

The cultural approach to fishing safety pays careful attention to how risks are defined, and by whom, as well as who bears responsibility for reducing these risks. In order to discover what risks – and consequences – are accepted by fish harvesters, we asked "What kinds of injuries are considered to be 'normal' or just part of the job?" Back problems or injuries were mentioned by 20 respondents, or 43 percent, and slips, falls, cuts and bruises were mentioned frequently as well. One harvester said that expected injuries include **"cuts, [but] you don't have to be careless for them" (FH 44).** This indicates the unpredictable nature of a job on a moving platform, and is an argument against the notion that human error, or incompetence, or lack of due diligence, is the primary cause of most injuries onboard.

We also asked "In your opinion, have you experienced any health problems that are related to fishing?" Twelve (26%) said that they had experienced some trouble with their back, and one said **"arthritis – all the fishermen my age" (FH 33)**. Four mentioned sore arms or carpal tunnel syndrome, and 52 percent (n = 24) said they had not experienced any health

problems related to fishing. One harvester replied **"Yes, any physical job would have it (back, shoulders, knees, elbows) but not an office job" (FH 28)**. Another agreed: **"No... aches but any type of manual job would have that. Numb feet and legs and feet burn, I think that's old age." (FH 32).** Although they interpreted the direction of the question a little differently, the answers are similar in spirit. These harvesters recognize that any form of manual work can be hard on the body, and fishing can lead to injury even when workers are very careful.

The cultural perspective highlights the socially-constructed nature of the debates happening about safety at sea, and can help us to identify factors that have been neglected up until now by the dominant paradigm. One clear-cut example of this cultural dimension of risk is tension over the direct and indirect costs of quotas, mandatory equipment and training. As Henry, an older male fish harvester, pointed out, **"the problem with having safety gear – we'd like to have it but the way they got us cut back in the fishery we're struggling to get by" (FH 40)**. He forcefully reiterated this point at the end of his interview:

> **We fished all our lives and enjoy fishing, invested everything we got our whole lives and could lose it all. There's fish - making us starve and let big boats go. They never hurts like we do. If fish are inshore why not let us fish it? I knows more about our job than those at a desk. We're getting the same amount of fish in six nets or 12 nets as we used to with 110 nets, so there's lots of fish. Put nets down for one and a half hours, 12 nets, near Labrador and got over 3000lbs - not that there's no fish - they just won't let us fish. Are they trying to get us out of Newfoundland? The big boats, factory freezer, their fish is leaving the country. The policy makers thinks fishermen haven't got a clue. Big problem with safety - if you**

come to my boat you'll see equipment that I'm missing but I can only barely afford to get by. I'd like to have it but the bottom line is I can't have it (FH 40).

The next section presents the CVs of our three groups of harvesters, in order to breathe life into the comments and figures above.

Imaginary Curricula Vitae

In order to present a snapshot of the different groups of harvesters who took part in this study, I decided to use Wendy Rickard's imaginary CV format. The categories covered include the participants' names (not their real names); age; qualifications; previous employment; current job; accident and injury history; and their thoughts on safety. All three of the names on the vitae are pseudonyms.

The comments and results largely suggested three broad cohorts, and I have selected illustrative cases for each. To this end, I include one older male harvester (Figure 9), one younger male harvester (Figure 10), and a female harvester (Figure 11). The male harvesters I present are composites created from information from members of each group who were participants in our study, with only identifying details changed to protect privacy. Although both men and women were invited to participate in this we received very little response from women: only one participated. We did not have enough female participants to accurately create a composite character from our respondents. However, I felt it would be remiss to present only men as "typical" harvesters,

given women's increasing entry into and work in the fisheries. I therefore created a female harvester character by drawing on information from our female participant as well as from accounts of women fish harvesters in Brenda Grzetic's book, *Women Fishes These Days*.

The two composite male harvester categories were assembled based on differences in their comments about training and experience that appear to be related to their age, and the stage of their career in which professionalization was introduced. The three levels of certification include Apprentice, Level I and Level II; harvesters advance from one level to the next based on their completion of a set number of years of full-time fishing, as well as the completion of a specific number of land-based credits. Some mature harvesters had been "grandfathered in," or assigned a level of certification when Professionalization began, based on their historic attachment to the fisheries and their financial dependence on the industry. This might mean that they were not required to do the same courses as younger harvesters would have been, and they often expressed some negativity about the requirements for training. For example, one said Professionalization **"didn't mean nothing" (FH 15)** and another referred to it as **"garbage... educating is not always smart" (FH 18).** They feel **"now it's too advanced – schooling and training isn't what we're there for" (FH 24)** and **"at my age, few of us went through high school, it's overwhelming" (32).**

Figure 9: Curriculum Vitae I: Older Male Harvester

PERSONAL DETAILS

Name:	Henry
Born:	1948
Current position:	Owner-operator ("skipper")

EDUCATION/QUALIFICATIONS

Left school in Grade 7 to fish
Lifeline safety course (offered after the Moratorium)
Basic Safety Training

PREVIOUS EMPLOYMENT

Fishing in small boat for lobster
Deckhand on 34'11"
"I never got a land-based paycheque" (FH 40).

CURRENT JOB

Level II Fish Harvester
Owner-operator of 44'11" vessel

ACCIDENT & INJURY HISTORY

Some close calls – almost collided with another vessel
Fell overboard once; not injured
Fell through the hatch; broke two ribs

THOUGHTS ON SAFETY

"The problem with having safety gear - we'd like to have it but the way they got us cut back in the fishery we're struggling to get by" (from FH040).

Figure 10: Curriculum Vitae II: Younger Male Harvester

PERSONAL DETAILS
Name: Mark
Born: 1977
Current position: Deckhand, gunner

EDUCATION/QUALIFICATIONS

Grade 12 graduation
MED A1

PREVIOUS EMPLOYMENT

Worked in Alberta in construction

CURRENT JOB

Level I Fish Harvester
Deckhand onboard 64'11"; gunner onboard 34'11" for sealing
5 years experience

ACCIDENT & INJURY HISTORY

Some bruises and strained muscles
Fell off the boat onto the ice while sealing

THOUGHTS ON SAFETY

"With sealing equipment, you're in God's pocket" (FH 17).

"Some skippers have no training; they might not realize they're putting life in harm's way all the time" (FH 17).

Figure 11: Curriculum Vitae III: Female Harvester

PERSONAL DETAILS
Name: Joan
Born: 1967
Current position: Deckhand

EDUCATION/QUALIFICATIONS

Grade 12 graduation
BST

PREVIOUS EMPLOYMENT

Cashier
Fish processing worker

CURRENT JOB

Level II Fish Harvester
Works with husband aboard 34'11"
12 years experience

ACCIDENT & INJURY HISTORY

Cuts on hands
Slipped getting out of boat (hurt arm)

THOUGHTS ON SAFETY

"I worry about the weather during the open and close of the fisheries" (FH 24).

"I think there should be more women fisherpersons because I believe women are more aware of safety than men. They are more conscious of things like wearing your life jacket" (pp 83).

"I can swim but my husband can't. I mean, what would happen if he fell over? What would I do? I could throw him a life buoy but that's it. How do I get him back in the boat?" (pp 75).

The results suggest that fish harvesters' perceptions of risk sometimes differ from other stakeholders' perceptions. The relevance of this for the different approaches to understanding risk in the literature is that the harvesters' experiential knowledge can highlight processes, events and circumstances that have been previously neglected in the study of risk. In addition to this, harvesters can share important insights on how risk factors interact. Chapter Five discusses the data presented here and proposes explanations as to why the patterns and diversities occur.

