EXPLORING SAFETY BEHAVIOURS IN THE NEWFOUNDLAND FIBREGLASS BOAT-BUILDING INDUSTRY: A COMMUNITY BASED STUDY

STACEY WAREHAM


CENTRE FOR NFLD. STUDIES
MEMORIAL UNIVERSITY
OF NEWFOUNDLAND

Exploring Safety Behaviours in the Newfoundland Fibreglass Boat-Building Industry: A Community Based Study

By

Stacey Wareham

A thesis submitted to the
School of Graduate Studies
in partial fulfillment of the
requirements for the degree of
Doctorate of Philosophy

Department of Psychology
Memorial University
December 2007

St. John's Newfoundland

Abstract

The process of fibreglass boat-building (FBB) and repair requires the use of the chemical styrene, a known neurotoxin which contributes to a number of physiological and psychological problems. There have been concerns over the lack of self-protective behaviours among FBB plant workers. The objective of this study was to assess factors affecting safety behaviours in the FBB industry in NL from a social psychological perspective, using the Theory of Planned Behaviour (TPB) as a foundation. A mixed methods approach was taken involving qualitative and quantitative data collection methods. Study 1 involved interviews with community members, managers, employees, and key informants. Qualitative analysis revealed several themes at the community, organizational, and individual levels that appear to affect safety behaviours in this industry. Study 2 involved the development of four surveys that were distributed to each group of interest (employees, managers, Occupational Health and Safety inspectors, and health care providers). Due to small samples sizes in three of the interest groups, subsequent analyses were conducted using only the employee survey data (N = 43, 80% response rate). Data from the employee surveys were used to (1) modify the survey instrument, (2) determine the factors that affect employee safety compliance, and (3) determine which of several potential factors (e.g., knowledge, safety climate, community attachment, perceived image risk, etc.) affect the proposed determinants of employee safety behaviour (e.g., attitudes, subjective norms, perceived behavioural control, perceptions of risk, and affective reactions to risk). Results suggest that exploring

employee safety behaviour requires an investigation of cognitive, social, and cultural factors. Employee safety behaviours appear to be associated with social influence beyond the workplace; that is, perceived behavioural expectations of significant others (i.e., family members and physicians) was associated with safety compliance. Results of this study also suggest that several distal determinants of behaviour (e.g., employee knowledge of the health effects of styrene, safety climate, and community attachment) are associated with the proximal determinants of behaviour. These findings underscore the importance of understanding behaviour by incorporating broader social factors into the TPB. The implications of these findings are discussed from both applied and theoretical perspectives.

Acknowledgements

The completion of this study was the result of a great deal of hard work and the support of a number of individuals and organisations. First of all, I am extremely grateful to all the individuals who participated in interviews, often welcoming me into their homes or places of work, and to all the individuals who took the time to complete surveys for this study. Without them this study would not have been possible.

To my supervisor, Dr. Christine Arlett, I am tremendously appreciative of all her hard work in the development, execution, and completion of this study. Christine's guidance and unwavering support and confidence in me contributed to my growth as a person and as an academic. She has had a considerable contribution in making my overall experience as a graduate student a wonderful one.

To my supervisory committee members, Dr. Rita Anderson and Dr. Ted Callanan, for their valuable advice and contributions to this study. I appreciate the time and commitment they both dedicated to this endeavour.

I would like to offer my appreciation to SafetyNet and the Newfoundland and Labrador Centre for Applied Health Research (NLCAHR). SafetyNet (Dr. Barbara Neis, Dr. Stephen Bornstein, and Dr. Scott McKinnon, among others) made this study possible through their financial contribution to the study and their confidence in allowing us to bring project styrene to fruition. In addition, SafetyNet and NLCAHR have both made significant contributions to my PhD program by providing much needed (and appreciated) financial support through their fellowships programs. I would like to send a special thank you to Joan Power who always had the answers to all of my financial and travel related questions.

I would like to thank several individuals associated with Memorial's psychology department. I would like to thank Professor Malcolm Grant for his advice on statistical aspects of the thesis. I would also like to thank Dr. Brent Snook for contributing to my teaching experience. In addition to her support throughout my graduate program, I want to thank Dr. Cathryn Button for creating this opportunity for me. When I decided that I

wanted to pursue a graduate program in social psychology, the deadlines for graduate schools had passed. In contacting Dr. Button and informing her of my dilemma she forwarded my name to Christine and, well, this is the result.

To the psychology department staff, Brenda Crewe, Shirley Bradbury, Maureen Howard, and, most recently, Sharon Rose, they always have the right answers to your questions and know how to get things done. I thank them for their support and friendship over the last six years. To the Head's of the Psychology Department during my Masters and PhD programs, Dr. John Evans, Dr. Gerard Martin, and Dr. Ian Neath, I would like to thank them for their advice on various aspects of my thesis and my career.

To Elizabeth Flynn-Dastoor and Ricky Cullen both of whom accompanied me on many trips around the province for data collection. Their company certainly made those trips as enjoyable as they could be with no shortage of conversation. Thank you for your hard work, support and friendship.

On a personal note, I want to thank my Mom (Gaye), Dad (Lloyd "Chum") and brother (John) for their endless support throughout my university career. Their advice and reassurance has meant so much to me; 'thank you' really doesn't cut it. To my extended family (my nan, aunts, uncles, and cousins) their appreciation of my academic ambitions has always been a constant motivator. My sincere appreciation is also extended to my best girlfriends, Bob, Sash, Crystal and Jill, for their encouragement, endless chats and steadfast friendships.

To my Ken, who has accompanied me on this journey. I cannot imagine having gone on this expedition without his amazing, infinite support. For listening, advising, and caring so much, I am forever grateful.

And finally, to my uncle, Roger Reid. He was a hard working and respected entrepreneur, a wonderful husband and father to a young family, a doting son, a loving brother and uncle, and a fun loving friend. Roger loved to create and construct beautiful homes for families; it is in doing so that he left us so suddenly. I dedicate this work to him and all workers that put themselves in harms way everyday to do what they love, or what they must.

Table of Contents

Chapter 2

Study 1 Method

Chapter 3

Study 1 Results

Chapter 4

Study 1 Discussion

Chapter 5

Study 2 Method: Survey Development and Data Collection

Chapter 6

Study 2 Results Part I

Refinement of the Employee Survey

Chapter 7

Study 2 Results Part II

Analysis of Employee Survey Data

Chapter 8

Study 2 Discussion

Chapter 9

Conclusions

Appendices

List of Tables

List of Figures

Chapter 1

Literature Review

Introduction

Boat-building has a long history in Newfoundland and Labrador (NL) and continues to play a role in rural Newfoundland both culturally and economically (Boat Builders' Association of Newfoundland and Labrador, 2006). With new manufacturing technology, wooden boats are no longer the norm; rather, fibreglass reinforced boats are in high demand.

Triggered by the 1992 cod collapse and subsequent industrial restructuring towards more deep sea species such as snow crab, fibreglass boat-building (FBB)[1] has expanded rapidly in NL (Dolan et al., 2005; Howse et al., 2006). Many rural communities have shown a dramatic population decline in response to economic hardship (Community Accounts, 2006; Fowler, 2007) and currently rely on one business or industry, such as boat-building, as a source of employment. The social and economic circumstances of these communities and of the individuals residing and working in them may have profound implications for the tolerance of risk in hazardous workplaces and for employee willingness to engage in safety behaviours. For example, competition for employment may affect tolerance of risk, particularly if the alternative is to move away or to rely on government assistance programs. Furthermore, norms held within specific social environments may contribute to safety attitudes, safety behaviours, and perceptions of risks. For example, lack of dialogue in communities regarding safety in the workplace may affect the extent to which workers will engage in self-protective behaviours.

[1] See Table 1 for a reference list of frequently used acronyms in this document and related meanings.

Table 1.1

List of Frequently Used Acronyms

Acronym	Meaning	First citation (page no.)
FBB	Fibreglass Boat-Building	2
OHS	Occupational Health and Safety	3
HBM	Health Belief Model	10
PMT	Protection Motivation Theory	11
HPD	Hearing Protection Device	12
TRA	Theory of Reasoned Action	13
TPB	Theory of Planned Behaviour	13
PBC	Perceived Behavioural Control	14
SCT	Social Cognitive Theory	15
PPE	Personal Protective Equipment	28
PCA	Principal Component Analysis	29
BRPM	Basic Risk Perception Model	32
CT	Cultural Theory	34
SRT	Social Representation Theory	39
PSOC	Psychological Sense of Community	51
SCI	Sense of Community Index	52

In the case of fibreglass boat building and repair, the process requires the release of the chemical styrene, a known neurotoxin. Acute exposure to styrene is associated with mood instability (Campagna et al., 1995); irritation and forgetfulness (Flodin, Ekberg, Anderson, 1989); fatigue and depression (ATSDR, 1992); reduced color vision (Castillo, Baldwin, Sassine, & Mergler, 2001); hearing loss (Sliwinska-Kowalska, et al., 2003); and psychological symptoms such as increased aggression that negatively impact social relationships (Julien, et al., 2000).

study. It may be the case that the attachment people have to their community and the desire to remain, as suggested by study participants, may affect their willingness to tolerate (or perhaps report) risks in the workplace.

Orton et al.'s (2001) study also lends support to the current findings that workers in economically challenged areas may be more likely to tolerate risks. It was observed among Hungarian and UK radiographers that even though Hungarians experienced the same radiation exposure risk as UK radiographers, their low pay and depressed economic state may have translated into lower reported perceptions of radiation risk compared to their counterparts. It might be the case that a depressed economic state may increase competition for work. Consequently, people may deny the risk to minimize dissonance they may feel with respect to taking a low paying job with increased health risks

Perceived job insecurity: Holding on to the job you have. It may certainly be the case that employees do their best to protect their health and safety at work. However, there may be situations that arise where the work environment is perceived by employees to be unsafe. While some employees may address such concerns with co-workers or persons in charge, others may not. It was suggested during the interviews that job insecurity and scarce employment opportunities were barriers for employees with respect to their willingness to raise safety issues. For example, the wife of the former boat-building plant employee suggested that with more employment alternatives, employees who felt that they were working in unsafe conditions would raise safety concerns with their employer. The Former Owner and OHS Representative supported this claim, further

proposing that an employee's comfort level with discussing health and safety issues depended on whether the employee is intimidated by management, concerned about losing their job or perceived to be creating trouble for the company. These findings suggest that if employees do not perceive a supportive safety climate they may be less likely to raise safety issues in the workplace if there is a sense of job insecurity.

The findings of the current study are similar to those documented in the literature. There are conflicting observations regarding the extent to which job insecurity affects workplace safety behaviours (e.g., Parker, Axtell, and Turner 2001; Probst, 2002; Quandt et al., 2001; Saha, Kulkarni, Chaudhuri, & Saiyed, 2005). Probst's (2004) study revealed that when employees perceived a low safety climate within the organization, job insecurity was associated with low levels of safety knowledge, less self-reported safety compliance, and greater likelihood of workplace injuries and accidents. Conversely, when employees perceived a strong safety climate, the effect of job insecurity on safety outcomes weakened. Such findings may be of particular importance to workplaces in areas with a stressed economic climate. As suggested by Probst (2004) these observations provide evidence for the significance of a strong organizational climate on employee safety outcomes in that it can affect the adverse effects of perceived job insecurity.

Perceived negative social consequences to raising safety issues. In addition to job security, there are potential social consequences to raising safety issues. The OHS Representative contended that workers who raise safety issues to an OHS inspector may be blamed or ostracized if the company experiences any repercussions due to the

employee's complaint. The potential negative outcome of reporting a workplace health and safety concern may affect an employee's willingness to raise such issues. This is a very important comment considering that the workplace is a social environment and that many people in rural communities work with the same people with whom they socialize outside the workplace. As suggested by previous participant statements, many of these communities have very close social networks. Therefore, conflict in one social environment, such as the workplace, may spill over into other social groups. With such convoluted social networks, people may be less likely to bring up contentious issues in order to avoid ostracism and criticism by members of their social networks (Asch, 1956; Cialdini & Trost, 1998; Kelley & Shapiro, 1954).

Implications for Study 2

The findings from Study 1 provide insight into a variety of issues associated with the fibreglass boat building industry in rural NL. It is clear that the major limitation to Study 1 is the small sample, with only seven of the 20 participants having a direct association with the industry. To further enhance our understanding of the factors affecting safety behaviours of those working in the industry, the interview data were used to inform the development of survey instruments to be administered to groups of interests (i.e., employees, managers, OHS Inspectors, and health care providers).

Chapter 5

Study 2 Method

Survey Development

&

Data Collection

Study 2 Method: Survey Development and Data Collection

Introduction

Study 2 involved the development and administration of surveys to further explore the predictors of perceived risk and safety behaviour in employees, plant managers, OHS inspectors, and health care providers (HCPs). The goal was to obtain information concerning issues raised in the related research literature and issues raised by Study 1.

Based on the findings from Study 1, the following themes were identified as needing inclusion in the survey instruments: (1) community well-being; (2) community attachment; (3) resident sense of belonging; (4) attitudes regarding health and safety in the industry; (5) safety motivation (e.g., safety climate, equipment, etc.); (6) perceptions of risk; (7) knowledge about health effects of styrene exposure; (8) social influence inside and outside the workplace; and (9) safety compliance. Wherever possible, existing questionnaires with established psychometric properties were used. However, some sections and items had to be developed specifically for this study in order to create an instrument relevant to the issues of the populations of interest. These latter components are necessarily exploratory in nature.

Pilot testing could not be conducted as the groups of interest had such small populations to begin with and using the participants for pilot testing would have resulted in a loss of participants to complete surveys. Without the benefit of pilot testing, items may not have been placed within the appropriate survey sections. Principal component analysis (PCA) was subsequently used to explore whether the items had in fact been

appropriately grouped together. A description of the compilation of the original survey items and item groupings follows.

Survey Development

Four surveys were developed for distribution to boat-building plant employees, managers, HCPs, and OHS inspectors. While the surveys shared core content, modifications were made to survey questions or sections to make the content applicable to the population of interest, and in some cases sections were omitted.

Slight wording changes were made to questions where appropriate in order to adjust to the group of interest.[1] A 5 point Likert-type scale was used for most sections in the survey ranging from '1 – Strongly disagree', '2 – Slightly agree', '3 – Neither Agree or Disagree, '4 – Slightly Agree', and '5 – Strongly Agree'. In total (excluding demographic questions) the employee survey contained 183 items, the manager survey 205 items, the HCP survey 57 items, and the OHS inspectors survey 130 items. The following describes the survey content for each of the interest groups, beginning with the core content sections. See Appendix D for copies of the surveys.