Chapter Five: Discussion

Fish harvesters' perceptions of risk are mediated by their experience, which includes: what they learn from others, and see and do when setting up or changing their enterprise; recruiting and training their crew; deciding when and where to sail; as well as their experience on the deck and in the wheelhouse of the boat while at sea, and on land when responding to government requests and regulatory regimes. Harvesters are out at sea at the point of interaction of cascading effects (physical, human capital, structural and cultural) and can provide very important insights into interactivity and commercial fishing safety. Many legislators and managers whose decisions are directly or indirectly affecting safety have never set foot on a fishing vessel and harvesters recognize and often resent this fact. One of the primary goals of this study was to make the implicit elements of the harvesters' experience, safety decisions and concerns explicit for the purpose of making these elements more accessible to external experts responsible for regulation and enforcement.

This chapter begins by exploring some of the diversity among harvesters. Next I examine the effects of biophysical, human capital, structural and cultural factors on fishing safety when seen through the eyes of these harvesters. The sections on human capital and structural factors (external actors) are discussed at greater length than the others, reflecting the proportion of statements made by

the harvesters interviewed for this study. After examining the effects of the factors individually, I apply the integrated framework developed in Chapter Two to illustrate how they can be described as having interactive, cascading effects. To do this, we will look at specific incidents mentioned by harvesters and examine how structural and human capital factors, for example, interacted in ways that magnified or reduced risk. The concluding chapter will summarize the major findings, as well as identify what we did not learn, and how future research could help fill these gaps.

Diversity

Before moving on to a discussion of themes that emerged from the interviews and interactive effects, it is important to see where the diversity lies among fish harvesters. There are temporal differences in the observations and experience of these harvesters related to age and the seasons they fish, as well as spatial differences (where fishing grounds are, what size of vessel, where they work on deck) in their fisheries. These spatial and temporal dimensions of fisheries interact with the cultural, organizational and regulatory dimensions to influence risk and perceptions of risk. All dimensions are dynamic in that they change over time as they interact.

Variables such as age, experience, and the type of vessel worked on, may affect harvesters' views of safety and risk. Crew on large ships, for example,

were less likely to rate weather (and forecasting) as important safety factors than skippers and crew on smaller vessels. For a harvester on a small vessel making daily decisions about whether to go fishing or stay in port, weather forecasting is very important. One such harvester remarked of meteorologists: **"they're not out on the water. It changes everything for us, everything."** Crews on larger ships, other than a few officers, have less say regarding whether to set sail than the owner-operators of smaller vessels, and large ships are more likely to set sail regardless of weather conditions.

Diversity of experience and opinion also exist between younger and older fish harvesters. Many of the older harvesters entered the industry at a time when no formal fishing or safety training was required. They tend to resent mandatory training more than younger harvesters, often feeling it is an external burden placed on them, when, by virtue of their decades of work in the fisheries and the fact that they remain able to work, they feel they do not particularly need it (i.e., the 'unsafe' workers have already removed themselves by having a major accident). In contrast, younger harvesters tend to expect mandatory training; they are entering the industry knowing that formal education is part of the career of a modern fish harvester.

From the data we have, it is hard to assess the relationship between safety training and perceptions of risk. Statistical correlations on this data are not really possible, because the harvesters' responses to questions on which courses they had completed are messy. Only one harvester said he was "not

sure" whether or not he had completed Basic Safety Training (FH 15) and thus potentially had not completed any safety-specific training at all. Many harvesters said they had completed "one or the other" of the courses, or they thought they had done a course but were not sure, or could not remember the name of it. Therefore, there are no clear divisions among the large group of harvesters (45) who have completed one or more courses in terms of which or how many courses they had done. In future research, it might be of benefit to ask them to look up which courses they had done (perhaps by gathering their certificates of completion prior to the research), or to ask PFHCB for a list of harvesters who had completed certain courses, but the data in its current form is difficult to work with. Thus, the information presented on training and its relevance is largely gathered from specific comments made by harvesters about the usefulness of training rather than quantitative calculations.

Having said that, the relationship between safety training and perceptions of the importance of training seems to suggest a sort of spiral in that once a harvester is trained, they see the value in what they did. They may feel it was useful to practice with safety and survival equipment like life rafts and immersion suits. Prior to or without the training, they may perceive it as a burden to be endured, "too much trouble" or as potentially embarrassing. This negative perception may be especially strong if they do not know how to swim or read; older harvesters may worry that they will not be able to complete some of the exercises required to pass the training courses.

Some harvesters we interviewed spoke to the frustration created by increasing requirements for formal education in an industry whose workers traditionally had little formal schooling: **"now it's too advanced – schooling and training isn't what we're there for" (FH 24)** and **"at my age, few of us went through high school, it's overwhelming" (FH 32)**. Younger harvesters are less likely to find this a challenge. Newfoundland and Labrador law now states that individuals may not leave school until the age of 16. Because it is now common knowledge that professionalization is a mandatory part of the modern fisheries, younger fishers have an increased incentive to stay in school and to learn to read and write. Older harvesters may have started fishing as early as the age of nine (FH 08), and three of the harvesters we interviewed have an education level of Grade Six or less (FH 03, FH 26, and FH 42); these factors may increase the likelihood of difficulties with literacy and thus formal safety training.

Biophysical Environment

Biophysical factors include the sex of the harvesters, species fished and the related location and nature of the grounds, the weather, water temperature and vessel design. Such biophysical factors as poor weather and the risks (such as rocky shoals) that are associated with particular fishing grounds have always been part of fishing and play a major role in the perception of fishing as a risky

occupation. Of the 23 accidents that occurred, only four happened in inclement weather (two in high winds and two in snow). While important, poor weather appears to be less of a risk factor in and of itself than a variable that makes harvesters more vigilant to the possibility of an incident. Thus, for the harvesters we interviewed, most incidents tended to happen during the day in good weather when safety may not have been the first thought on their minds, as opposed to during "dark and stormy nights". This seems counter-intuitive, but may relate to the fact that we did not hear about any serious incidents such as a vessel capsizing or the death of a crew member. If we had inquired about the period prior to the last ten years, we might have found that very poor weather is correlated with severe accidents, but not mild to moderately bad ones. Alternatively, this finding may be due to the small sample size in this study.

Weather interacts with other biophysical and social factors to mediate risk. For instance, almost 40 percent of the harvesters I interviewed fish from vessels in the 24' to 34'11" length category. When the weather is good (often called "fine" or "fair" by harvesters) all boats in this sector in their area can leave at the same time; when the weather is very poor, no vessels can set out. However, moderately bad weather can pose a serious problem for this sector: high winds that permit the larger vessels to set out can present significant danger to middle- and small-sized vessels. If the larger ships set their gear and take a good first haul, the smaller vessels are apt to go despite the weather, especially in a fishery that has a competitive quota. Even if there are Individual Quotas, the

Department of Fisheries and Oceans can close the season at any time if they feel it is appropriate or necessary, which means those who do not catch their quotas quickly might lose out. Alternatively, in fisheries where the quality and therefore price of the catch can decrease as the season progresses (as with soft-shell crab, for example), it is an urgent priority to get out and set traps as quickly as possible. Thus, a variety of social and regulatory factors can mediate the effect of weather on risk.

Human Capital Approach

The human capital approach to risk focuses on factors such as an individual's level of training, experience, attitudes (including coping mechanisms) and their perceptions of risk.

Our results somewhat disagree with those of researchers who see human capital factors such as coping mechanisms (Murray and Dolomount 1994) and accident proneness (Iverson and Erwin 1997) as the main contributors to risk and danger at sea. In terms of coping mechanisms, only one harvester we interviewed said fishing is 'less dangerous than most other jobs', suggesting that trivialization of risk is not as widespread in this sample as expected or found in other studies. This harvester said he sees fishing as having **"the same [risk as other jobs] or even less. I don't play that up" (FH 41).** He did fit with the predicted pattern of those who tend to trivialize risk in that he had been fishing

many years and fished with his two children (Murray & Dolomount 1994). Whether saying fishing is risky is 'playing it up' or whether it is acknowledging the fact that he works in a statistically dangerous occupation could be considered a matter of debate. Overall, however, harvesters interviewed for this study appeared to openly acknowledge the high level of risk associated with fishing as a job. Gaba and Viscusi argue that those with less education are less likely to consider a particular job risky (1998). While this harvester did not graduate high school, he did complete some courses at the high school level and went on to obtain a Fishing Master 4 designation.

Some have argued that high rates of accidents and injuries are largely due not to dangerous work environments, but rather to specific workers who incur repeated injuries. Iverson and Irwin's theory would suggest that high rates of accidents are not due to many accidents spread out over the worker population, but rather to a few workers who have many accidents (1997). Thus, from this perspective, the appropriate way to reduce the number of accidents is to target accident-prone individuals. Our results do not support this hypothesis, because half of the harvesters we interviewed had been involved in an accident in the past ten years. In terms of the accident-prone hypothesis, the statistics for "falling overboard" could be interpreted as supporting the hypothesis because one sealer fell overboard twelve times in the last 10 years. However, I argue this is more closely related to the fishery involved, or the tasks (and thus physical location on the vessel) rather than one individual being more "prone" than another. For

example, a gunner on a sealing vessel is more "prone" to fall overboard than a skipper in the wheelhouse. (Only one of the harvesters who had targeted seal in 2004 identified himself as a gunner.) The "accident proneness" hypothesis may also relate to the nature and setting of the work; falling overboard is not something that would be possible in a factory or office, for example, so traditional occupational health and safety research might focus on things like cuts and slips.

Another human capital factor other researchers have linked to risk is the skill, training and experience of the members onboard, particularly the captain. The theme "Having a good skipper" in our responses points to the realization among harvesters that human decisions play a large part in determining levels of risk and the outcome of a risky situation. Human behavior does not fully determine the parameters of risk, but it certainly plays an important role. The issue of greenhorns (inexperienced crew) alluded to by a few harvesters points to this as well; however, every harvester has to begin fishing sometime, and if new crew are properly supervised this does not present a problem (FH 20, FH 25, FH 29). Multiple greenhorns on one vessel may require more help and supervision than experienced crew can offer.

Our findings on "all depends on who the skipper of the boat is" support Nordic research by Palsson (1994), whose respondents said that the "Captain's disposition" was one of the most important factors related to the enskilment of fish harvesters. Palsson argues that the role of captains has changed with regulatory and other changes in the Icelandic fishery. They have gone from being

colloquially called 'catch-kings' to 'quota-kings' with increased regulation taking the individual skill and "nose for fishing" out of consideration. With increased and increasingly stringent management policies, being a "good" captain may become more a matter of how much quota one can access or accumulate.

While Palsson is not writing about safety specifically, his work has implications for understanding job satisfaction and processes related to the acquisition of safety and other skills at sea in this study. The job satisfaction questions where responses ranked highest all related to autonomy and included such phrases as 'the opportunity to be your own boss' and 'a sense of adventure.' Many harvesters remarked that their satisfaction with these aspects of their job is not as high as it used to be when they first started fishing. As such, it is plain that what might be considered 'pure' human capital factors (satisfaction, and feelings of control and autonomy, for example) are shaped to a large extent by such structural factors as regulatory change. High levels of stress and dissatisfaction with changes in the work environment might make it difficult to pay attention to tasks at hand, which might in turn increase the likelihood of having an accident.

Structure

Government regulations are a huge issue for the sample of harvesters interviewed here and elicited the most comments. When asked, "in your opinion,

what are the three things that have the most effect on fishing safety?" one participant replied **"regulations, regulations, and regulations" (FH 18).** This harvester later changed one of the items to 'weather forecasting', but the force of the original answer speaks to the importance assigned to policy by harvesters. This is likely because regulatory agencies, particularly the people in positions of authority within those agencies, have the power to change their fishing lives and experiences, including the parameters of occupational risk (Jermier, Gaines & MacIntosh 1989). The government regulators tend to individualize and approach fishing safety using a human capital paradigm, while fish harvesters focus on the impact of regulations on safety. They focus on how, structurally, they are being put in harm's way.

Some harvesters, particularly those who have 'grown up fishing' by first helping family members and eventually moving into their own boat, reported a strong sense of uncontrolled change in particular fisheries. They seemed to feel that some of the conservation rules and regulations painted them as ignorant and eager to 'fish out' the stocks. For some, these regulations are even more important for fishing safety than safety regulations. It is not possible to say for how many, as there is no specific question in the data to access this, but the feeling was certainly communicated through harvesters' tone of voice when discussing policies.

Intended Safety Consequences of Regulations

One of the issues with rigid regulations applied evenly across diverse fisheries occurring in dynamic environments is whether it is possible to generalize across space and time. Rules are by nature generalizable, but they may not be appropriate in all situations or for all relevant risks; rules may make some risks worse or create new ones in some contexts. Thus, regulations can actually put people at risk, which can present a serious problem when they are designed by authorities with no legislative responsibility for safety.

Important implications for injury prevention stem from the conflicting pressures harvesters confront to make a living and to put safety first. On the one hand, fish harvesters certainly recognize the need for safety equipment and training and to minimize the risk of injury by monitoring when, where and how they fish, as well as who they fish with. On the other hand, they are quick to point out the financial pressures placed on them by a combination of safety regulations, high costs and limited incomes.

In terms of safety training requirements, some fish harvesters who have done the training seem to be more conscious of certain issues like vessel stability, but those who have not yet done the mandatory training feel that it is prohibitively expensive and distant from their location. We did not specifically ask a question that addressed this, but it came up in the focus groups and was mentioned as an aside in a few interviews. This can pose a problem to those

who fish with their spouse; they must both do the training, which can be a concern for families with small children.

Regulations that deal with mandatory inspections and survival equipment also have intended safety consequences. The last chapter revealed that the percentage of harvesters who have safety equipment onboard is rarely as high as the percentage of harvesters who claim to know how to use such equipment. This may reflect how we asked the question about the vessel they spent most of their time on; harvesters might have fished on several vessels in their career and practiced using safety equipment that is not on their primary vessel. However, as Douglas points out, there can be controversy over the costs of safe production (1986) and therefore tension over mandatory equipment and training costs. Some harvesters feel that having a life-ring aboard a boat when there is only one person fishing is senseless; **"what is the use of a life ring if there's no one there to throw it to you?" (FH 15).** However, one rationale for this rule is that harvesters fishing alone, but in close proximity to each other, would be able to throw a life-ring to someone else who needs help. This illustrates the need for clear communication on the part of regulators and safety trainers, so that harvesters understand the need for each piece of required safety equipment, and why it is not 'nonsense' or a waste of money.

One possible solution to the documented resentment and resistance harvesters have for regulations might be for the government to offer some sort of financial incentive for training and safety equipment. This would have the benefit

of supporting a trained, skilled, well-equipped (and hopefully safe) workforce while reducing the conflict and risk created by the cost-price squeeze.