Attitudes Toward Working in the Fibreglass Boat-Building (FBB) Industry and Styrene

Each interest group was asked to indicate their feelings and beliefs about working in the FBB industry and about styrene. These items were developed based on participant interviews, including key informant comments.

[1] For example, an employee item was "I do everything I can to ensure my health and safety at work" and the manager item was "Employees do everything they can to ensure their health and safety at work".

Core content (see Table 5.1): Items assessed participants' beliefs related to styrene use (e.g., 'I believe styrene is regulated properly at this plant') and safety (e.g., 'I believe styrene is hazardous to people's health because science says that is the case'); opinions related to OHS inspectors (e.g., 'I believe that Occupational Health and Safety Personnel should visit my workplace more often'); beliefs regarding health care provider knowledge (e.g., 'I believe health care professionals in my community are aware of the health effects of styrene'); and beliefs about employee health management (e.g., 'I believe I do everything I can to ensure my health and safety at work'). Two items were reverse scored to minimize participant response bias. All participants received the same 14 items (with minor wording changes to reflect the group of interest responding to the questions), with the exception of two items that were not included in the HCP survey ('I believe Occupational Health and Safety personnel are unaware of the problems the safety equipment causes to my ability to complete my work' and 'I feel safe when working with styrene') as HCPs would most likely not have the relevant experience or knowledge to answer these items.

Additional content (see Table 5.2). Three items were relevant only to employees and managers (e.g., 'I am satisfied with my job'). Employees responded to an additional two items to assess their beliefs about coworkers attitudes (e.g., "I believe my coworkers are concerned about their health and safety at work). Managers were given three similar items to assess management attitudes toward their own behaviour ('I believe I do everything I can to ensure the health and safety of employees at work') and their beliefs

Table 5.1

Core Content: Attitudes Toward Working in the Fibreglass Boat-Building Industry and Styrene

	Survey items
1.	I believe the use of styrene is regulated properly at my workplace
2.	I do not believe that working with styrene is hazardous to my health (r)
3.	I feel safe when working with styrene*
4.	I do not believe that styrene is harmful because of my own experience working here (r)
5.	I have not had negative health experiences while working with styrene
6.	I believe styrene is hazardous to my health because science says that is the case
7.	I believe my working environment could be a safer place to work
8.	I believe I do everything I can to ensure my health and safety at work
9.	I believe Occupational Health and Safety personnel need to do more to ensure my working environment is safe
10.	I believe Occupational Health and Safety personnel are unaware of the problems the safety equipment causes to my ability to complete my work*
11.	I believe that Occupational Health and Safety personnel should visit my workplace more often
12.	I am concerned about my own health and safety at work
13.	I believe health care professionals in my community are aware of the health effects of styrene
14.	I believe the health care professionals in my community can recognize the symptoms of having been over-exposed to styrene

Note. Items appearing in the table are from the employee survey. Slight wording changes were made where appropriate when administering to the remaining groups of interest. See appendix for exact survey items. (r) refers to reversed scored items

* This item was excluded from the Health Care Personnel Survey.

about employee attitudes (e.g., 'I believe employees at this plant are concerned about their health and safety at work').

Table 5.2

Additional Content: Attitudes Toward Working in the Fibreglass Boat-Building Industry and Styrene

Survey item
Employees and Managers
15. I believe the WHMIS training was useful
16. I am satisfied with my job
17. I feel I have control over my own safety at work
Employees
18. I believe my coworkers do everything they can to ensure their health and safety at work
19. I believe my coworkers are concerned about their health and safety at work
Managers
18. I believe I do everything I can to ensure the health and safety of employees at work
19. I believe employees at this plant do everything they can to ensure their health and safety at work
20. I believe employees at this plant are concerned about their health and safety at work
OHS Inspectors
15. I believe managers do everything they can to ensure the health and safety of employees at work while working with styrene
16. I believe employees do everything they can to ensure their health and safety at work while working with styrene
17. I believe managers are concerned about the health and safety of employees at work when working with styrene
18. Employees believe the WHMIS training is useful
19. Managers believe the WHMIS training is useful

For OHS inspectors, five items assessed their beliefs about managers and employees separately, for instance, 'I believe *managers* do everything they can to ensure the health and safety of their employees at work while working with styrene' and 'I believe *employees* do everything they can to ensure their health and safety at work while working with styrene'. Therefore, this section of the employee survey contained 19 items, the

As a consequence, NL Occupational Health and Safety (OHS) personnel have raised concerns regarding styrene exposure for those involved in the boat building and repair industry (personal communication, March 2004). There is ongoing concern over the lack of self-protective behaviours, particularly the use of safety equipment. Further, OHS personnel have suggested that part of the explanation of the under-utilization of self-protective behaviours is inaccurate risk perception. That is, they contend that employees do not see the risk associated with styrene exposure and this interferes with the use of safety equipment and compliance with safety practices. In support of this position, researchers have shown risk perception to be one of the numerous factors associated with effective safety behaviour education and risk communication (e.g., Cree & Kelloway, 1997; Harvey et al., 2001).

Furthermore, OHS personnel (personal communication, March 2004) contend that there is a resilient and prevailing attitude among these workers that 'we have always done it this way and we have not had any problems'. This attitude, according to OHS personnel, is very difficult to penetrate and makes it very difficult for them to get employees to embrace self-protective safety practices in the workplace. Workplace safety attitudes have indeed been shown to affect risk perception (e.g., Meams, Rundmo, Flin, Gordon, & Fleming, 2004; Sjoberg, 2000). Further, experience, everyday observation, social context, and culture have been shown to create different mental representations/models of risk (Irwin, Simmons, & Walker, 1999). Understanding the cognitive and social processes that lead to attitudes and perceptions of risk is essential

manager survey 20 items, the OHS inspector survey 19 items, and the HCP survey 12 items.

Perceived Health Risks with Working in the Fibreglass Boat- Building Industry

Core content (see Table 5.3): Eight core items, three reverse scored, were developed to assess the degree to which participants perceived health risks associated with working in the fibreglass boat building industry. These items were developed based on Study 1 data. Participants provided their level of agreement with such statements as: 'The health risks of working with styrene are low' (reverse scored), 'I worry I may get sick in the further because I work with styrene', 'I believe working with styrene poses a threat to my health, and 'If I cannot smell styrene than I am not at risk for over-exposure (reverse scored) '.

Table 5.3

Core Content: Perceived Health Risks with Working in the Fibreglass Boat-Building Industry

	Survey items
1.	I work in a risky environment *
2.	The health risks of working with styrene are low
3.	If I do not feel sick, then the styrene does not pose a threat to my health (r)
4.	If I cannot smell the styrene, I am not at risk for over-exposure (r)
5.	I worry that I may get sick in the future because I work with styrene
6.	I know people who have gotten sick while working with styrene
7.	This is a healthy place to work (r)
8.	I believe working with styrene poses a threat to my health

Note. Items appearing in the table are from the employee survey. Slight wording changes were made where appropriate when administering to the remaining groups of interest. See appendix for exact survey items. (r) refers to reversed scored items.
* This item was excluded from the HCP survey

Each of the four interest groups received these eight core items with the exception of HCPs who received seven of the items ('I work in a risky environment' was omitted).

Additional content (see Table 5.4). Four items were adapted from Weyman et al. (2003) to assess perceptions of risk: 'In general men have a good understanding of the risk in this industry, and take account of them as they work', 'If men thought they were going to get hurt they wouldn't take the risk they do', 'Men tend to think that they know the risk and are sufficiently skilled to take account of the to avoid getting injured', and 'Most men are confident that they know all of the risks associated with their job'. These items were modified for the current study, for example, 'I believe I have a good understanding of the risks associated with working with styrene', 'If I think I will get hurt or ill when doing a job then I will not take the risk', 'I believe I know all the risks and I am skilled enough to take account of them to avoid illness or injury', and 'I believe I know all the risks associated with working with styrene', respectively. Employees were also asked these items in relation to their coworkers. For example, 'I believe my coworkers have a good understanding of the risks associated with working with styrene'. Managers were also asked these four items in relation to employees. For example, 'I believe employees have a good understanding of the risk associated with working with styrene'. This resulted in eight items each for employees and managers. In addition, both managers and employees were asked to respond to the item 'I sometimes worry that working with styrene will make me sick.'

Table 5.4

Additional Content: Perceived Health Risks with Working in the Fibreglass Boat-Building Industry

Survey item
Employees
9. I sometimes worry that working with styrene will make me sick
10. I believe I have a good understanding of the risks associated with working with styrene [a]
11. If I think I will get hurt or ill when doing a job then I will not take the risk [a]
12. I believe I know the risks and I am skilled enough to take account of them to avoid injury or illness [a]
13. I believe I know all the risks associated with working with styrene [a]
14. I believe my coworkers have a good understanding of the risks associated with working with styrene [a]
15. If my coworkers think they will get hurt or ill when doing a job then they will not take the risk [a]
16. I believe my coworkers know the risks and they are skilled enough to take account of them and avoid injury or illness [a]
17. I believe my coworkers know all the risks associated with working with styrene [a]
Managers
9. I sometimes worry that working with styrene will make me sick
10. I feel that the employees at this workplace are at risk when it comes to their health
11. The employees at this plant think working with styrene is dangerous to their health
12. I believe I have a good understanding of the risks associated with working with styrene [a]
13. I believe employees have a good understanding of the risks associated with working with styrene [a]
14. If I think I will get hurt or ill when doing a job then I will not take the risk [a]
15. I believe I know the risks of working with styrene and I am skilled enough to take account of them to avoid injury or illness [a]
16. I believe I know all the risk associated with working with styrene [a]
17. If employees think they will get hurt or ill when doing a job then they will not take the risk [a]
18. I believe employees know the risks of working with styrene and they are skilled enough to take account of them to avoid injury or illness [a]
19. I believe employees know all the risks associated with working with styrene [a]
OHS Inspector
9. I sometimes worry that visiting these worksites will make me sick

Table 5.4 Continued

Additional Content: Perceived Health Risks with Working in the Fiberglass Boat-Building Industry

Survey item
OHS Inspector
10. Employees (Managers) believe that the health risks of working with styrene are low
11. Employees (Managers) worry that working in this environment will make them sick
12. Employees (managers) believe that the fibreglass boat building industry is a risky work environment
13. If employees (managers) do not feel sick, then they believe that styrene does not pose a threat to their health (r)
14. If employees (managers) cannot smell the styrene, they believe they are not at risk for over-exposure (r)
15. Employees (Managers) worry that they may get sick in the future because they work with styrene
16. Employees (Managers) believe that the fibreglass boat-building industry is a healthy place to work
17. Employees (Managers) believe that working with styrene puts their health at risk

Note. OHS Inspectors were asked to give their responses with respect to employees and managers, separately. (r) refers to reversed scored items.
[a] Items adapted from Weyman et al. (2003)

OHS inspectors were asked to indicate their own level of risk perception (e.g., 'The fibreglass boat-building industry is a risky work environment'), their beliefs with respect to managers' perceptions of risk (e.g., 'Managers believe that the fibreglass boat-building industry is a risky work environment'), and their beliefs with respect to employee perceptions of risk (e.g., 'Employees believe that the fibreglass boat-building industry is a risky work environment'). These 14 items were developed based on Study 1 data.

This section of the survey therefore consisted of 17 items for the employee survey, 19 items for the manager survey, 25 items for the OHS Inspector survey, and seven items for the HCPs.

Social Influence

Core Content (see Table 5.5). This section of the survey was developed to assess beliefs concerning sources of social influence on safety behaviour. Each of the four groups of interest received seven core items (with the exception of HCPs who received only four of the items). Items were developed based on Study 1 data and assessed family influence (e.g., 'My family encourages me to use safety equipment at work'), physician influence (e.g., 'My doctor constantly reminds me to use safety equipment at work'), and social influence at work ('I find it difficult to behave safely at work when my coworkers are not behaving safely'). Minor wording changes were made to reflect the group of interest. For example, the HCP survey read 'I encourage clients working in the boat-building industry to use safety equipment'.

Table 5.5

Core Content: Social Influence

	Survey items
1.	I see the value of using safety equipment
2.	My doctor encourages me to wear safety equipment at work
3.	My doctor constantly reminds me to wear safety equipment at work
4.	My doctor has talked to me about the health effects of styrene
5.	My family encourages me to use safety equipment at work*
6.	I find it difficult to behave safely at work when my coworkers are not behaving safely*
7.	My boss and I discuss health and safety issues as it relates to our*

Note. Items appearing in the table are from the employee survey. Slight wording changes were made where appropriate when administering to the remaining groups of interest. See appendix for exact survey items.
* This item was excluded from the HCP survey

Additional Content (see Table 5.6). Employees and managers were asked to respond to an additional 13 items. Nine of these items were based on the results from Study 1 (e.g., 'My coworkers do not see the value of safety equipment' (reverse scored); 'My family is concerned about how styrene will affect my health'). Two items were adapted from Ashford, Rothbard, Piderit, and Dutton (1998) and Mullen (2005) to assess factors affecting employee willingness to raise safety issues in the workplace: 'In this organization, safety issues are kept under the table' and 'People seldom raise safety issues in this organization'. Two items were also adapted from Ashford's (1986) risk in seeking feedback scale: 'My image would be hurt if I brought up safety concerns' and 'My coworkers would think badly of me if I brought up safety concerns.' Similarly worded items were used by Mullen (2005) to assess employee willingness to raise safety issues in the workplace.

Employees were asked four additional items related to social influence in the workplace based on data from Study 1: 'My coworkers think working with styrene is dangerous to their health', 'I often remind my coworkers to use their safety equipment', 'My boss does not see the value of using safety equipment' (reverse scored), and 'My coworkers and I often discuss health and safety issues as it relates to the workplace.'

OHS inspectors were asked an additional seven questions based on key informant interviews from Study 1. For example, 'As an Occupational Health and Safety Inspector I strongly insist employees use safety equipment at work' and 'I remind employees to use their safety equipment at work.'