Some rules that are meant to increase safety are undermined, or mitigated, by other factors such as prices or competitive fisheries. Fisheries with Individual Quotas, for example, which are usually seen as enhancing safety, can be impacted by other variables which can augment risk. For example, one harvester points to the danger of **"overloading the boat, especially when you're on quota and have far to go - don't want to make an extra trip" (FH 33).** Likewise, better boats or better forecasts may have the potential to increase safety, but this potential benefit can be counteracted by a competitive fishery in which people feel forced to go.

Unintended Safety Consequences of Regulations

Conservation rules and regulations seem to exert the strongest forces undermining safety, according to the harvesters I interviewed. Vessel replacement and/or modification rules are seen as having a big effect on safety, particularly as fishing vessels moved further offshore in the 1990s. The size of vessels seems to present a problem as the medium-sized vessels are trying to keep up with the big boats and stay ahead of the smaller boats. Harvesters insisted that vessel replacement rules have a huge impact on safety, although government regulators argue that the rules are in place for conservation and

capacity reasons. There is some controversy over this idea, but the debate is outside the scope of this thesis.

Other than vessel length, season length was the next most mentioned area of regulation with unintended safety consequences. More flexibility is called for by harvesters because weather can severely impact who can safely go to sea, or perhaps more importantly, who will try to go and when the seasons are short or are about to close harvesters might be more likely to take a chance on fishing in bad weather. Similarly, gear-setting rules affect fleets differently: large ships appear to suffer little safety impact; medium vessels experience major impact; and small vessels experience major impact. One harvester remarked, **"when you're carrying gear in or out, you want to make sure you have stable seas" (FH 11).** Gear-setting rules specify that lobster pots can only be set in a certain 48-hour time frame (increased from 24 hours due to similar safety issues in the past). This means that the boat, typically sized for checking the pots and bringing back the catch, is often overloaded to get the first set of pots out as close to the opening of the season as possible. Several harvesters mentioned the fact that the "first catch is always the best," so to delay setting pots because of the weather is often not seen as an option. Likewise, at the end of the season pots have to come in during a very specific timeframe or harvesters face hefty fines. They feel they are sometimes forced to go out in unfit weather or else be punished by law.

Safety Consequences of Too Little Regulation

We did not have a question that specifically asked whether certain fisheries in the province are too tightly regulated, but many harvesters offered that opinion as an aside to their answers to related questions on related topics; for example, **"it's too much" (FH 29)** and **"overregulated" (FH 17)**. The sealing industry is the only exception: licensing requires no formal training of commercial sealers, simply a two-year span working with a professional sealer. They are encouraged, but not required, to take courses on hunting techniques and product preparation (DFO 2007), but it is possible to have relative novices on the ice shooting high-powered rifles. I spoke to a gunner who loved the adventure of the hunt, but who has fallen off the vessel several times. One harvester (FH 15) noted the danger of stepping on ice that appears solid, but is in fact "slub" ice. He emphasized the importance of testing one's path with a gaff stick. In addition to these risks, there is the chance of being shot by another sealer. The conditions on the ice are often stormy, and several sealers noted that being among the seals is not the safest place to be. Two sealers specifically suggested a boat quota is needed to reduce the dangers posed by an open, competitive seal hunt (FH 17 and FH 18). There is also the danger of getting stuck in the ice; the *National Fisherman* (August 2007) reported that some vessels were immobilized by ice for over 21 days in the 2007 hunt!

Overall, more input in the policy-making process is desired by fish harvesters as a way to positively impact safety in the fisheries. Official statistics

are often used to justify policies and regulations that impact safety; however, our research reveals that many accidents and injuries are not reported to emergency response organizations. According to our interviewees, none of the 23 accidents we heard about had been reported to Search and Rescue or Coast Guard, and only six to the WHSCC. If an injury or accident does not require Coast Guard or Search and Rescue to be called in, and does not result in a WHSCC claim, then it slips under the radar. It is difficult for regulatory agencies to prevent injuries of which they are not aware. Isolated anecdotes are not enough to base policy on, so it seems important to find some way of encouraging harvesters to systematically share their observations on near-misses and other types of accidents that are not reported. This will permit policy to be more sensitive to methods of preventing accidents and injuries that are currently underreported and therefore overlooked.

The perceived legitimacy (and motives) of the people and groups implementing policies that affect safety can dramatically alter the extent to which the policies are accepted as valid; for example, one harvester suggested **"they never hurts like we do.... the policy makers thinks fishermen haven't got a clue" (FH 40).** The best safety policy possible might be of limited value if introduced by an agency which is distrusted by fishermen. The ideal method would be to have safety experts working alongside fishermen, with not just one-shot inspections saying "you don't have this or this", but rather a feedback spiral so that harvesters feel like their input is valuable and taken seriously.

Cultural Approach

From the cultural perspective, one of the key issues is who has the power to shape and define risks. Fish harvesters have a keen sense that not everyone has an equal role in shaping and defining risks and this feeling of disparity is reflected in their comments. For example, one harvester wondered why the 'big boats' are allowed to fish cod while the fleet of smaller vessels is not (FH 40). Central to the understanding of cultural factors in fishing risk is the question of who has power to define risk and to define the policy response to risk. For instance, some harvesters argue that because of government regulations they have to buy dilapidated old boats rather than purchase or build new, safer vessels. DFO regulators are trying to reduce overall fleet capacity through the Vessel Replacement Policy (DFO 2002), although fish harvesters argue that they do not want more fishing capacity, and that just because they have a bigger boat does not mean they have to fill it every time they come ashore. They indicate that having a larger vessel could mean that they could make fewer trips, bringing in more of the catch on each trip and spending less time exposed to risks at sea. This example shows how looking at the same issue through different lenses (for example, conservation and safety) can highlight the differing priorities of different groups.

The cultural perspective can be compared to the metaphor Messing (1998) uses to describe a theory of social determinism ("clay pegs in round or square holes"). She says that a cultural view of work would argue stereotyping

and other social forces tend to push or pull men and women into different types of jobs and that in different times and places, these forces may differ. In contrast, a structural approach would consider the differences between men and women and their typical jobs to be more fixed. To extrapolate from this metaphor to fishing safety, the tensions over the costs of safe production (Douglas 1986) exist because social forces, and not natural divisions of responsibilities, dictate how some groups can exert influence on decision-makers more directly than others. This may partially explain why safety equipment seems prohibitively expensive (the influence of equipment manufacturers and market forces), and why safety training is seen as somewhat inaccessible (costs are decided on by the groups offering the courses). To relate this back to Messing (1998), we could say that social forces play a greater role in determining the costs of safe production than a structural perspective might have us believe.

Protective Factors

There are a number of factors harvesters mentioned that can help to reduce risk at sea. While regulations drew a great deal of negative attention in terms of safety, regulations regarding training and safety equipment were largely viewed in a positive light. Mandatory training is seen as a good thing overall; **"fishing is dangerous, but if you're trained it's not as dangerous as it could be" (FH 25).** Training in stability is useful, for example, providing it is introduced in ways

that resonate with harvesters. Policies on mandatory safety equipment are seen as being important as well. It is seen as beneficial that harvesters have to bring appropriate safety and survival equipment with them, but financial constraints prevent people from carrying everything they are legislated to carry, or would like to carry) (FH 40). A few harvesters suggested that more input by practicing fish harvesters could help to identify and alleviate some of the safety constraints caused by policy: **"fish harvesters should have input before regulations are put in place – they're the ones that have to do it." (FH 39)**

Another protective factor that harvesters mentioned is the use of redundant safety and survival systems and equipment onboard a fishing vessel. This may include supplementing modern methods or technologies with traditional ones; for example, learning celestial navigation to supplement technological systems or learning how to forecast weather with change of clouds (FH 42). Such redundancy may also take the shape of physical backup equipment, including carrying extra compasses (FH 17, FH 25, FH 28) and marine batteries (FH 42). Furthermore, there can and should be multiple crewmembers who are trained in essential skills onboard; for example, it could be very important to having more than one person who is trained to navigate the boat home if anything goes wrong.

Applying the Integrated Framework

Ideally, we need a way to deal with injury prevention in a dynamic environment. Messing's (1998) notion of clay pegs in clay holes is an effective way of understanding this type of dynamism and its relationship to occupational health in that it considers mutual adaptations of worker and work environment (24). Rather than viewing harvesters as static individuals, we need to consider the dynamism of human capital factors: people are learning all the time, from both formal training and personal experience. Likewise, structural aspects of fishing safety, including both intended and unintended consequences of various policies, change from season to season and interact with human capital factors. Messing's work has the potential to address such risk factors in ways that fit them together like pieces of a puzzle, instead of simply naming single factors in isolation. This would be one of the main benefits of using an integrated approach to fishing safety.

Torner's (1999) method of repeat visits to fish harvesters' vessels by safety experts could work quite well in this way. Rather than focusing only on what harvesters are required to have onboard (although that would be one purpose), such visits could open up a dialogue about fishing safely, and ideas for improving practices and routines onboard. Such repeat visits to harvesters who participate would open up an avenue for tracking change and anticipating what kinds of changes in safety might occur when changes in biophysical or structural factors occur.

Because of this, I support Neis and Kean (2003) in the call for fish harvesters' knowledge to be combined with that of DFO scientists and would apply it to safety, with harvester knowledge as well as that of safety experts and policymakers contributing to an integrated understanding. Fishing safety is a workplace issue and should incorporate ergonomics and 'fishing safely' everyday, not simply emergency protocol, and should account for both behavioral and non-behavioral factors. When several problems (or risk factors) arise at once – engine failure and poor weather, for example – an emergency can escalate devastatingly fast.

The next section presents selected quotations from the fish harvesters I interviewed with a focus on how the interactivity of risk factors can compound danger.

Cascading Effects

Harvesters described how the combination of risk factors makes situations exponentially more dangerous than in situations where each risk factor is operating in isolation. For example, a small boat may be perfectly safe in good weather; however, if policies such as a competitive fishery combine with the effects of vessel replacement rules and poor weather, the risk to harvesters can be very high.

The first quote is from a harvester who was **"down in 3Ps with engine out, electrical failure and in fog with shipping and large vessels" (FH 41).**

This brief quote illustrates the interaction of biophysical factors (fog), human capital factors (whether crew members were experienced with this kind of situation, or trained or knowledgeable about navigation, shipping lanes, and proper signaling), and structural factors (vessel design, maintenance and inspections, whether legislated to carry spare parts, availability of Search and Rescue resources). Such interaction between risk factors suggests that complementary and redundant systems might be the most effective way to prevent accidents at sea. As Binkley mentions, traditional methods of forecasting and navigating should complement new technologies (1995) rather than be superseded by them. The factors can be said to 'cascade' because each influences the others: fishing in 3Ps might be perfectly safe in good weather, for example, but fishing in fog with engine and electrical failure might create or compound distress, particularly while in a high-traffic shipping lane. The idea of experience might not be solely a human capital factor, as the fishing grounds "down in 3Ps" might be new to them because of the structural changes taking place in the industry.

A second quote to illustrate cascading effects is by a harvester who describes: **"taking on water after lending out lifejackets – left the wharf, didn't check for lifejackets and life raft, I think" (FH 44).** In this situation, something that might normally be a habit at a friendly wharf – lending out lifejackets – quickly turns troublesome when an adverse event occurs. The pre-trip safety practice of ensuring that all safety equipment is present was not

followed; whether it was a one-time event or a routine, it speaks to the importance of having a clearly defined pre-trip safety routine and ensuring it is followed every time the vessel leaves the wharf. Incorporating Torner's method (1999) could help to create a climate in which safety practices are accepted as meaningful, valued aspects of a harvester's routine, rather than nuisances. Cultural and human capital factors play a role here in determining who is responsible for setting and maintaining safety practices in order to mitigate risk.

A third example of cascading effects is the harvester who fell into the hold and injured himself, attributing it to **"carelessness – the hold should have been closed. [There's a] person to do particular jobs on the boat, [but] we never had a hatch before. One's responsibility is checking oil, and so on. Nobody really geared in to [that] risky responsibility" (FH 44).** This incident illustrates the interactivity of human capital factors (the harvester describes it as 'careless,' as each person should know which tasks they are responsible for onboard), biophysical factors (a new physical feature on the vessel), a social factor (changes in target species that lead to changes in vessel design) and the dynamism of working on a changing, moving platform. Binkley's work speaks to this kind of incident as well, in that safety assessments need to follow changes in technology or work practices (1995). The harvester in this example injured himself; to extrapolate from the incident, we can imagine that if he was fishing with a smaller crew than usual (due to a structural factor like financial constraints) and he was the only person onboard trained or experienced in navigation, the

incident could have escalated into emergency status quickly. This is why having redundant safety systems and a full complement of trained crew is important to fishing safely. Given the swiftness with which an accident can occur, and the exponential danger that can be created with multiple risk factors or problems occurring at once, it is vital to have several lines of defense in case of emergency. This illustrates the importance of having an integrated approach to safety, one which includes redundant safety systems and an awareness of how risk factors can combine. An integrated approach implies that the best way to promote safety is not by focusing on one specific aspect of risk at a time, but rather to attempt to create a safety framework with which harvesters can become comfortable.

The fourth example is the quote that inspired the title of this thesis: **"with sealing equipment, you're in God's pocket" (FH 17).** Sealing is the single fishery that harvesters say is under-regulated, and they feel this lack of regulations makes them less safe while at sea. Being "in God's pocket" alludes to the trust one must have when dealing with risk. A harvester can take every possible step to ensure the safety of the ship and those onboard, but with no way to 100 percent guarantee a safe voyage, the harvester must trust or else abandon fishing as a livelihood. This relates to human capital factors like coping strategies: when faced with the pressures of making a living and doing dangerous work, there can be a tendency to ignore or downplay some of the risks in order to reduce the cognitive dissonance. This can be accomplished

through minimizing or trivializing the risks (Murray & Dolomount 1994), or "othering" risk (Joffe 1999). Power's (2005) work on coping strategies provides an interesting counterpoint to the psychological perspective which tends to see trivialization and fatalism as negative. Coping strategies like these might actually reduce the stress of worrying about what might go wrong, and being stressed out trying to determine how much of the power to control accidents is their own. Stress can lead to fatigue, which can lead someone to potentially make a mistake. Denial, fatalism, and trivialization can be considered ways of coping with the extreme individualizing discourse of government and regulatory agencies. It can be difficult to create a safe space to speak out against or resist dominant paradigms (Power 2005), and saying that one is "in God's pocket" might be one way to represent fatalism in a way that is not necessarily negative.

The quotation also refers to being at the mercy of the elements, a biophysical risk factor which saw sealers stuck in the ice for almost a month in the spring of 2007 (Dyer 2007). Adding to the risks posed by weather and ice, harvesters also need to consider other sealers who are possibly untrained and inexperienced (greenhorns), and possibly shooting high-powered rifles in conditions with low visibility. Given the need to go out on the ice to retrieve the seal, this is one situation where cascading effects can clearly have tremendous consequences.