Table 5.6

Additional Content: Social Influence

Survey item
Employees and Managers
8. My coworkers do not see the value of using safety equipment (r)
9. My coworkers want me to use safety equipment
10. My employer strongly insists on the use of safety equipment
11. My family is concerned about how styrene will affect my health
12. I feel that my boss is concerned about the health of his/her employees
13. My boss constantly reminds me to use safety equipment
14. I care about what my coworkers think about my safety behavior
15. I care about what my family thinks about my safety behavior at work
16. Safety issues are kept under the table at my workplace
17. People seldom raise safety issues at my workplace
18. My image at work would be hurt if I brought up safety concerns
19. My coworkers would think badly of me if I brought up safety concerns
20. I would not think badly of a coworker for bringing up safety concerns at work (r)
Employees
21. My coworkers think working with styrene is dangerous to their health
22. I often remind my coworkers to use their safety equipment
23. My boss does not see the value of using safety equipment (r)
24. My coworkers and I often discuss health and safety issues as it relates to our workplace
OHS Inspectors
8. In general, employees think working with styrene is dangerous to their health
9. As an Occupational Health and Safety Inspector, I strongly insist employees use safety equipment at work
10. I remind *employees* to use their safety equipment at work
11. I remind *managers* to use their safety equipment at work
12. Employees do not see the value of using safety equipment at work (r)
13. Managers do not see the value of using safety equipment at work (r)
14. Managers are concerned about the health of employees

Table 5.6 Continued

Additional content: Social Influence

	Survey item
HCP	
6.	My clients who work in the fibreglass boat-building industry think working with styrene is dangerous to their health
7.	My clients who work with styrene do not see the value of using safety equipment (r)
8.	As a healthcare provider I am concerned about the health of my clients who work with styrene

Note. The social influence sections of the Employee survey contained 24 items, the manager survey contained 20, the OHS contained 14, and the HCP contained 7. (r) refers to reversed scored items.

Finally, HCPs were asked an additional three items based on Study 1 data. For example, 'My clients who work with styrene do not see the value of using safety equipment'. Therefore, this section of the employee survey contained a total of 24 items, the manager survey 20 items, the OHS inspector survey 14 items and the HCP survey eight items.

Safety Motivation

Core content (see Table 5.7). Employee safety motivation, i.e., an employee's willingness to engage in safety related behaviour (Neal et al., 2000), was assessed using four items adapted from Probst and Brubaker's (2001) safety motivation scale. These items (with minor wording changes) reflect extrinsic motivation: 'There is no incentive for me to follow the safety polices at my work' (reverse scored), 'I am not rewarded for being safe' (reverse scored), 'My supervisor praises me when he or she sees that I am following proper safety procedures', and 'When I ignore safety rules my supervisor reprimands me'.

Table 5.7

Core Content: Social Motivation

	Survey items
1.	I am provided free safety glasses
2.	I am provided free work gloves
3.	I am provided free face masks
4.	I am provided free charcoal filters for the breathing mask
5.	This company has monthly safety meetings
6.	There is no incentive (reason) for me to follow the safety policies at my work* (r)
7.	I am not rewarded for being safe * (r)
8.	My supervisor praises me when he or she sees that I am following proper safety procedures*
9.	When I ignore safety rules my supervisor reprimands me*
10.	Wearing the mask while working is very uncomfortable*

Note. Items appearing in the table are from the employee survey. Slight wording changes were made where appropriate when administering to the remaining groups of interest. See appendix for exact survey items. (r) refers to reversed scored items

* This item was excluded from the HCP survey

Six further items were developed based on Study 1 data. Five items asked participants to indicate using a 3-point scale (0 – No, 1 – Sometimes, and 2 – Yes) if employees were provided with safety equipment (i.e., safety glasses, work gloves, face masks, and charcoal filter for the respirator) with no charge to them and whether their workplace held monthly safety meetings. Participants were also asked to indicate their level of agreement with the items 'Wearing the mask while working is very uncomfortable'. Of the 10 core content items, 5 were excluded from the HCP survey as they could not be expected to have the knowledge to accurately respond to the items.

Additional content (see Table 5.8). Employees and managers were asked a further seven items based on Study 1 data. Items included: 'The owner/manager of this company takes employee health and safety very seriously', 'management know employees take risk while they work but they are not bothered by it' and 'I often feel under pressure to meet deadlines'.

Employees were asked an additional six items related to safety motivation based on Study 1 data (e.g., 'I feel anxious about talking with my manager/supervisor about safety issues' and 'Although management say they put safety first no one really believes them').

Table 5.8

Additional Content: Safety Motivation

	Survey item
Employees and Managers	
11.	The owner/manager of this company takes employee health and safety very seriously
12.	Wearing safety glasses does not slow down my work (r)
13.	Wearing a mask/respirator slows down my work
14.	I often feel under pressure to meet deadlines
15.	Health and safety concerns are more valued at my workplace than production concerns
16.	The cost of better ventilation for the plant exceeds the company profits
17.	I have been informed about the health effects of styrene
Employees	
18.	I feel anxious about talking with my manager/supervisor about safety issues
19.	I worry about losing my job or being replaced if I bring up concerns about health and safety with my boss
20.	Management know employees take risk while they work but they are not bothered by it
21.	Management will turn a blind eye to rules being broken to get the job done
22.	Although management say they put safety first no one really believes them
23.	Sometimes workers are afraid to turn down a job that they consider to be risky because they think they will be labelled trouble makers

both for effective risk communication (MacGregor, Slovic, & Malmfors, 1999) and for exploring the circumstances that affect safety behaviour at work (e.g., Rundmo, 1996).

The purpose of this study is therefore to explore factors affecting safety behaviours related to fibreglass boat-building from a social psychological perspective. Of particular interest are the attitudes, perceptions, and behaviours of those groups who have personal contact with or have a vested interest in the boat building industry. Such groups include boat-building plant workers, boat-building plant managers, health care personnel providing services to those communities with boat-building plants, and Government Services OHS inspectors.

There are numerous models grounded within the social psychological and related literatures that address behavioural intentions/outcomes; however, only a few models will fit the approach that has been adopted to address the objectives of this study. As will be revealed in a review of several of these models, the Theory of Planned Behaviour (TPB; Fishbein & Ajzen, 1975; Ajzen, 1988) was chosen as a foundation for this study. This model has been found to account for significantly more variance in health related behaviour than other related models (Armitage & Conner, 2000; a more complete explanation for the use of this model is forthcoming in this document). Despite the utility of this model for providing insight into health related behaviours, it is the contention of this thesis that the model requires modification to fully reflect the processes underlying a complex issue such as workplace safety behaviours, particularly within a workplace associated with a precarious industry and embedded within a community experiencing economic crisis. For example, to fully explore the issue of workplace safety, the model

Table 5.8 Continued

Additional Content: Safety Motivation

Survey item
Managers
18. This company is not rewarded for being safe (r)
19. I am open to talking about safety issues with employees
20. I reassure employees that bringing up concerns about safety issues will not negatively affect their job
21. Wearing safety glasses does not slow down the work of employees (r)
22. Wearing a mask/respirator slows down the work of employees
23. Employees have been informed about the health effects of styrene
24. I worry when employees take risks on the job
25. The employees at this workplace should not do a job they think is a risk to their health
OHS Inspector
11. There is no incentive (reason) for managers to follow the safety policies at work
12. Managers are not rewarded for being safe
13. These fibreglass boat-building companies are not rewarded for being safe
14. Managers praise employees when they see that employees are following proper safety procedures
15. Managers reprimand employees when they don't follow safety rules
16. Managers take employee health and safety very seriously
17. Managers are open to talking about safety issues with employees
18. Managers reassure employees that bringing up concerns about health and safety will not negatively affect their job
19. Managers feel that wearing a mask while working is very uncomfortable
20. Managers believe that the cost of proper ventilation for these plants exceeds the company's profits
21. Managers believe that wearing safety glasses does not slow down employee work
22. Managers believer that wearing a mask/respirator slows down the work of employees
23. Managers often feel under pressure to meet deadlines
24. Managers value health and safety concerns more than production concerns
25. Employees take health and safety very seriously
26. Employees feel that managers are open to talking about safety issues

Table 5.8 Continued

Additional Content: Safety Motivation

Survey item
OHS Inspector
27. Employees are reassured by managers that bringing up concerns about health and safety will not negatively affect their job
28. Employees value health and safety concerns more than production concerns
29. Employees feel that managers take health and safety concerns very seriously
30. Employees often feel under pressure to meet manager deadlines
31. Employees feel that wearing safety glasses does not slow down their work

Note. The safety motivation section of the Employee survey contained 23 items, the manager survey contained 25, the OHS contained 31, and the HCP contained 5. (r) refers to reversed scored items

Managers were asked an additional eight items to assess safety motivation based on the data obtained from Study 1. For example, 'This company is not rewarded for being safe', and 'I am open to talking about safety issues with employees'.

OHS inspectors were asked an additional 21 questions pertaining to both managers and employees related to safety motivation. These questions were based on Study 1 data (e.g., 'Managers are not rewarded for being safe' (reverse scored), and 'Employees feel that managers take health and safety very seriously').

Altogether this section of the employee survey contained a total of 23 items, the manager survey contained 25 items, the OHS inspector survey a total of 31 items, and the HCP survey five items.

Health Effects of Styrene

Core content (see Table 5.9). All participants were asked to indicate their level of agreement on nine items related to the health effects of styrene. These items were developed based on existing literature related to the health effects of styrene exposure. For example, such items included: 'Excessive exposure to styrene is related to reduced color vision', '... is not related to hearing loss', '... causes eye irritation', and '...is related to aggression'. Negatively worded items in this section were included to reduce participant response bias and were later reverse scored. In addition, one filter question was added to the scale to identify response bias, '...is related to hair loss'.

Table 5.9

Core Content: Knowledge about the Health Effects of Styrene

Survey items
Excessive exposure to styrene...
1. Is related to reduced color vision
2. Is not related to hearing loss (r)
3. Is related to changes in mood
4. Is not related to depression (r)
5. Is related to aggression
6. Is related to hair loss**
7. Is not related to lung problems (r)
8. Does not cause skin irritation (r)
9. Causes eye irritation

Note. (r) refers to reversed scored items
** filter item.

Additional content (see Table 5.10). A second section was developed to reflect the potential mood and cognitive effects of styrene exposure. These 15 items were developed based on the existing literature on psychological and social effects of styrene and Study 1. For example: 'Excessive exposure to styrene has affected my (coworkers/workers')

ability to make good decisions', 'I have noticed changes in my mood that I believe are related to styrene exposure', 'working with styrene has affected my relationships with my family (coworkers)', and 'Family members (coworkers) have commented about changes in my mood since I started working with styrene'. Employees and managers were also asked 'Do you think working with styrene has affected your mood?' The response options for this item were 'Yes', 'Maybe', and 'No'.

OHS inspectors and HCPs were asked only three of the questions with respect to mood and cognitive effects of workers: 'Excessive exposure to styrene can affect one's ability to make good decisions', 'Excessive exposure to styrene has resulted in mood changes in workers' and 'Excessive exposure to styrene has resulted in personality changes in workers'.

Employees and managers were also asked five additional questions to assess workplace illness related to styrene exposure. For example: 'I believe my health has gotten worse since I began working with styrene', 'I have experienced a work related illness I believe is due to exposure to styrene', 'I believe I can recognize the symptoms related to styrene exposure', and 'I have seen people get sick while working with styrene'.

Including the core content items, this section of the employee and manager surveys contained 24 items, and the OHS inspector and Health Care Provider surveys contained 12 items.

Table 5.10

Additional Content: Health Effects of Styrene – Mood and Cognitive Effects

Survey item
Employees and Managers
10. Do you think working with styrene has affected your mood? **
11. Since I began working with styrene I find myself to be more irritable/ moody
12. Working with styrene has affected my relationships with my coworkers
13. Working with styrene has affected my relationships with family
14. Excessive exposure to styrene has affected my ability to make good decisions
15. Family members have commented about changes in my mood since I started working with styrene
16. Coworkers have commented about changes in my mood since I started working with styrene
17. I have noticed changes in my coworkers' mood that I believe is related to styrene exposure
18. I have noticed changes in my coworkers' personality that I believe is related to styrene exposure
19. I have noticed changes in my mood that I believe is related to styrene exposure
20. I believe my health has gotten worse since I began working with styrene
21. I have experienced a work related illness that I believe is due to exposure to styrene
22. I have seen people get sick while working with styrene
23. I have experienced a work related injury since I began working here
24. I believe I can recognize the symptoms related to styrene exposure
OHS Inspectors and HCPs
10. Excessive exposure to styrene can affect one's ability to make good decisions
11. Excessive exposure to styrene has resulted in mood changes in workers
12. Excessive exposure to styrene has resulted in personality changes in workers

** Response options for this item was "Yes", "Maybe", and "No".

Safety Compliance (see Table 5.11)

In an attempt to assess the degree to which employees comply with safety procedures and polices in the workplace, a self report measure was developed. These

questions were largely based on information provided by the Key Informant interview with the OHS Representative who suggested safety behaviours specifically for those working with styrene. Six items were developed based on data from Study 1. For example, employees and managers were asked 'In your opinion, how often do: 'you use a respirator/mask when working with styrene?' 'you wear protective gloves while working with styrene?' and 'you clean your respirator after every use?'

In addition to the items developed based on information provided by the OHS Representative, two items were adapted from Prosbt and Brubaker (2001) with minor wording changes to assess safety compliance: "How often do you take shortcuts in safety guidelines related to the use of or handling styrene in order to get the job done faster?' and 'How often do you ignore safety rules and regulations while working with styrene'?

Table 5.11

Core Content: Safety Compliance – Safety Behaviours at Work

Survey items
How often do you …
1. Use a respirator/mask when working with styrene?
2. Wear safety glasses when grinding?
3. Wear safety glasses when spraying?
4. Wear protective gloves while you work with styrene?
5. Have your work clothes cleaned/washed everyday?
6. Ignore safety rules and regulations at work when working with styrene? [a] (r)
7. Take shortcuts in safety guidelines related to styrene use or handling in order to get the job done faster? [a] (r)
8. Clean your respirator after every use?

Note. This section of the employee survey contained 8 items. OHS inspectors and HCP were asked to provide their opinions on employee behavior resulting in 8 items. Managers were asked to respond to the questions with respect to their own behaviour and employee behaviour resulting in 16 items. (r) refers to reversed scored items.

[a] Items adapted from Prosbt & Brubaker (2001).

Again, depending on the survey, wording changes were made to reflect the opinions of the group of interest.

Managers were also asked these questions with respect to employees. This resulted in a total of 16 items. OHS inspectors and HCPs were asked to give their opinions with respect to employees only (e.g., 'How often do *employees*... wear safety glasses when spraying?...wear safety glasses when spraying'). This section of the Employee, OHS inspectors and HCP surveys each contained eight items. Participants provided their responses using a 5-point Likert scale ranging from 1 (Never) to 5 (Always).

Safety Knowledge: Employees, Managers, and OHS Inspectors (see Table 5.12)

Employees, managers and OHS inspectors were asked to indicate the extent to which workers demonstrated safety knowledge, that is, employee knowledge of safety procedures and use of safety equipment (e.g., Hoffmann, Jacobs, & Landy, 1995; Probst & Brubaker, 2001). Three items in this section of the survey were adopted from Probst and Brubaker (2001): 'I know who to ask if I am unsure about the safe way to complete a task', ' I feel free to request additional safety training if I think it is needed', and 'I know the safe way to complete my work tasks'.

Thirteen questions were developed based on information provided in Study 1 and the objectives of the study. For example, additional items included: 'I believe I know the correct way to use a respirator/mask', 'I read the MSDS (material safety data sheets)

Table 5.12

Safety Knowledge

Survey items
Employees and Managers
1. I know who to ask if I am not sure about the safe way to complete a task [a, b]
2. I feel free to request additional safety training if I think it is needed [a, b]
3. I know the safe way to complete my work [a, b]
4. I believe wearing a mask or respirator is part of the safety equipment required for my job [a, b]
5. I believe I know the correct way to use a respirator/mask [a, b]
6. I read the MSDS (Material Safety Data Sheets) when I have to work with chemicals [a, b]
7. The MSDS sheets are easy to read [a, b]
8. I understand the information provided in the MSDS sheets [a, b]
9. The MSDS sheets provide valuable information about the chemicals I use at work
10. I received safety training before I started my job
11. I believe I know when the filter in my mask/respirator needs to be replaced
12. I keep my chin area clean shaven if I know I will be using a respirator
13. I have received safety training during my employment with this company
14. I have received formal training (trade school or training program) on how to construct fibreglass boats/products [b]
15. I believe I have been properly fitted for a respirator [a, b]
16. I have been given training on how to use a respirator [a]

Note. This section was excluded from the HCPs survey. This section of the Employee survey contained 16 items. (r) refers to reversed scored items

[a] Managers were asked to respond to all 16 items as they pertained to them, and were asked to answer these additional items with respect to employees (e.g., "I believe employees know the safe way to complete their work") resulting in 26 items in total.

[b] OHS Inspectors were asked to respond to these items with respect to employees (10 items) and managers (10 items) separately resulting in 20 items in total.

when I have to work with chemicals', 'I received safety training before I started my job', and 'I believe I have been properly fitted for a respirator'.

This section of the employee survey safety knowledge section contained 16 items. Managers were asked to provide their perception of employee knowledge as well as their own. However, there were several questions managers did not answer with respect to employee knowledge. This section of the manager survey contained 26 items.

OHS inspectors were only asked 10 of the overall 16 items with respect to both managers and employees as OHS inspectors may not have the knowledge to answer the remaining 6 items from the perspective of managers or employees (e.g., "I keep my chin area clean shaven if I know I will be using a respirator"). This section of the OHS Inspector survey contained 20 items.

Community

Based on participants' emphasis on the importance of community well-being and the potential effects of such community factors on employee safety behaviours, three scales were used to assess community status, community attachment and psychological sense of community. These items (and sections to follow) were included only on the manager and employee surveys.

Community status. The Community Status scale contained six items developed from interview data from Study 1. For example, Employees and Managers were asked to indicate their beliefs with respect to the following: 'My community is growing', 'The fibreglass boat building industry is very important for the success of this community', 'Many people are leaving my community', 'People here fear that this community will not survive', 'It is difficult to keep young people in the community', and 'I am hopeful about the future of my community' (reverse scored). Participant's response options ranged from 1 (Strongly disagree) to 5 – (Strongly agree).

Community attachment. Four items for the community attachment scale were adapted from Williams and Roggenbuck's (1989; cited in Kyle, Graefe, and Manning, 2005) measure of place attachment with minor wording changes: 'My community means a lot to me', 'I am very attached to my community', 'I identify strongly with my community', and 'I feel no commitment to my community' (reverse score).

Given that social networks emerged as an important community characteristic in Study 1, community social bonding was captured using Kyle, Grafe, and Manning's (2005) social bonding scale. Three items were adapted from this scale with minor wording changes: 'I have a lot of fond memories in my community', 'I have a special connection to my community and the people living here', and 'I want my children to grow up here'.

Two additional items were added based on the qualitative analysis. These items were: 'I will take any job that allows me to stay in my community' and 'I have a lot of freedom here to do the things that I enjoy'. In total, this section of the manager and employee surveys contained nine items. Participants' response options ranged from 1 (Strongly Disagree) to 5 (Strongly Agree). In total, this section of the employee and manager surveys contained nine items.

Sense of community. Ten items were adapted from Obst and White's (2004) Psychological Sense of Community Scale (PSOC). Items included: "I feel at home in my community', 'I think my community is a good place to live', 'It is important for me to live in my community', and 'I have no influence over what this community is like

requires additional individual level components (e.g., perceptions of risk and affective reactions to risk) and broader social level components (e.g., perceived social/cultural context and existing social networks).

In addition to the impetus deriving from OHS personnel concerns, this study stems from a variety of studies conducted to assess perceptions of risk and safety behaviours in 'high risk industries' such as fishers, miners, offshore oil workers, firefighters, and radiation protection specialists (e.g., Bellrose & Pilisuk, 1991; Mearns, Flin, Gordon, & Fleming, 1998; Mearns, Rundmo, Flin, Gordon, & Fleming, 2004; Pollnac, Poggie, & Cabral, 1998; Power, Neis, Brennan & Binkley, 2006; Rundmo, 1992a, 1992b; Weyman, Clarke, & Cox, 2003) all of which point to the significance of employee perceptions of risk with respect to safety behaviours. An important contribution of this thesis is the additional factor concerning the social circumstances in which people are embedded. As previously mentioned, due to the precarious nature of the NL fibreglass boat-building industry and the social and cultural context in which it is immersed, the theoretical approach guiding this study must incorporate broad social/contextual influences when exploring safety behaviours among boat-building employees and managers.

The following section begins with a review of stages of change and social cognitive models related to behaviour outcomes that have been applied to safety behaviours in the workplace. A rationale for using the TPB as a framework for the current study is offered, along with an argument for the addition of several components to this model that, it is anticipated, will provide additional information regarding the

(reverse score).' Participants' response options ranged from 1 (Strongly Disagree) to 5 (Strongly Agree).

Company/Plant Status

Employees and managers were asked to provide information about their plant. Four questions were used to assess the plant status. Such questions included: 'The amount of work at this plant has decreased' and 'This plant is seasonal'. The response options for these items ranged from 1 (Strongly Disagree) to 5 (Strongly Agree). However, after assessing completed surveys the vast majority of participants responded to the extreme ends of the scale. It was evident from participant responses that a better response scale would have been one that included 'yes', 'no', and 'maybe'. Consequently, the responses were recoded so that participants who responded 'Strongly disagree' or 'slightly disagree' (though very few chose this option) were recoded as 'no'. Those participants who responded 'neither agree/disagree' were recoded as 'maybe' while those who responded 'slightly agree' or 'strongly agree' were recoded as responding 'yes'.

Perceived Job Security

Employee and manager perceptions of job security were assessed using seven items. Two of the items were adapted from Karasek's Job Content Questionnaire (1985; as cited in Pelfren, Vlerick, Moreau, Mak, Kornitzer, & De Backer, 2003) with minor wording changes: 'My job security is good', and 'I feel it is likely that I might lose my

job in years to come'. Five additional items were added based on Study 1 data: 'I fear not having a job', 'I fear losing this job', 'I feel like I could be easily replaced by someone else at my job', 'The number of hours I work at this company changes quite often', and 'I feel that the future of this company is uncertain'. Participants' response options ranged from 1 (Strongly Disagree to 5 (Strongly Agree).

Perceived Alternative Means of Employment

In addition to Study 1 participants indicating that there was a fear of losing their current employment, there was an overarching theme that employment opportunities were scarce. Participants suggested that lack of employment opportunities may affect employee risk tolerance. Consequently, six items were developed to assess employee and manager perceptions of employment opportunities. These items included: 'There are very few jobs available for me in my community', 'I would continue to work at this job even if there were other job opportunities', and I feel like I have no other choice but to work at this job'. Participants' response options ranged from 1 – Strongly disagree to 5 – Strongly agree.

Demographics

Demographic variables differed depending on the group of interest. Participants were asked to provide information regarding their job title, age, gender, education, approximate income, marital status, whether or not that had a child or children, presence of other members of the family contributing to household income, and an estimate the

number of people in their community (not applicable to OHS inspectors). In addition, employees and managers were asked to indicate the number of years they had worked in the FBB industry, whether part of their job was to work with styrene, how many hours a day he or she worked with styrene, how many hours a day he or she was exposed to styrene even if not working directly with it, (5) how many months of the year they worked at the plant, and, whether the employee or manager had completed the WHMIS (Workplace Hazardous Materials Information System) program.

Health Care Satisfaction and Utilization

While not directly relevant to the objectives of the current study, participants (with the exception of OHS Inspectors) were asked 11 questions related to general health care utilization and health care system satisfaction. These questions were adapted from the Canadian Community Health Care Survey Cycle 2.1 (Statistics Canada, 2003). Questions included were: 'Do you have a regular medical doctor?', 'Have you seen a doctor in the past 12 months?', 'How would you rate the availability of health care services in you community?', and 'How would you rate the quality of health care in your community?' Additional questions were added to assess health care with respect to workplace injury and illness. For example: 'Have you seen a doctor in the last 12 months for an injury or illness that you thought might be work related?', and 'How satisfied are you with the availability of health care in you community as it relates to workplace injury or illness?' Data obtained from these questions were not directly relevant to the current study but are intended for use in a future study.

Survey Review

Normally, a pilot testing of the surveys for each group of interest would have been conducted. However, due to the small, finite populations of interest a true pilot testing of the surveys was not conducted as doing so would have reduced the number of participants during actual data collection. Rather, the key informant participants in Study 1 and the investigator's thesis committee reviewed the surveys for item relevance, appropriate use of technical language and wording, and provided suggestions for modifications. All questions were reviewed to ensure content readability was at an eighth grade level based on a word processor reading level diagnostics (Microsoft Office).

Participants

Study 2 participants included FBB plant employees, managers and owners of FBB plants, healthcare providers servicing communities with FBB plants, and OHS inspectors who had visited FBB plants. Due to the small numbers of potential individuals in each group, all participants who were available for participation were asked to complete a survey. For at least three of these groups (i.e., managers, healthcare personnel, OHS inspectors), the number of actual participants was anticipated to be very small.

Participant recruitment

Employees and Managers. A list of boat building plants in Newfoundland was developed to determine the number of FBB plants currently in operation. This list was

developed using information from the Boat Builders Association of Newfoundland and Labrador website (http://www.boatsnl.com/) and NL Yellow pages. All plants were selected to participate in Study 2, for a total of 14 FBB plants. Each FBB plant was contacted via telephone to confirm it was in operation and to obtain the location (i.e., street address) and the name of the manager or owner.

Health care providers. A list of health care providers servicing the communities with FBB plants was created. This list was composed with the help of an administrative health care professional working at the Health Sciences Center in St. John's NL and information provided by the College of Physicians and Surgeons of NL website (http://www.nmb.ca/FindDoctor.asp). General practitioners, family physicians, registered nurses, nurse practitioners, and licensed practical nurses were selected for inclusion in this study. All health care providers in each community were asked to participate in the study to maximize the number of required responses for analysis.

OHS inspectors. Contact was made with an OHS representative in Study 1. This participant provided a list of OHS inspectors who had been directly involved with monitoring FBB plants. Email addresses were obtained from the OHS representative to use in contacting participants.

Procedure

To ensure the greatest response rate possible for each interest group, the investigator and research assistant traveled to each FBB plant in Newfoundland to distribute the surveys. This procedure involved three separate visits to 14 rural communities in the province totalling 14 days (See Figure 4.1 for a general indication of FBB plant location; the circles indicate the areas of the province visited). These visits occurred between October 1st and December 8th, 2006.

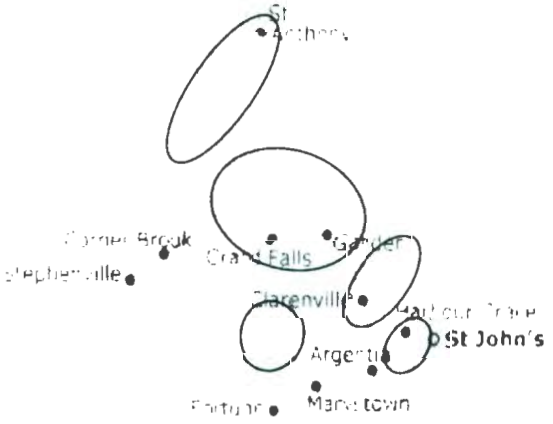

Figure 4.1 - A map indicating the general locations of the FBB plants in the Newfoundland.

Each survey package contained an information sheet about the study and the rights of participants, a copy of the survey, and contact information for the investigator and the Interdisciplinary Committee on Ethics for Human Research (ICEHR) at Memorial University (see Appendix B for ICEHR documents). Participants were fully informed through the information sheet (and verbally when possible) that their

participation was voluntary and that they could decide to refrain from filling out the survey at any point in time. Participants were informed that the answers provided in their questionnaires were strictly confidential and anonymous. Participants were given the primary investigator's contact information in the event they had questions or comments about the study. Each participant was informed that the completion and return of the survey was considered as consent to take part in the study (see Appendix E for consent forms for each of the groups of interests).

Employees and Managers. Contact was made with each plant manager upon arrival at the establishment. The manager was informed of the objectives of the study and was presented with a survey. With the manager's approval the research team presented employees with the surveys. Managers and employees were given similar verbal instructions for completion: (1) to carefully read the information sheet at the beginning of the survey; (2) that completion of the survey was considered their consent to participate in the survey; and (3) to complete all sections as much as possible; however, participants were informed that they had the right to refuse to answer any section or omit any items that they were not comfortable completing. Given the sensitive nature of the survey content it was stressed to participants that the information they provided was anonymous and confidential. They were encouraged to seal the envelope provided to them to ensure the privacy of their responses. The research team answered any participant questions before leaving the premises.