The fifth quote, presented in the data chapter, offers a rich and complex perspective:

"We fished all our lives and enjoy fishing, invested everything we got our whole lives and could lose it all. There's fish - making us starve and let big boats go. They never hurts like we do. If fish are inshore why not let us fish it? I knows more about our job than those at a desk. We're getting same amount of fish in 6 nets or 12 nets as we used to with 110 nets (so there's lots of fish). Put nets down for 1 1/2 hours (12 nets) near Labrador and got over 3000lbs - not that there's no fish - they just won't let us fish. Are they trying to get us out of Newfoundland? The big boats, factory freezer, their fish is leaving the country. The policy-makers thinks fishermen haven't got a clue. Big problem with safety - if you come to my boat you'll see equipment that I'm missing but I can only barely afford to get by. I'd like to have it but the bottom line is I can't have it" (FH 40).

This harvester highlights the cultural differences in sets of knowledge, pointing out that his direct experiential knowledge conflicts with (and is undermined by) official discourse. The "policy makers" he speaks of are saying that there are no fish to fish, but his first-hand information leads him to believe otherwise. This may be due to certain fishing grounds renewing faster than others (a biophysical factor), or it could be that the science behind quota allocations is inaccurate (a structural factor) or could reflect differences in scientists' and harvesters' assessments of abundance and trends related to the spatial and temporal dimensions of their knowledge and the limited extent to which catch per unit of effort actually reflects abundance in many situations. Furthermore, with 'big boats' allowed to fish and smaller vessels not allowed, this situation could have evolved from corporate pressure to rationalize the fisheries, thereby reducing the number of vessels and harvesters. Such a process may be considered products of structural changes, influenced (culturally) by groups with greater sway than the fleet of small vessels. Finally, he says 'they' (DFO) are 'making us starve' and asks if 'they' are trying to get small-vessel operators to leave the fishery and

therefore the province. These statements demonstrate interactivity: the human capital factor of having to make personal decisions about livelihood and region of residence reflects the structural and cultural nature of thousands of people having to make similar decisions. This illustrates the need to consider risk factors in a holistic, integrated framework, rather than attempting to analyze them in isolation from each other.

The sixth quote comes from a harvester who, when asked if there are certain injuries that are 'normal' or a common part of the job, replied: **"cuts – you don't have to be careless for them" (FH 44)**. Harvesters are working on moving platforms (a biophysical factor), with varying levels of experience, training, and comfort with the activity (human capital factors). This harvester also identifies how cultural factors can interact with human capital factors. Individualizing theories of accidents (those which suggest workers who get cut are careless or accident prone) are perhaps rooted in land-based safety research, where work platforms are stable and the environment is comparatively constant. The harvester's comment suggests he thinks people often ascribe cuts to carelessness, and that he disagrees. While some cuts may be due to paying insufficient attention to the task at hand, it is not always the case. Fishing is an industry where one must work as fast as possible, as safe as possible, with safety sometimes being sacrificed for the sake of speed.

Half of the harvesters we interviewed had experienced accidents, and most of them only had one or two in the last 10 years. Further research is

needed to determine whether the distribution of accidents among fish harvesters is more closely linked to the position on the ship, tasks being performed, or perhaps working in a marine environment. Falling overboard can be related to the position on the ship: the man who fell overboard 12 times is a gunner on a sealing boat, a physical location that is more exposed and precarious than that of the captain in the wheelhouse, for example. Similarly, cuts may not be due to certain 'careless' or 'clumsy' workers who keep having accidents; work in a marine environment is different from that on land.

Because changes in technology can increase risk, it is important to supplement new technologies with traditional methods; the final quote is from a harvester who believes **"a lot of young people can't determine the change of clouds. Traditional ways of telling the weather are always better, it seems" (FH 42)**. This may link to the decline in intergenerational, informal 'apprenticeships' – typically, children (usually sons) were brought into the fishery and trained by their parents (usually their father). With increasing reliance on external technologies and institutions, people are being formally trained in specialized ways, where (particularly in a vessel with a small crew) jacks-of-all-trades may be more helpful. This reliance is to some extent expected and necessary in an increasingly electronic and complex world as a characteristic of modernity; but traditional methods can supplement or provide backup in the case of technological failure. Changes in technology can be considered 'human capital' factors in the sense that people can individually take action to keep up

with new technology; but these changes are also structural as government and regulators bring in new technology that harvesters must keep up with.

Summary

Overall, what harvesters seem to agree on is that while some things have improved and others have stayed the same, there have been driving forces in the fishery since the early 1990's which were not present before and that have encouraged many of them to engage in risky behavior more often. This behavior may take the shape of going out when the weather was unsuitable, or going further out to sea in a small boat when a larger one would be more stable and safe. There are also economic pressures placed on harvesters; many of them forego survival suits, for example, simply because they do not know if the fishery will be viable for them next year.

The following might work as a tentative understanding of the interactivity of risk factors, keeping in mind that this is not a simple, closed mathematical system and that there will be some factors that we are not even aware of (see Wynne 2002 on the notion of "unknown unknowns"), let alone able to quantify:

(biophysical) + (human capital) + (structure) + (culture) + (dynamism) = RISK

These factors are cumulative and interactive; this is not rational choice or game theory. All of the choices harvesters make, as well as the decisions made

by others such as regulators and other harvesters, impact the circumstances in which each next choice happens. That is, if a harvester had a particularly bad year in 2006 (had difficulty making loan payments and paying crew, for example) their choices in 2007 would bear the weight of 2006. They might lean towards taking greater chances for a bigger payoff: they might feel pressure to go in bad weather, to stay out during storms or gamble on whether or not a forecast for inclement weather will materialize. They also might try to make do with less safety and survival equipment, might try to fish with less crew so the crew's share does not take up so much of the profits, and/or might try to skirt some regulations by highgrading (discarding some catch at sea to secure better prices).

Some types of risks are seen as being clearly within the individual harvester's control, and can therefore be addressed to some extent on an individual level. Overloading the boat and going out in extreme weather are two risks mentioned by harvesters that are sometimes ascribed to carelessness or ignorance on the part of the skipper. Harvesters tend to agree that such risk factors can be reduced by education. However, the choices and actions of harvesters, like any social actors, are shaped and constrained by the sociopolitical circumstances in which they are choosing and acting. To illustrate how this can lead to a harvester choosing to overload the boat: gear-setting rules only permit 24-48 hours to set gear, harvesters are not always in the size of vessel that they feel is safe for the fishery, so they go out in poor weather with more pots than they probably should carry at one time. Alternatively, the vessel

might be the right size for fishing but the wrong size for setting gear. There is certainly an element of personal responsibility that should be acknowledged; but many harvesters mentioned feeling as though they are in some ways forced to make the unsafe decisions that they have made. They know their actions may be considered careless or dangerous, but feel they have little choice.

There are mitigating factors that affect the intended consequences of particular safety regulations. For example, the introduction of Individual Quotas for crab theoretically allows harvesters to choose when to fish throughout the season, but as the season goes on, the quality (and thus price) of the catch can decrease, or the season could be prematurely closed by DFO.