To ensure the least amount of inconvenience to managers and employees, participants were informed that they could complete the survey after work. The investigator went back to each FBB plant approximately 24 hours later to collect the completed surveys.

Health care providers. The office of each health care provider servicing the communities with FBB plants was visited. It is important to note that the health care providers servicing the communities with FBB were sometimes located in a neighbouring town rather than in that community. At each health care facility it was determined, through contact with the Administrative Assistant or Nurse Manager, the number of health care providers at the facility.

Due to the extremely busy and unpredictable nature of health care, health care providers were provided with a stamped, addressed envelope for return to the investigator upon completion of the survey. The contact person was given this information and was asked to distribute the surveys to the available health care personnel. Again, the research team answered any questions prior to leaving the premises.

OHS Inspectors. It was suggested by the OHS Representative in Study 1 that the best method for contacting OHS Inspectors was via email. As such, each OHS Inspector was contacted via email with a copy of the survey attached. The participants were asked to return the survey via fax or mail. Email reminders were sent to participants approximately 5 days and 10 days after the initial email had been sent.

Chapter 6

Study 2 Results Part I

Refinement of the Employee Survey

Study 2 Results Part I: Refinement of the Employee Survey

Response Rates

As anticipated, the number of participants for the three interest groups, managers, OHS inspectors, and Health Care Providers was rather small. Fourteen surveys were distributed to managers resulting in nine completed surveys (64% response rate). Sixty-one surveys were distributed to Health Care Providers resulting in 14 completed surveys (23% response rate). There were only seven OHS inspectors that directly monitored the FBB industry in the province. Of these participants, four completed surveys were returned (57% response rate). The response rate for employees was considerably higher (80%), with 43 out of 54 employees having completed surveys.

Refinement of the Employee Survey

All questionnaires were coded and entered into separate SPSS datafiles. Due to the exploratory nature of this study, principal components analysis (PCA; rather than factor analyses) was used to explore the data. The intent was to use PCA to reduce the number of items and to develop internally consistent scales in each section of the survey. However, due the small samples in three of the interests groups (i.e., managers, HCPs, and OHS inspectors), this analysis could only be carried out for the employee survey data.

The survey administered to employees contained 183 items (excluding demographic questions). The large number of items coupled with the modest sample size meant that a PCA of the entire survey could not be completed with confidence. This is

processes underlying safety behaviours. A broader purpose to this approach is to inject more social context into a model that is heavily weighted with individual cognition.

Cognitive Approaches to Workplace Behaviour: Stages of Change Models

Stages of change models are based on the idea that people progress through several pre-defined stages when making decisions about health-related behaviour (Barrett, Haslam, Lee, & Ellis, 2005). Prochaska and colleagues' Transtheoretical model (Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992) proposes that people go through six phases when attempting to improve health-related behaviour: (1) precontemplation, (2) contemplation, (3) preparation, (4) action, (5) maintenance, and (6) relapse. The underlying assumption of this model is that the stage at which an individual resides determines the degree of receptiveness to health communication or education (Prochaska, Norcross, & DiClemente, 1994).

Barrett et al. (2005) utilized the Prochaska and DiClemente's stages of change model to assess attitudes and beliefs concerning health and safety within a manufacturing company. Data were collected via a case study method whereby interviews were conducted with various stakeholders in the organization hierarchy (i.e., production workers, supervisors, middle management, and senior management) using stage-targeted questions. When the researchers had difficulty fitting interview responses to the stages of the model, additional information was collected using the Safety Climate Assessment toolkit (Cox & Cheyne, 1999 as cited in Barrett et al. 2005) which involved a short form checklist (i.e., questionnaire) of managers' and production line workers' attitudes and

especially true given that missing data for each case was not replaced. While there are benefits to replacing data with individual mean scores or group mean scores (such as increasing the sample size), there is also a risk in doing so. For example, substituting means for missing values reduces the variance of the variable and correlations between variables are reduced due to this reduction in variance (e.g., Tabachnick & Fidell, 2007). The decision was made to retain the true scores of the participants despite missing values; consequently, the number of participants included in each analysis may differ. Therefore, separate PCAs were carried out for nine of the 12 sections in the survey.

The PCA was conducted using varimax rotation (the most commonly used rotation technique) to achieve a simple, orthogonal structure (e.g., Ferguson & Cox, 1993; Tabachnick & Fidell, 2007). Factorability of the data was assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity (BS) requiring that the KMO for each PCA be greater than .50 and the BS be significant (e.g., Ferguson & Cox, 1993). These criteria were met for all of the following PCAs.

Each PCA was an iterative process. In addition to the previous criteria, guidelines for retaining survey items in each PCA was a KMO value > .50 for each item (as indicated by the anti-image of the analysis) and factor loadings $\geq .50$. This stringent factor loading and KMO criteria were used due to the small sample size (e.g., Brace, Kemp, & Snelger, 2003). If items did not meet these criteria, the item was removed from the list of items and the PCA was conducted again. This process was repeated until all

items met the proposed criteria. Additionally, only factors with eigenvalues greater than 1.0 were extracted.

Items which did not meet the above statistical criteria were reviewed for (a) meaning and relevance to questions pivotal to the study and (b) relevance to the assigned subscale. For example, within the 'Perceived Risk' subscale, four items had low KMO values ("I sometimes worry that working with styrene will make me sick", "I work in a risky environment", "If I can smell styrene then I am at risk for over exposure", and "I know people who have gotten sick while working with styrene") . However, with further inspection of these items, it was observed that one of the items ("I work in a risky environment") may be assessing risk of the work environment as a whole rather than working with styrene. When this item was removed, the remaining three items gained acceptable KMO values and factor loadings. Furthermore, items that did not meet statistical criteria for inclusion in a particular subscale (i.e., emergent factor) were also assessed as to whether they were relevant to a different subscale.

Upon completion of each PCA, each factor was given a conceptually appropriate label. Internal consistency of each factor was calculated using Cronbach's α. Factor loadings, eigenvalues, and Cronbach's α values for each factor are presented in the tables below.

Attitudes toward working in the fibreglass boat building industry. This scale initially contained 19 items and was reduced to four subscales (that is, four factors emerged) totalling 12 items. Within this section, four factors emerged (see Table 6.1) accounting for 77% of the variance. The first factor contained four items, was labelled 'Confidence in External Institutions' and accounted for 23% of the variance. Factor 2 contained four items, was given the label of 'Concerns about Health and Safety at Work' and accounted for 21% of the variance. Factor 3 contained two items representing 'Perceived Personal Health and Safety' and accounted for 18% of the variance. Finally, the remaining factor included two items, represented "Perceived Workplace Norms" and contributed 15% to the overall variance.

Perceived risks with working in the fibreglass boat building industry. Initially, this scale contained 17 items but through the PCA it was reduced to 15 items and four subscales. These four factors accounted for 74% of the total variance. Factor 1 contained six items that appeared to represent "Confidence in dealing with workplace risks", and accounted for 29% of the variance. The second factor, with four items, accounted for 16% of the variance and was labelled "Perceived Health Risks". Factor 3 represented "Awareness of Styrene Exposure" and consisted of two items that contributed to 16% of the overall variance. Finally, Factor 4 contained three items representing "Anxiety Concerning Styrene Exposure" and contributed to 13% of the variance (see Table 6.2).

Table 6.1

Factor Analysis Results for Attitudes Toward Working in the FBB Industry Scale and Subscales

Attitudes Toward Working in the FBB Industry Scale	Rotated Factor Loadings			
	Factor 1	Factor 2	Factor 3	Factor 4
Confidence in External Institutions (α = .75)				
I believe the HCP in my community can not recognize the symptoms of having been over-exposed to styrene.	0.91			
I believe HCP in my community are not aware of the health effects of styrene	0.78			
I believe the use of styrene is not regulated properly at my workplace	0.58			
Concern about Health and Safety at Work (α = .76)				
I believe my coworkers are concerned about their health and safety at work		0.82		
I am concerned about my own health and safety at work		0.78		
I believe my coworkers do everything they can to ensure their health and safety at work		0.69		
I believe I do everything I can to ensure my health and safety at work		0.57		
Perceived Personal Health and Safety (α = .69)				
I feel safe when working with styrene			0.88	
I have not had negative health experience while working with styrene			0.86	
Perceived Workplace Norms (α = .52)				
People seldom raise safety issues at my workplace				0.90
Safety issues are kept under the table at my workplace				0.56

Note. KMO values, communalities and factor loadings for all items are ≥ .50. Eigenvalues for factors 1 – 4, are 2.48, 2.30, 1.94, 1.71, respectively.

Table 6.2

Factor Analysis Results for Perceived Risks Scale and Subscales

Perceived risks with working in the FBB industry Scale	Rotated Factor Loadings			
	Factor 1	Factor 2	Factor 3	Factor 4
Confidence in dealing with risks (α = .90)				
I believe my coworkers have a good understanding of the risks associated with working with...	0.90			
I believe my coworkers know all the risk associated with working with styrene	0.84			
I believe I know all the risk associated with working with styrene	0.80			
If my coworkers think they will get hurt or ill when doing a job they will not take the risk	0.78			
If I think I will get hurt or ill when doing a job then I will not take the risk	0.75			
I believe I have a good understanding of the risks associated with working with styrene	0.74			
Perceived Health Risks (α = .79)				
I believe working with styrene poses a threat to my health		0.83		
The health risk of working with styrene are low (r)		0.74		
I believe that styrene is harmful because of my own experience working here		0.67		
I believe styrene is hazardous to my health because science says that is the case		0.66		
Awareness of Styrene (α = .88)				
If I can smell the styrene then I am at risk for over-exposure			0.88	
If I feel sick, then the styrene poses a threat to my health			0.84	
Anxiety Concerning Styrene Exposure (α = .66)				
I sometimes worry that working with styrene will make me sick				0.88
This is not a healthy place to work				0.78
I worry that I may get sick in the future because I work with styrene				0.65

Note. KMO values, communalities, and factor loading for all items are > .50 Eigenvalues for Factors 1 – 4 are 2.48, 2.30, 1.94, and 1.71 respectively.

Social influence. The original social influence scale included 24 items and was reduced to 11 items representing three subscales accounting for 62% of the variance (see Table 6.3). Factor 1 contained four items and appeared to represent "Social Influence at Work"; this factor accounted for 23% of the total variance. Factor 2 was labelled "External Social Influence" and contained five items that accounted for 22% of the variance. Finally, the third factor represented "Perceived Image Risk". This subscale contained two items and contributed to 17% of the overall variance.

Table 6.3

Factor Analysis Results for Social Influence Scale and Subscales

Social Influence Scale	Rotated Factor Loadings		
	Factor 1	Factor 2	Factor 3
Social Influence at Work (α = .73)			
My coworkers want me to use safety equipment	0.84		
I often remind my coworkers to use their safety equipment	0.72		
I feel that my boss is concerned about the health of his/her employees	0.71		
My coworkers see the value of using safety equipment	0.69		
External Social Influence (α = .74)			
My doctor encourages me to wear safety equipment at work		0.82	
My doctor constantly reminds me to wear safety equipment at work		0.74	
My doctor has talked to me about the health effects of styrene		0.62	
I care about what my family things about my safety behavior at work		0.60	
Perceived Image Risk (α = .75)			
My image at work would be hurt if I brought up safety concerns			0.90
My coworkers would think badly of me if I brought up safety concerns			0.82

Note. KMO values, communalities, and factor loadings for all items are $\geq .50$. Eigenvalues for Factors 1 – 3 are 2.52, 2.46, and 1.82 respectively.

Safety motivation. The original Safety Motivation scale contained 23 items and was reduced to 11 items representing three subscales accounting for 66% of the variance (see Table 6.4). Factor 1, representing "Perceptions Regarding Management Commitment to Safety", contained three items accounting for 25% of the variance. The second factor representing "Perceptions of Managements' Response to Safety Issues", contained four items and accounted for 22% of the variance. Factor 3, labelled "Employee Satisfaction with Work", contained four items accounting for 19% of the overall variance.

Table 6.4

Factor Analysis Results for Safety Motivation Scale and Subscales

Safety Motivation Scale	Rotated Factor Loadings		
	Factor 1	Factor 2	Factor 3
Perceptions of Management Commitment to Safety (α = .79)			
Health and safety concerns are more valued at my workplace then production concerns	0.89		
The owner/manager of this company takes employees health and safety very seriously	0.85		
When I ignore safety rules my supervisor does reprimands me	0.64		
Perceptions of Managements' Response to Safety Issues (α =.83)			
I worry about losing my job or being replaced If I bring up health and safety concerns with my boss		0.84	
Management know employees take risk while they work but they are not bothered by it		0.74	
Sometimes workers are afraid to turn down a job that they consider risky.		0.70	
Management will turn a blind eye to rules being broken to get the job done		0.66	
Satisfaction With Work (α = .65)			
I feel I have control over my own safety at work			0.87
I am satisfied with my job			0.73
I have been informed about the health effects of styrene			0.62
I am not rewarded for being safe			0.54

Note. KMO values, communalities and factor loadings for all items are ≥ .50. Eigenvalues for factors 1 – 3 were 2.72, 2.40, and 2.13, respectively.

Safety knowledge. The safety knowledge section initially contained 16 items and was reduced to 11 items representing four subscales (see Table 6.5) accounting for 78% of the variance. Factor 1, representing "Understanding MSDS", contained three items contributing to 41% of the variance. Factor 2, "Equipment training", included three items accounting for 16% of the variance. Factor 3, "General Training", contained three items and accounted for 11% of the variance. Finally, Factor 4 represented "Accessing Safety Information" with two items contributing to 10% of the overall variance.

Table 6.5

Factor Analysis Results for Self-Perceived Safety Knowledge Scale and Subscales

Self-Perceived Safety Knowledge Scale	Rotated Factor Loadings			
	Factor 1	Factor 2	Factor 3	Factor 4
Understanding MSDS (α = .89)				
The MSDS are easy to read	0.95			
I understand the information provided by in the MSDS sheets	0.88			
The MSDS provide valuable info about the chemicals I use at work	0.82			
Equipment Training (α = .81)				
I believe I have been properly fitted for a respirator		0.84		
I know who to ask if I am not sure about the safe way to complete a task		0.78		
I have been given training on how to use a respirator		0.75		
Training (α =.74)				
I have received formal training on how to construct fibreglass boats/products			0.87	
I received safety training before I started my job			0.69	
I have received safety training during my employment with this company			0.62	
Accessing Information (α = .69)				
I read the MSDS when I have to work with chemicals				0.89
I feel free to request additional safety training if I think it is needed				0.77

Note. KMO values, communalities and factor loadings for all items are > .50. Eigenvalues for factors 1 - 4, are 4.55, 1.77, 1.15, and 1.13, respectively.

Perceived mood and cognitive effects of styrene. Initially, this section of the employee survey contained 10 items. The PCA resulted in two factors with a total of nine items accounting for 75% of the variance (see Table 6.6). Factor 1, "Mood Changes", included six items contributing to 45% of the variance. Factor 2, "Perceived Relationship and Cognitive Effects of Styrene", included three items accounting for 30% of the variance.

Table 6.6

Factor Analysis Results for Perceived Mood and Cognitive Effects Scale and Subscales

Perceived Mood and Cognitive Effects Scale	Rotated Factor Loadings	
	Factor 1	Factor 2
Mood Changes (α = .92)		
Since I began working with styrene I find myself to be more irritable/moody	0.79	
Family members have commented about changes in my mood since I started working with...	0.77	
Coworkers have commented about changes in my mood since I started working with...	0.70	
I have noticed changes in my coworkers mood that I believe is related to styrene exposure	0.89	
I have noticed changes in my coworkers personality that I believe is related to styrene exposure	0.74	
I have noticed changes in my mood that I believe is related to styrene exposure	0.88	
Perceived Relationship and Cognitive Effects Styrene (α = .84)		
Working with styrene has affected my relationships with my coworkers		0.83
Working with styrene has affected my relationships with my family		0.89
Excessive exposure to styrene has affected my ability to make good decisions		0.76

Note. KMO values, communalities, and factor loadings for all items are > .50. Eigenvalues factors 1 and 2 were 4.04 and 2.72, respectively.

Community status. The community status scale originally contained six items. The PCA revealed one factor containing five items accounting for 56% of the variance. The construct label remained the same. Table 6.7 below provides the item factor loadings.

Table 6.7

Factor Analysis Results for Community Status Scale

	Rotated Factor Loading
Community Status Scale (α = .72)	Factor 1
Many people are leaving my community	0.84
People here fear that this community will not survive	0.80
It is difficult to keep young people in the community	0.72
My community is not growing	0.62

Note. KMO values and communalities for all items and scales are ≥ .50 and factor loadings < .50 were excluded. Eigenvalue for factor 1 was 2.25.

Community connections. Given the overlap in concepts between the 2 sections, and to minimize the number of items in this section, items from both scales were entered into one PCA. The community attachment scale initially contained nine items and the PSOC contained 10. The PCA reduced the number of items to a total of nine loading on two factors, together resulting in a 'Community Connections' (see Table 6.8). Factor 1 contained six items and accounted for 40% of the variance. This factor represented 'Community Attachment'. The second factor contained three items and represented 'Social Connectedness'. This factor contributed to 17% of the overall variance (57%).

beliefs relating to safety climate. The results suggested that senior and middle management needed to encourage commitment to change, resolve the conflict between production and safety, and improve communication between employees.

While the stages of change model may provide a framework for assessing health and safety beliefs, Barrett et al. (2005) raised several notable concerns. A significant challenge was that the interview questions they developed were bounded by the model and therefore, individual responses were restricted to fitting the model. More specifically, instead of conducting interviews and developing a model based on analyses of interview responses to determine whether (and the extent to which) the responses resembled that of the proposed model, the interviews were analyzed within the restrictive framework of a predetermined model. This method proved so problematic that a quantitative scale (i.e., Safety Climate toolkit) for attitude and belief assessment was necessary.

While Barrett et al. do not suggest it, it is also conceivable that using questions to identify the stages may actually influence the respondent's current stage of change and therefore may not provide a true reflection of where an individual naturally resides in the stage of change model degree of contemplation. One could also criticize the model for its reliance on individual cognition as a sole determinant of attitudes and beliefs. Hence, while the model provides a means of understanding attitudes and beliefs at various levels of "contemplation", it does not provide explanation for the development of such attitudes or the wider social context contributing to such attitudes and beliefs.

Based on his review of value expectancy models, environmental models, and behaviour change models, DeJoy (1996) argued that constructs within all of these models

Table 6.8

Factor Analysis Results for Community Connections Scale

Community Connections Scale	Rotated Factor Loadings	
	Factor 1	Factor 2
Community Attachment (α = .79)		
I am very attached to my community	0.87	
I feel at home in my community	0.82	
My community means a lot to me	0.72	
I have a lot of fond memories in my community	0.68	
I think my community is a good place to live	0.67	
I feel commitment to my community	0.62	
Social Connectedness (α = .58)		
People in my community share the same values as me		0.77
The people who live in my community get along well		0.73
I care about what my neighbours think about my actions		0.68

Note. KMO values and communalities for all items and scales are ≥ .50 and factor loadings < .50 were excluded. Eigenvalues factors 1 and 2 were 3.57 and 1.52, respectively.

Perceived job security. Similarly, given the overlap in concepts between Job Security (seven items) and Alternative Means of Employment (six items), and to minimize the number of items in this section, items from both scales were entered into one PCA. Taken together, the items represented three factors totalling nine items and accounting for 70% of the variance (see Table 6.9). Factor 1 contained four items representing "Perceptions of Job Continuation", accounted for 35% of the variance. The second factor accounted for 19% of the variance. This factor contained two items and represented "Precariousness of Work". Finally, Factor 3 consisted of three items representing "Job Security and Alternative Employment", accounting for 16% of the total

variance.

Table 6.9

Factor Analysis Results for Perceived Job Security Scale and Subscales

Perceived Job Security	Rotated Factor Loadings		
	Factor 1	Factor 2	Factor 3
Perceptions of Job Continuation (α = .90)			
I fear not having a job	0.92		
I fear losing this job	0.88		
I feel it is likely that I might lose my job in the years to come	0.86		
I feel that the future of this company is uncertain	0.78		
Precariousness of Work (α = .64)			
The number of hours I work at this company changes quite often		0.87	
I feel like I could easily be replaced by someone else at my job		0.81	
Job Security and Alternative Employment (α = .42)			
My job security is good			0.71
I feel like I have no other choice but to work at this job			0.65
There are very few jobs available fro me in my community			0.58

Note. KMO values and communalities for all items and scales are ≥ .50 and factor loadings < .50 were excluded. Eigenvalues for Factors 1 – 3 were 3.11, 1.67, and 1.44, respectively.

Health effects of styrene and safety compliance .Two scales ('Knowledge about the Health Effects of Styrene' and 'Safety Compliance') were not included in the PCA as the items within these scales were considered to be necessary to the objectives of the current study.

The 'Health Effects of Styrene' scale contained nine items (see Table 4.9, Chapter 5, p. 195) developed to assess participant knowledge of the mental and physical health

effects of styrene. High scores on this scale indicated greater knowledge of the health effects of styrene exposure.

Initially, the filter question ("Excessive exposure to styrene is related to hair loss") was added to the scale to assess participant response bias. Admittedly, this filter question may not have been suitable for a scale designed to assess participant knowledge, particularly when measures had been taken to reduce response bias by rewording half of the items so that these items were reversed scored. Consequently, participant responses to this item were omitted from any subsequent analyses using this scale.

Overall mean scores on this scale suggested that employees have insufficient knowledge of the health effects of styrene ($M = 3.44$, $SD = .51$, $N = 36$). However as presented in Table 6.10, the distribution of participants' scores suggests that participants are more knowledgeable (or more aware) of the health effects that are more likely to be experienced after a short period of styrene exposure (e.g., skin irritation, eye irritation, lung problems, mood changes) and are less knowledgeable (or aware) of long term health effects such as reduced colour vision and hearing loss. With the exception of items 1, 6, 7, and 8, the majority of participants responded 'Strongly Disagree', 'Slightly Disagree' or 'Neither Agree/Disagree' to scale items suggesting that they did not have sufficient knowledge of the health effects of styrene.

The 'Safety Compliance' scale contained eight items (see Table 4.11, Chapter 5, p. 198) to assess employee compliance with safety policies and procedures. Higher scores on this scale reflected greater compliance with safety policies and procedures. Overall, employees reported that they 'Sometimes' or 'Almost Always' comply with safety

Table 6.10

Distribution of Participant Responses to the Knowledge of the Health Effects of Styrene Scale

	Percentage of Respondents (*n*)				
Excessive exposure to styrene is related to…	Strongly Disagree	Slightly Disagree	Neither Agree/ Disagree	Slightly Agree	Strongly Agree
1. Is related to reduced color vision ($N = 37$)	13.5 (5)	10.8 (4)	59.5 (22)	13.5 (5)	2.7 (1)
2. Is related to hearing loss ($N = 37$)	10.8 (4)	5.4 (2)	45.9 (17)	18.9 (7)	18.9 (7)
3. Is related to changes in mood ($N = 38$)	5.3 (2)	10.5 (4)	26.3 (10)	31.6 (12)	26.3 (10)
4. Is related to depression ($N = 38$)	5.4 (2)	5.4 (2)	42.1 (16)	21.8 (8)	21.8 (8)
5. Is related to aggression ($N = 37$)	5.4 (2)	5.4 (2)	62.2 (23)	18.9 (7)	8.1 (3)
6. Is related to lung problems ($N = 38$)	10.5 (4)	2.6 (1)	28.9 (11)	28.9 (11)	28.9 (11)
7. Does cause skin irritation ($N = 40$)	5.0 (2)	5.2 (2)	17.5 (7)	22.5 (9)	50.0 (20)
8. Causes eye irritation ($N = 40$)	12.5 (5)	7.5 (3)	15.0 (6)	5.0 (2)	60.0 (24)

Note. Items 2, 4, 6, and 7 were reversed scored when entered in to the SPSS datafile resulting in the values above. These items were reworded to reflect reverse scoring.

policies and procedures ($M = 3.77$, $SD = .65$, $N = 38$). The distributions of participant responses (see Table 6.11) to each of the eight items suggests that the majority of employees reported that they 'Sometimes' to 'Always' comply with safety policies and procedures represented by in the scale.

Table 6.11

Distribution of Participant Responses to the Safety Compliance Scale

	Percentage of Respondents (*n*)				
How often do you...	Never	Almost Never	Sometimes	Almost Always	Always
1. Use a respirator/mask when working with styrene? (*N* = 41)	0	14.6 (6)	24.4 (10)	24.4 (10)	36.6 (15)
2. Wear safety glasses when grinding? (*N* = 41)	0	2.4 (1)	26.8 (11)	22.0 (9)	48.8 (20)
3. Wear safety glasses when spraying? (*N* = 38)	21.1 (8)	15.8 (6)	15.8 (6)	15.8 (6)	31.6 (12)
4. Wear protective gloves while you work with styrene? (*N* = 40)	5.0 (2)	2.5 (1)	10.0 (4)	20.0 (8)	62.5 (25)
5. Have your work clothes cleaned/washed everyday? (*N* = 41)	12.2 (5)	14.6 (6)	24.4 (10)	22.0 (9)	26.8 (11)
6. Ignore safety rules and regulations at work when working with styrene? (r) (*N* = 41)	4.9 (2)	7.3 (3)	29.3 (12)	22.0 (9)	36.6 (15)
7. Take shortcuts in safety guidelines related to styrene use or handling in order to get the job done faster? (r) (*N* = 41)	7.3 (3)	0	39.0 (16)	17.1 (7)	36.6 (15)
8. Clean your respirator after every use? (*N* = 41)	7.3 (3)	4.9 (2)	12.2 (5)	31.7 (13)	43.9 (18)

Note. Items 6 and 7 were reversed scored (r) so that higher scores reflected greater compliance with safety policies and procedures. Reversed score response for these items resulted in the values presented above.

Factor Scores

In conducting the PCA analysis, the method for establishing factor scores was an issue of consideration. In the literature there are examples of analyses in which factor scores were derived based on an average of individual respondent scores computed across items (e.g., Fowler, 2007). Other investigators have opted to derive factor scores which are in effect weighted averages, weighted according to the factor loadings (e.g., Kerlinger & Lee, 2000). In such cases, individual scores represent the respondent's relative position to a group mean (that is zero) resulting in a standardized score. While the first approach is easier to interpret as average scores represent the actual scale of measurement (e.g., on a scale of 1 - Strongly Disagree to 5 - Strongly Agree, a mean of 4.5 indicates the respondent's tendency toward agreement), the small number of observations and skewed item responses in the present study make the weighted averages approach more appropriate (e.g., Kerlinger & Lee, 2000). Consequently, scores were computed for emergent factors using the regression method approach in SPSS (Brace, Kemp, & Snelgar, 2003). For the scales that were not part of the PCA process (i.e., Knowledge of Health Effects and Safety Compliance), scores were transformed to standardized z-scores to make the measurements consistent for subsequent multiple regression analyses.

Chapter 7

Study 2 Results Part II

Analysis of Employee Survey Data

Results Part II: Analysis of Employee Survey Data

Participants

Forty-three employees returned completed surveys, 3 (7%) women and 40 (93%) men. The average age of participants was 41 years ($SD = 9.13$), with a range from 23 to 62 years of age. The average length of time having worked in the industry was 11.8 years ($SD = 7.06$), ranging from 1 year to 30 years.

Data Analyses

The first step was to determine which scales to use in the subsequent regression analyses. The scales that emerged from the PCA were explored to determine which factors best represented the variables in the proposed TPB framework (see Figure 2 in Chapter 1) using two criteria: Cronbach's alpha and relevance (objectives of the current study and existing literature). There is considerable debate over the acceptable level of Cronbach's alpha (e.g., Pedhazur & Shmelkin, 1991). Nunnelly (1967) initially suggested that alpha levels of .50 or .60 were sufficient, but later went on to suggest .70 as the minimum acceptable level (Nunnelly, 1978). Hair, Anderson, Tatham, and Black (1998) agreed that while .70 is acceptable for exploratory research, a cut-off as lenient as .60 may be used. Each scale was therefore assessed according to the importance of the scale to the current study, as suggested by Pedhazur & Shmelkin (1991) and scales with a Cronbach's alpha less than .60 excluded. In fact, Cronbach's alpha ranged from .65 to .90 across the 17 retained scales. Figure 7.1 shows the proposed TPB model with the factored scales, considered to represent the variable of interest included.