Chapter Six: Conclusion

Newfoundland harvesters' observations on risk highlight the need for an integrated approach to understanding fishing safety, one which can handle biophysical, human capital, structural and cultural factors, as well as account for the way these factors interact in a context of industrial and policy change. Results from this set of semi-structured phone interviews with 46 Newfoundland fish harvesters highlight the complexity of fishing safety and of perceptions of risk. There are many ways to be safe (redundant safety, survival, and communication equipment, for example); but, simultaneously there are *many* things that can go wrong. Almost anything can happen to members of a fishing crew, from cutting a finger to breaking a leg, from getting bitten by a fish to drowning. There is no doubt that the generally remote locations associated with harvesting and the fact that Newfoundland and Labrador harvesting takes place in the context of cold and often hostile oceanographic contexts contribute to the risks associated with even relatively minor injuries. In a sense, this has been common knowledge among harvesters and their families for centuries. Individual risk to harvesters is considered 'part of the job' by most of those interviewed; however, what has not necessarily been obvious is that there are overarching patterns of risk, differentially influenced by various factors and having different

levels of effect on different fleets and groups of harvesters and that risk can change relatively rapidly over time as a consequence of environment, social and policy change. The notion of 'cascading effects' describes how these factors can combine and exponentially increase or reduce the degree of risk and likelihood of accident, injury or death.

In this concluding chapter, I briefly summarize the major findings of this research. Next, I discuss the strengths and limitations of the study and explore implications and directions for future research. Finally, I identify the contributions of the research to the literature on fishing safety.

Major Findings

The research findings point to biophysical factors as a constant concern. Commercial fish harvesters have always faced risk from their physical environment; for instance, many harvesters said that severe weather plays an important role in fishing safety. In terms of risk being located in the physical body, harvesters note that fitness is important, particularly when faced with fishing alone.

Characteristics of the individual, such as their experience or level of training, were also seen as having a significant impact on safety at sea. In terms of training, there are challenges to its effectiveness due to skepticism on the part of those harvesters who have not completed training. However, over half of the harvesters who had completed a safety training course felt that such training is

'extremely important' to fishing safety. Respondents also emphasized common sense and experience as important protective factors against accidents and injuries.

Some of the harvesters I interviewed argued that safety promotion efforts are arbitrary and unfair, which could be considered a cultural aspect of fishing safety. There is controversy over which fleets are allotted quota in different fisheries, and subsequent controversy over the economic constraints created by 'unfair' allocations. One of the most interesting aspects of this research, in my opinion, was hearing first-hand which risks are considered 'normal'; risks which, in almost any other profession, might be deemed unacceptable.

Regulations were mentioned by many harvesters as the single biggest factor affecting the parameters of safety at sea. Rules such as those related to vessel replacement, tight deadlines for gear-setting and retrieval appeared to be the most significant from the harvesters' perspective. Financial constraints due to regulatory changes and the cost/price squeeze were also mentioned frequently by harvesters as having a significant impact on their ability to comply with safety regulations. These constraints sometimes prevent harvesters from being able to fish safely with a full complement of crew and safety equipment.

Harvesters who have an expert knowledge of a particular fishery but move into a new area or vessel, or use new technologies, may find that their extensive experience is not appropriate for their new environment. The importance of remaining aware of potential hazards in a new environment is paramount,

whether it involves being extra careful around a new hatch, or taking time to become familiarized with charts and weather patterns for new fishing grounds. This demonstrates that the dynamism of the industry is an important variable in the study of risk.

Another major finding of this research is that while each risk factor may present a serious danger in and of itself, when factors cascade (or problems happen simultaneously) the risk to vessel and crew grows exponentially. This demonstrates the need for multiple backup systems and vigilance while working at sea.

Strengths and Limitations

One of the strengths of this research is that it adds insights from active fish harvesters (the "view from the deck") to what is already known about risk at sea. Harvesters are situated at a pivotal point where they are able to see the simultaneous and interactive effects of biophysical, human capital, structural and cultural risk factors, as well as how the factors interact and change over time. This thesis contains valuable information which could be important to fish harvesters, regulatory agencies, and safety educators. The research makes a contribution to the academic pool of knowledge about risk in commercial fishing, and situates itself in an integrated framework.

In terms of limitations of the research, our decision to conduct the interviews by telephone was partially an attempt to combat the effects of illiteracy

on responses. However, due to ethics requirements we had to send out an introductory package so that harvesters could give informed consent. This package contained letters from us, the researchers, as well as agencies supporting our work (the Professional Fish Harvesters Certification Board, for example). Because of this, we likely received fewer responses from harvesters who experience difficulty reading and writing, and this may have affected our results.

In their research on the New England fishery, Pollnac, Poggie and VanDusen (1995) interviewed harvesters to assess their level of knowledge of different risky situations. We thought the eight-item ranking of severity question was interesting and tried to replicate it in our interview schedule; however, it was difficult to do so over the telephone. Afterwards, I thought the question might be problematic because we were essentially saying "here is the actual statistical danger of particular incidents; let's see if the fish harvesters know which one is most dangerous." We were assuming that the level of risk is more or less static and objectively measurable; we were taking a question from one context and asking it about another set of fishing grounds; and we did not inquire deeply into contextual information, information we might have gotten from a question like "in which circumstances might swamping be more dangerous than a fire?"

We learned that harvesters suffer from many health problems, but not how such problems are specifically linked to work in fishing. Two harvesters, who both identified themselves as having health problems likely related to their job,

mentioned that it is possible they would suffer from the same health problems while performing any manual labor as a career. Future research into fishing health problems should inquire more deeply into how these problems might differ from those in other labor-intensive, high-stress jobs.

One final potential limitation lies in one of the findings. The results of this study supported previous research which suggested most accidents happen in clear weather (Jensen, Christensen, Larsen & Soerensen 1996); however, we only inquired about the past ten years, and no major accidents had happened in that timeframe to our sample of harvesters. What might be the case is that accidents with severe consequences for the vessel or crew (such as capsizing or drowning) tend to happen in bad weather, while minor accidents are just as likely, or even more likely, to happen in good weather.

Implications

This section addresses methodological and theoretical implications of this research for future studies in this area. One of the methodological implications of this research is that future researchers might want to ask different questions about safety training in order to obtain more specific and useful data. For example, the resentment that some older harvesters feel about training is an area that would benefit from further study. This study did not directly ask questions about this area, as the idea of resentment towards training was not

necessarily anticipated while designing the research, but it did emerge in the comments and tone of some harvesters when asked about the impact of training on safety. Further research in this area could help to identify ways of making the training more meaningful and accepted among older harvesters, and therefore potentially more effective in reducing accident rates.

Methodologically, future research in fishing occupational health and safety would benefit from asking some different types of questions. For example, inquiring about the circumstances in which some risky events would be magnified or made even more dangerous. Similarly, it would be of great benefit to inquire whether the injuries considered a "normal" part of fishing would be common in other occupations as well. In terms of modifying the interview schedule, future researchers in this area may want to group list items differently to check for validity and reliability.

When inquiring about level of job satisfaction, it would be useful to acknowledge the economic and occupational constraints of living and working in rural Newfoundland by asking questions such as: "is other work available to you?" This might provide some context for asking if the harvesters would go into fishing again; they may feel their options to be limited by their geographic region. The method of contact worked well for our purposes with this study; future researchers might enhance participation rates by doing presentations at local fishery meetings. The costs of recruitment would likely be higher, as would the response rate. Another important fact to keep in mind is the timing of research in

the fisheries, so that researchers are able to work around low return rates by considering political issues, fishing seasons, and other factors that might discourage participation.

In terms of the theoretical implications of this work, it may be useful to investigate approaches to safety management that incorporate lessons learned from resource management. In particular, co-management regimes could bring resource users and dependent communities more directly into the management and science process (Neis et al. 1999). The benefits of this process include the sharing of power to make decisions, as well as accountability for consequences with a government agency. The most significant benefit of co-management noted is the heightened acceptance and compliance towards management rules. Future research in this area could investigate co-management regimes in different geographic areas to see what types elicit highest levels of satisfaction and cooperation.