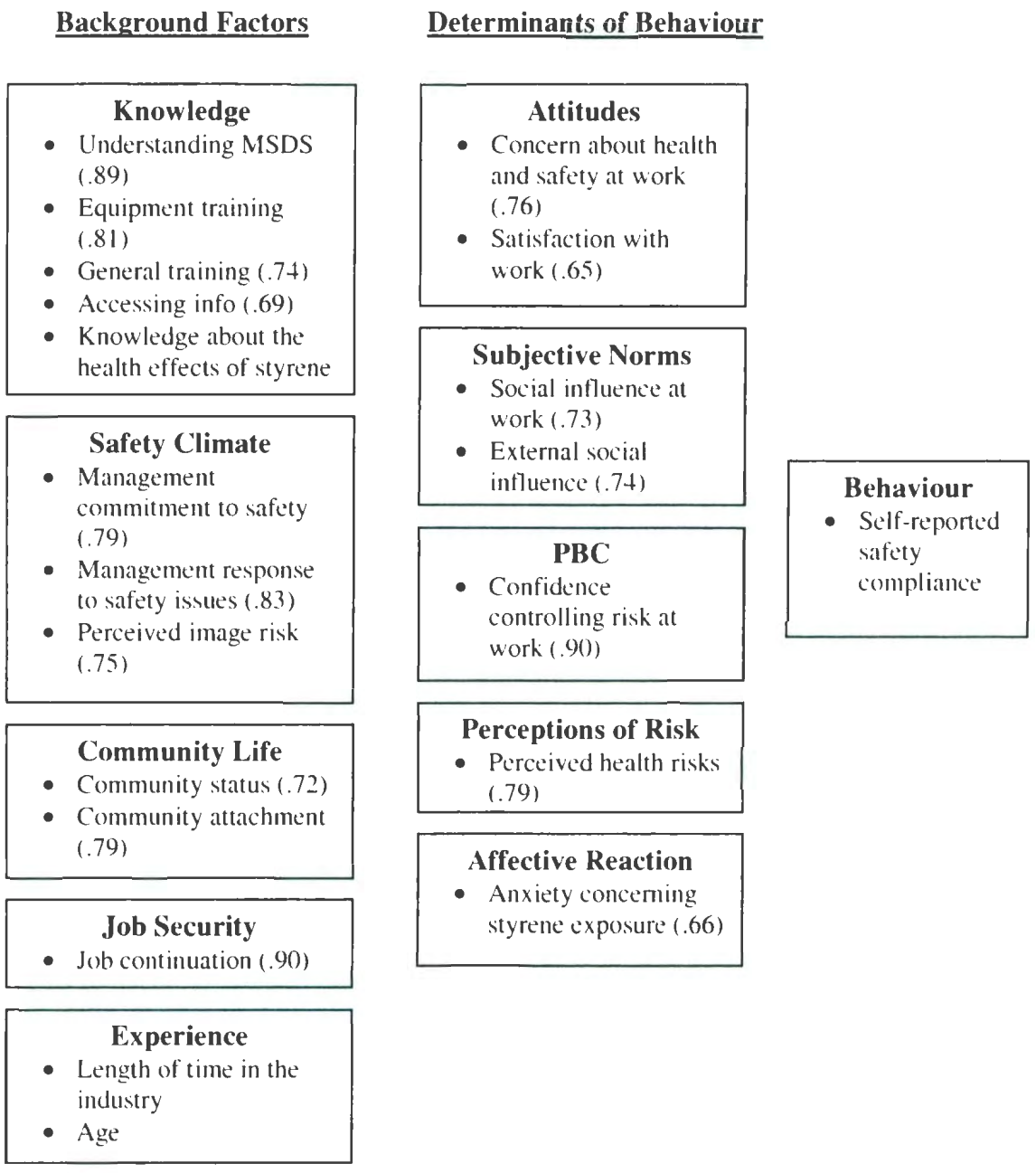

Figure 7.1 – Proposed augmentation to the TPB and scales representing the determinants of behaviours and background (distal) determinants of behaviour. Cronbach's alpha presented in brackets.

Recall that the constructs in the original TPB were criticized as being ill defined.

Although most of that criticism has been directed at the social normative component

(e.g., Armitage & Conner, 2001), this may also be true of the attitudinal component in that a person may have multiple attitudes about the same behaviour. In the present study, two factors emerged that appeared to represent employee attitudes ('Concern about Health and Safety at Work' and 'Satisfaction with Work') and two factors appeared to represent different forms of subjective norms ('Social Influence at Work' and 'External Social Influence'). In an attempt to assess the factors affecting safety behaviours and relating to the development of the hypothesized proximal determinants of behaviour (e.g., attitudes, normative influence, PBC, risk perception, and affective reaction), multiple representations of the attitude and subjective norm components were maintained.

Stepwise multiple regression analyses were conducted to determine the factor(s) contributing to the development of each of the hypothesized proximal determinants of behaviour and to determine the factor(s) affecting safety compliance. The author acknowledges that given the sample size ($n = 43$), the number of predictor variables exceeds the recommended criteria for multiple regression, that is, a minimum of 10 cases per predictor variable (e.g., Brace, Kemp & Snelgar, 2003). As previously mentioned (Chapter 6), missing data for each case were not replaced. While there are benefits to replacing data with individual mean scores or group mean scores (such as increasing the sample size), there is also a risk in doing so. For example, substituting means for missing values reduces the variance of the variable and correlations between variables are reduced due to this reduction in variance (e.g., Tabachnick & Fidell, 2007). Participants that responded to all items relevant to the dependent and independent variables in the survey were included in the following regression analyses; that is, if a participant did not

are relevant to workplace self-protective behaviour. In his particular stage model of self-protective behaviour, DeJoy proposed four stages: (1) hazard appraisal, (2) decision making, (3) initiation, and (4) adherence. In the hazard appraisal stage, DeJoy proposed that workers benefit from information about the hazard, risk estimates, exposure modes, and existing control measures and that importance should be placed on personalizing the risks.

At the decision making stage, workers address issues of self-efficacy, response efficacy, and the cost/benefits of the self-protective behaviours. Self-efficacy can be developed, according to DeJoy, through education, training and skill development. Costs may include time constraints, physical discomfort, decreased productivity levels, and so on, while benefits include a safer working environment, availability of safety equipment, training in the usage of safety equipment, and equipment that will make self-protection easier and more effective.

During the initiation stage, DeJoy suggested that facilitating conditions and safety climate are the prominent constructs. Facilitating conditions such as readily available safety equipment, training in the use of such equipment, and re-designing jobs to facilitate self-protection counteract the perceived costs. Safety performance information and other types of feedback received from coworkers and supervisors is an important facet of safety climate. Finally, the adherence stage is when there is long-term adherence to safety behaviour and this is strongly influenced by the environmental and organizational climate.

respond to a particular item in the scale, the participant was not included in the analysis. This resulted in 25 participants (or 26, depending on the analysis) in each regression analysis. Given that 18 participants, approximately 40% of the entire sample had missing data, replacing the missing values with individual or group means would significantly reduce the variance in participant responses and provide an inaccurate representation of participant responses. The decision was made to stay true to the data and proceed with the analyses using the 25 (26) participants with complete data.

While results of the following analyses should be interpreted with caution, stringent criteria were put in place when assessing each regression analysis. The level of significance for the analysis was set at .01 to minimize the probability of Type 1 error. Furthermore, in addition to reporting the R^2 for each regression analysis, adjusted R^2 was also reported. This adjustment reduces the multiple correlation (R^2) to take into account the ratio of the number of cases to the number of predictor variables and reduces the overestimation of the relationship resulting from chance covariation. This adjustment is recommended for small samples when using a large number of predictor variables (Pedhazur & Schmelkin, 1991; Tabachnick & Fidell, 1996, 2007).

Multicollinearity diagnostic procedures were carried out for all regression analyses. As suggested by Besley, Kuh, and Welsch (1980; as cited in Tabachnick & Fidell, 2007), criteria for multicollinearity are a conditioning index for each variable exceeding 30 and variance proportions greater than .50 for at least two different variables. In the following regression analyses, the condition index for the variables in the resultant regression models ranged from 1.0 – 3.47 with no two variables exceeding

.50 proportion of variance on the same dimension. In addition, tolerance was calculated (using SPSS software) for each variable in the resultant multiple regression models. Tolerance, the proportion of variance unique to an independent variable, varies between 0 and 1. Tolerance is considered acceptable the closer this value approaches 1 (Tabachnick & Fidell, 2007). In the subsequent multiple regression analyses tolerance ranged between .78 and 1.0. Correlation matrices produced for each regression analysis revealed correlations between independent variables ranging from .01 to .66. Correlations of .90 or greater suggest multicollinearity (Tabachnick & Fidell, 2007). Thus, according to these measures, multicollinearity of the variables in the subsequent analyses is not an issue.

As previously described, factor scores (i.e., standardized scores) were calculated for each of the emergent scales. These scores were used in the subsequent analysis rather than raw data (see previous chapter for explanation). However, descriptive statistics for unstandardised scores of the scales used in the following analyses are provided in Table 7.1.

Employee Attitudes

Concern about health and safety at work. A stepwise multiple regression analysis was conducted to determine the factors affecting 'Concern about Health and Safety at Work' (M = .25, SD = .73, n = 25). All five scales representing the hypothesized proximal determinants of behaviour (with the exception of the other attitude scale "Satisfaction with Work"), the eleven potential 'background factors' (i.e., knowledge, safety climate, community life, job security), and two demographic variables (length of

Table 7.1

Descriptive Statistics for Factored Scales using Unstandardised Scores

	N	Mean	*SD*
Employee Behavior			
Self Reported Safety Compliance	38	3.77	.65
Employee Attitudes			
Concern about Health and Safety at Work	41	4.23	.76
Employee Satisfaction	39	3.47	.90
Normative Influence			
Social Influence at Work	39	3.92	.77
External Social Influence	34	3.65	.68
Perceived Behavioral Control			
Confidence in Controlling Risk at Work	40	3.51	1.05
Perceptions of Risk			
Perceived Health Risks	38	4.07	.76
Affective Reaction			
Anxiety about Styrene Exposure	40	3.95	.90
Knowledge			
Knowledge re the Health Effects of Styrene	36	3.44	.51
Equipment Training	41	3.85	1.08
Understanding MSDS	42	4.15	.85
General Training	41	2.69	1.26
Accessing Information	41	4.20	.82
Safety Climate			
Perceived Image Risk	41	2.09	.88
Managements' Response to Safety Issues	41	2.63	1.08
Managements Commitment to Safety	40	2.95	1.19
Community Life			
Community Status	41	4.16	.83
Community Attachment	41	4.64	.48
Job Security			
Job Continuation	40	3.73	1.15

time working in the industry and age) were included in the analysis, resulting in 18 predictor variables (refer to Figure 7.1 above for variables). Results of the analysis revealed 'Knowledge about the Health Effects of Styrene' ($M = .07$, $SD = 1.02$) as the only significant predictor, $F(1, 23) = 11.90$, $p = .002$, $\beta = .58$, accounting for 34% (adjusted $R^2 = .31$) of the variance in employee attitudes toward health and safety at

work. Attitudes toward workplace health and safety were positively associated with knowledge of health effects of styrene. That is, greater employee knowledge of the health effects of styrene was related to more positive attitudes toward workplace health and safety.

Employee satisfaction with work environment. All five scales representing the hypothesized proximal determinants of behaviour (with the exception of the other attitude scale 'Concerns about health and safety at work'), the eleven potential 'background factors', and two demographic variables (length of time working in the industry and age) were included in the stepwise regression analysis, resulting in 18 predictor variables. The analysis revealed one significant predictor of 'Employee Satisfaction with Work' (M = .02, SD = .90, n = 26). 'Community Attachment' (M = .05, SD = .85) was positively associated with responses on the employee satisfaction scale, $F(1, 24) = 15.46$, $p = .001$, $\beta = .63$, accounting for 39% (adjusted $R^2 = .37$) of the variance. These findings suggested that employees who reported being more attached to their community were more likely to report greater satisfaction with their work environment.

Subjective Norms

Social influence at work. All five scales representing the hypothesized proximal determinants of behaviour (with the exception of the other normative influence scale 'External Social Influence'), the eleven potential 'background factors' and two demographic variables (length of time working in the industry and age) were included in

the stepwise regression analysis, resulting in 18 predictor variables. The analysis revealed two significant predictors of 'Social Influence at Work' (M = -.02, SD = 1.12, n = 25), $F(2, 22) = 8.73$, $p = .002$, accounting for 44% (adjusted $R^2 = .39$) of the variance. At step 1, 'length of time working in the industry' (M = 12.06 years, SD = 7.8) was positively associated with social influence at work ($\beta = .50$) accounting for 24% (adjusted $R^2 = .20$) of the model variance. The longer employees had been working in the industry the more likely they were to report greater social influence of their peers at work. At step 2 of the analysis, 'Employee Confidence in Controlling Risk at Work' (M = .14, SD = .95) was positively associated ($\beta = .45$) with 'Social Influence at Work', accounting for an additional 21% of the variance (adjusted $R^2 = .19$). That is, greater reported social influence in the workplace was related to increased confidence in controlling risk in the workplace. See Table 7.2 for model summary.

Table 7.2

Stepwise Regression Analysis for Social Influence at Work

Variable	β	R^2	Adjusted R^2	Adjusted R^2 (total)
Step 1				
Length of time working in the industry (yrs)	.50*	.24	.20	
Step 2				
Confidence controlling risk at work	.45*	.21	.19	.39

*$p < .01$

External social influence. All five scales representing the hypothesized proximal determinants of behaviour (with the exception of the other normative influence scale 'Social Influence at Work'), the eleven potential 'background factors' and two demographic variables (length of time working in the industry and age) were included in the stepwise regression analysis, resulting in 18 predictor variables. Stepwise regression analysis revealed 'length of time working in the industry' (M = 12.06 years, SD = 7.8) as the only predictor of 'External Social Influence' (M = .25, SD = .96, n = 25), $F(1, 23)$ = 4.53, p = .008, accounting for 17% (adjusted R^2 = .13) of the variance. The length of time employees had worked in the industry was negatively (β = -.41) related to external social influence. It appears that the longer employees had been working in the industry, the less influence those outside the workplace (e.g., family and physicians) had with respect to their safety behaviours at work.