Given the extensive commentary on the lack of regulations and thus increased perceptions of danger in the seal hunt, future research is needed to explore the possible benefits and disadvantages of further regulation, and more specifically how risk can be reduced. Harvesters feel that increased regulation is needed to tighten restrictions on who can hunt seals, and in which type of vessel.

Overall, theoretical implications for future research include the need to account for the dynamism of the industry; the need to consider the fishing vessel

as a workplace; causal multiplicity; and the importance of using a conceptual framework which is able to handle very different sorts of factors.

Directions for Future Research

I feel more research is needed on participatory processes that involve harvesters as primary stakeholders in fishing safety. To manage risks that are controllable at the individual, or crew, level, Torner's (1999) system of promoting safety intervention measures appears to work well. Having safety experts come onboard (at little or no cost to the harvesters; user-pay monitoring systems are another source of contention) to discuss putting rope in the right place, having a full complement of safety and survival equipment, and a trained crew, can permit safety experts and harvesters to collectively learn more about at what times and in which locations it might be possible to take action to prevent accidents. For those risks which are created or magnified by larger political forces, individual intervention may not be the most effective means to address such risk. I recommend adding a component to Torner's method which creates a space for harvesters to have input on external factors they feel affect fishing safety. Fishermen want more input on regulations, particularly those that will affect safety directly or indirectly.

Current approaches to fishing safety are typically driven by experts whose concerns are too often bounded by their disciplinary backgrounds and institutional interests. More interdisciplinary approaches to fishing safety and greater engagement of fish harvesters have the potential to substantially reduce risk at sea. As a social science researcher, I am neither a practitioner nor regulator. I understand that the knowledge I have sought to produce in this thesis is partial, like all other types of knowledge. However, careful attention to the voice of harvesters and systematic comparisons between that voice and the larger literature on risk has permitted me to contribute to the development of a third kind of knowledge with insights from both. Speaking with harvesters convinced me that their observations from the deck of the boat could reveal significant linkages and gaps between biophysical, human capital, structural and cultural risk factors and that these observations could help the fishing community move towards a comprehensive, integrated safety framework. By giving voice to harvesters who might otherwise go unheard, this thesis presents their views in a format accessible to other stakeholders in the fishing safety process and invites response.

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Appendices

Appendix A: Information Sheet

PERCEPTIONS OF RISK STUDY

SafetyNet is a Community Research Alliance on Health and Safety in Marine and Coastal Work jointly funded by the Canadian Institutes for Health Research, Memorial University, the Workplace Health Safety and Compensation Commission, and the New Initiatives Fund of Coast Guard, Transport Canada and DFO. The Perceptions of Risk study is one of six projects that make up SafetyNet's SafeCatch project on fishing safety.

The aim of the Perceptions of Risk study is to explore fish harvesters' perceptions of the things that put them at risk in today's fishery. The Human Investigations Committee (HIC) of Memorial University's Faculty of Medicine and the Human Research Ethics Board at Dalhousie University have granted ethical approval for the study. The study is supported by Professional Fish Harvesters Certification Board (PFHCB). In fact, without their support, you would not be reading this letter. As you probably know, researchers do not have access to your personal information, in this case information about you held by the PFHCB. The PFHCB is contacting you on our behalf so that we can tell you about our study and see if you would be willing to participate.

Should you decide to join the study, the information provided by yourself and many other fish harvesters will be used to produce research reports, including a report to Coast Guard, Transport Canada, DFO and the PFHCB. It will also contribute to a graduate student's thesis and be used in some academic papers. However, your privacy will be maintained and your name will not be used in anything we write.

We recognize that much research has been done on the fishery since the Northern Cod moratorium but we think ours is different and necessary. We are closely examining the existing statistics on fish harvesters' accidents, injuries and fatalities but these statistics can tell us only a small part of the story about those things that put fish harvesters at risk and those that promote fishing safety.

If you have any questions or would like more information before deciding to participate, feel free to contact us:

Dr. Barbara Neis,
Principal Investigator
Telephone: 709-777-8249
Email: bneis@mun.ca

Sandra Brennan,
Graduate student/Researcher
Telephone: 709-777-8748
Email: sbrennan@mun.ca

Appendix B: Recruitment Letter

Dear Fish Harvester:

We would like to invite you to take part in a research project about fish harvesters' perceptions of the things that affect fishing safety in Newfoundland and Labrador today. Participation in this project is voluntary. If you agree to participate, we will contact you by phone and carry out a phone interview. In that interview, we will ask you about:

a) your fishing experience
b) your thoughts on the things that affect risk and safety in today's fisheries
c) your experience with risky situations, accidents and injuries
d) quality of life
e) things that might make fishing safer
f) a few questions on your income and your general health.

SafetyNet is a research group based at Memorial University. Our focus is health and safety in marine and coastal work. We partner with researchers at other universities and with community groups.

The Professional Fish Harvesters' Certification Board is partnering with SafetyNet in this study. They selected your name randomly from their list of professional fish harvesters and they have mailed this letter to you on our behalf. We do not know who has received our letters.

If you agree to participate in this research an interviewer from SafetyNet will telephone you. The phone interview we would like to do with you is simply a more detailed discussion of the issues listed above. It will take approximately 45 minutes, and the call will take place at a time that is convenient for you. Your identity will be kept confidential and your name will not be used in any reports resulting from this study. A final report containing no names will be available to participants and to interested agencies.

Further details about the study are enclosed. **If you would like to participate in the study, please complete the attached Contact Reply Form and return it to us in the stamped, self-addressed envelope provided as soon as possible.** After receiving your reply we will arrange a time for the interview that is suitable for you.

Thank you for considering this request.

Barbara Neis (Ph.D.)
Professor, Department of Sociology and
Co-Director of SafetyNet,
Memorial University.

Marian Binkley (Ph.D.),
Dean, Faculty of Arts and
Social Sciences, Dalhousie
Dalhousie University.

Appendix C: Phone Script and Oral Consent Form

Phone Script and Oral Consent
SafeCatch: Fish Harvesters' Perceptions of Risk
Phase II: Phone Survey

Confidential when Filled In

Hello _____ . My name is _____ I am a researcher working with SafetyNet, a Research project based at Memorial University. With me on the phone is _____ another researcher.

You recently responded to our letter inviting you to participate in a research project on fishing safety. Thank you for getting back to us. As we explained in our letter, participation in this study is voluntary. If you agree to participate we will ask you questions about where you fish, your vessel, gear and the species you fished for in 2004. We will also ask you about accidents and injuries you have had, about things you think might affect fishing safety and a few questions about yourself including your income, quality of life and your health. There are no right or wrong answers. We want to know about your fishing experience, your experience with risk and with safety training and equipment.

Should you agree to do this phone interview, you can refuse to answer any question put to you and you are free to withdraw from the study at any time. Your name will not be used in any reports or articles we produce from this study. Your interview will be assigned a number and the list of names will be stored separately from the interview and only research team members will have access to that information. The information you provide will be used only for this research project.

Dr. Barbara Neis at Memorial University and Dr. Marian Binkley at Dalhousie University are leading this research. It is funded by a research grant from one of the national research councils, and by a grant from Coast Guard. This research has ethics approval from the Human Investigations Committee at Memorial University and from the Human Research Ethics Board at Dalhousie University.

Are you willing to participate in this interview? Yes ____ No _____

If yes, is this a good time? Yes ____ No _____

If no, is there a more convenient time when I could reach you? _____