Perceived Behavioural Control

Confidence in controlling risk at work. All six scales representing the hypothesized proximal determinants of behaviour, the eleven potential 'background factors' and two demographic variables (length of time working in the industry and age) were included in the stepwise regression analysis, resulting in 19 predictor variables. The stepwise regression analysis revealed two significant predictors of employee 'Confidence in Controlling Risk at Work' (M = .14, SD = .95, n = 25), $F(2, 22)$ = 13.54, $p < .001$, together accounting for 55% (adjusted R^2 = .51) of the variance (see Table 7.3). At step 1, 'Employee Perceptions of Managements' Commitment to Safety' (M = .30, SD = .92)

was positively associated (β = .62) with employee control over risks. That is, participants who believed that management was committed to employee safety were more likely to report that they felt confident in dealing with the risk in their workplace. Step 2 of the analysis revealed 'Anxiety about Styrene Exposure' (M = .13, SD = .74) as positively (β = .35) associated with employee confidence in controlling risk at work. That is, the more employees reported anxiety with respect to styrene exposure, the more likely they were to report that they felt confident in dealing with the risk in their workplace. This suggests that heightened anxiety may motivate employees to take control of their workplace.

Table 7.3

Stepwise Regression Analysis for Employee Confidence in Dealing with Workplace Risk (PBC)

Variable	β	R^2	Adjusted R^2	Adjusted R^2 (total)
Step 1				
Employee perceptions about managements' commitment to safety	.62*	.43	.41	
Step 2				
Anxiety about styrene exposure	.36**	.12	.10	.51

*$p < .001$
**$p = .002$

Perceptions of Risk

Perceived health risks. All six scales representing the hypothesized proximal determinants of behaviour, the eleven potential 'background factors' and two demographic variables (length of time working in the industry and age) were included in

the stepwise regression analysis, resulting in 19 predictor variables. The analysis revealed two significant predictors of 'Employee Perceived Health Risks' (M = .12, SD = .89, n = 25), $F(2, 22) = 15.32$, $p < .001$, together accounting for 58% (adjusted R^2 = .54) of the variance (see Table 7.4). Step 1 of the analysis revealed 'Employee's Perceptions of Managements' Response to Safety Issues' (M = .11, SD = .96) to be negatively associated (β = -.82) with employee Perceived Health Risk. This suggests employees were less likely to report health risks if they felt that management would not effectively respond to safety issues. The second step of the analysis revealed 'Perceived Image Risk' (M = .01, SD = 1.03) to be positively associated with employee perceived health risk (β = .60). Employees who were more likely to report that they were worried about their image at work if they brought up safety concerns were more likely to perceive health risks associated with working with styrene. This finding suggests that those who perceive a health risk may be less likely to voice their concerns for fear of criticism from their coworkers.

Table 7.4

Stepwise Regression Analysis for Employee Perceptions of Health Risk

Variable	β	R^2	Adjusted R^2	Adjusted R^2 (total)
Step 1				
Employee perceptions about managements' response to safety issues	-.82*	.29	.26	
Step 2				
Perceived Image Risk	.60**	.28	.28	.54

*$p < .001$
**$p = .001$

Affective Reaction

Anxiety concerning styrene exposure. All six scales representing the hypothesized proximal determinants of behaviour, the eleven potential 'background factors' and two demographic variables (length of time working in the industry and age) were included in the stepwise regression analysis, resulting in 19 predictor variables. The stepwise regression analysis revealed two significant predictors associated with employee 'Anxiety about styrene exposure' (M = .13, SD =.74, n = 25), $F(2, 22) = 7.67$, $p = .003$, accounting for 41% (adjusted R^2 = .36) of the variance (see Table 7.5). Step 1 of the analysis revealed 'Employee Perceptions About Managements' Response to Safety Issues' (M = .11, SD = .95) was negatively associated (β = -.53) with anxiety about styrene exposure. That is, employees who reported that management did not respond in a positive way to safety issues were also more likely to report that they were more anxious about styrene exposure. Step 2 revealed that 'Community Attachment' (M = .04, SD = .87) was negatively associated (β = -.39) with anxiety about styrene exposure, suggesting that high community attachment was related to less anxiety about styrene exposure.

Table 7.5

Stepwise Regression Analysis for Employee Anxiety Concerning Styrene Exposure

Variable	β	R^2	Adjusted R^2	Adjusted R^2 (total)
Step 1				
Employee perceptions about managements' response to safety issues	-.53*	.26	.23	
Step 2				
Community Attachment	-.39**	.15	.13	.36

*$p < .001$
**$p = .001$

Safety Behaviours

Self-reported safety compliance. All scales representing the proximal determinants of behaviour (seven predictor variables) were entered into a stepwise regression analysis to assess the effect of these variables on safety compliance. The analysis revealed only one predictor of 'Safety Compliance' (M = .02, SD = .53, n = 25), $F(1, 24) = 12.31$, $p = .002$. 'External Social Influence' (M = .06, SD = 1.01) was positively associated (β = .52) with self-reported Safety Compliance, accounting for 33% (adjusted R^2 = .31) of the variance. This finding suggests that employees who were more likely to report that their family doctors and family members were concerned about their safety at work were also more likely to indicate that they complied with safety procedures.

Figure 7.2 (following page) shows the standardized β values of the regression analyses indicating the magnitude and direction of the relationships among the significant variables in the model. This figure is included to aid the reader in the interpretation of the results; it is not the intention of the author to simulate Structural Equation Modeling (SEM) or path analysis as the current data cannot provide evidence regarding the model fit to the data due to the small sample size.

To date, DeJoy's stage model of workplace self-protective behaviours has not been empirically tested (DeJoy, personal communication, 2004). While DeJoy has advocated the importance of environmental and situational factors in affecting self-protective work behaviours (Barrett et al., 2005), the model, again, falls short of encompassing the individual's environment and social circumstances outside the organizational context (e.g., individual economic status, community economic and social status, etc.).

Cognitive Approaches to Workplace Behaviour: Social Cognitive Models

A number of social-cognitive models have been developed to explain behaviour intentions or behaviour change. However, the Health Belief Model (HBM) proposed by Janz and Becker (1984) is the only model of behavioural intention that was specifically developed to explain health related behaviour (DeJoy, 1996). Janz and Becker (1984) suggest six determinants of behaviour: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, health motivation, and cues to action. The HBM predicts that the behaviour is more likely to be performed if the individual perceives a threat, if the benefits of performing the behaviour outweigh the costs, and/or there are few barriers to performing the behaviour (Armitage & Conner, 2000). This model has been applied to a variety of issues related to preventative health behaviour (e.g., dieting, exercise, smoking cessation, etc.) and, more recently, to workplace safety behaviour.

Numerous studies have investigated the impact of health promotion activities on behaviour change in the workplace particularly using social cognitive models to explain

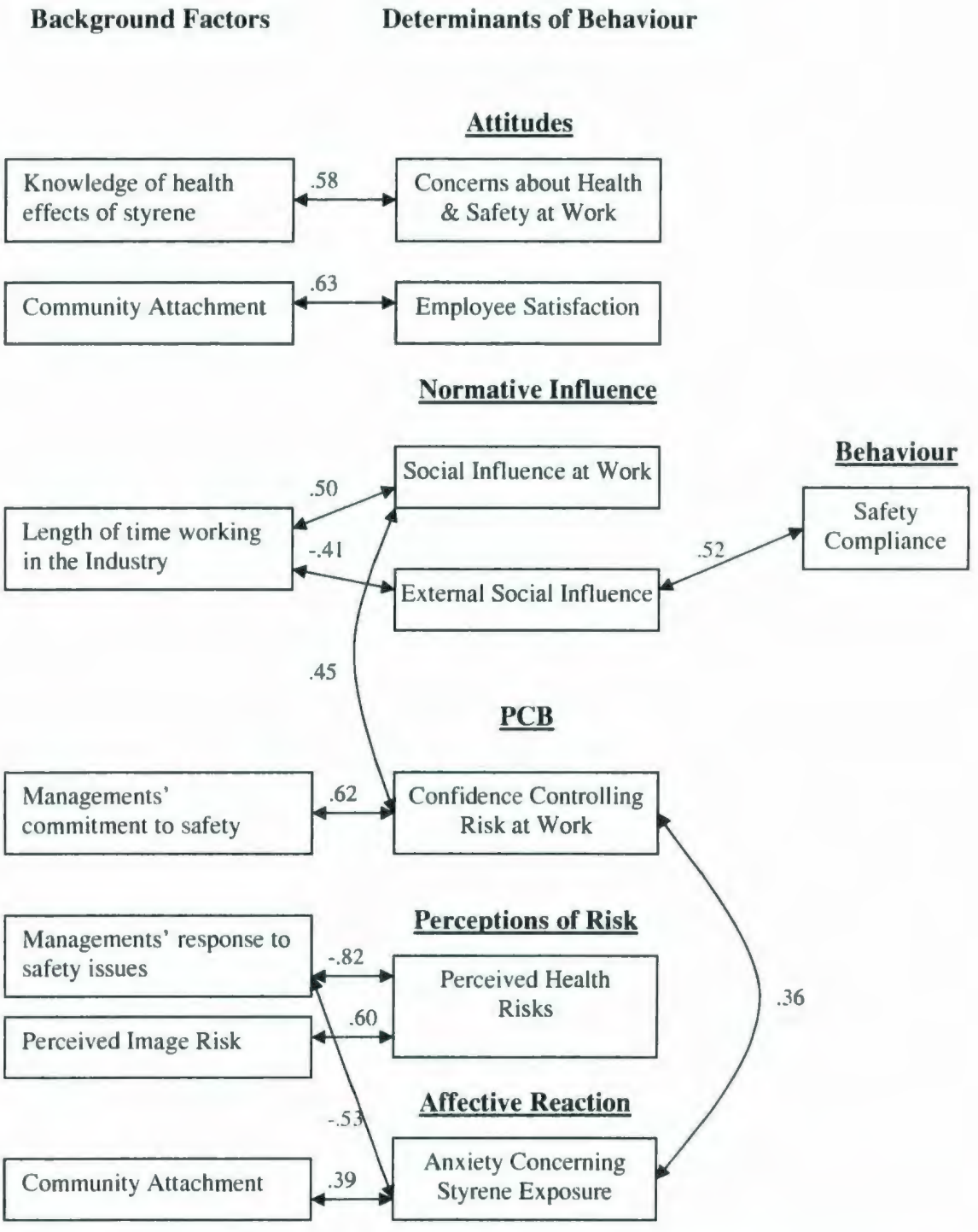

Figure 7.2 - Augmented TPB. Standardized β values represent the magnitude and direction of the relationships among variables in the model.

Chapter 8

Study 2 Discussion

Study 2 Discussion

Introduction

The analyses presented in the results section explored the relationship between variables in the proposed augmented TPB to address three questions. (1) What factors influence employee attitudes, subjective normative influence, PBC, risk perception and affective reactions to risk? (2) Do the proposed background factors provide information that enhances our understanding of employee safety behaviours and the proposed determinants of behaviour? (3) What are the factors influencing employee safety behaviours in the NL boat building industry?

As previously argued, a limitation of the TPB model is that factors influencing the determinants of behaviour (e.g., attitudes, subjective norms, PBC, and in the current study, risk perception and affective reaction) have been neglected. The following discussion will address each of these proposed determinants of behaviour in the augmented TPB model highlighting the background factors associated with each as determined by the regression analyses. Following this discussion we will turn our attention to the main objective of this study: exploring the factors affecting the safety behaviours of employees working in the fibreglass boat-building industry.

Attitudes

The attitude component in the model was composed of two independent constructs as determined by the PCA, 'Concern about Health and Safety at Work' and 'Employee Satisfaction with Work Environment'. With respect to the first of these,

employee knowledge about the health effects of styrene was positively associated with employee attitudes toward health and safety at work. That is, it appears that increased quality and quantity of employee knowledge of the health effects of styrene exposure was associated with more positive attitudes toward health and safety at work. Similar findings were reported by Quandt et al. (2001) among farmworkers where inaccurate and insufficient knowledge about the effects of pesticides was negatively related to their attitudes and beliefs about safety procedures and, consequently, their safety behaviours at work.

This relationship is particularly interesting given that the mean employee score on the 'Knowledge of Health Effects of Styrene' scale was hovering around the 'neither agree/disagree' point of the response scale ($M = .07$, $SD = 1.02$).[1] This scale rated employees agreement with eight questions (filter question omitted) pertaining to the health conditions found to be associated with styrene exposure. Greater agreement on those items reflected greater employee knowledge of the health effects of styrene exposure. It appears that, on average, employees either do not know about the health effects of styrene or possess a mix of accurate and inaccurate information about the ill effects. More specifically, the distribution of employee responses to items on this scale (see Table 6.10, p. 232) suggests that employees are more knowledgeable about (or aware of) the more immediate health effects of styrene (e.g., skin irritation, eye irritation, breathing problems, and mood effects) than the health effects that are more likely to

[1] The employee mean unstandardised score with respect to 'Knowledge about the Health Effects of Styrene' was 3.44, $SD = .51$.

occur due to chronic exposure (e.g., reduced colour vision, hearing loss, and depression). Given that the attitudes of employees in this study towards health and safety are associated with knowledge about styrene exposure, this apparent lack of accurate knowledge is disconcerting. However, such a finding might suggest that enhancing knowledge about the health effects of styrene may contribute to more positive attitudes concerning health and safety in the workplace. These findings also support those of Study 1 where, with the exception of the managers, most participants reported that they believed employees were not knowledgeable about the health effects of styrene.

With respect to the second attitude construct, 'Employee Satisfaction with the Work Environment', the results from Study 2 suggest that community attachment is associated with employee satisfaction. The more attached employees felt to their community, the more likely they were to report being satisfied with their workplace. This finding suggests that community attachment may influence the extent to which an employee is willing to acknowledge negative aspects (e.g., styrene exposure and unsafe working conditions) of the work environment. For example, if employees are attached to their community, they may be less inclined to acknowledge anything that would put their job status in jeopardy or cause them to question their motives for staying in a job with negative attributes. Heightened community attachment may motivate individuals to deny unpleasant work environments or work hazards and to tolerate risks. Conversely, those who reported that they were not satisfied with their work environment may be less attached to their community and may be more likely to identify negative attributes associated with their workplace. Study 1 participants often spoke fondly of their

community and the lifestyle associated with living in rural areas. Most participants of Communities A and C in Study 1 were fearful of the future for their communities and were worried about economic security and potential out-migration. Participants also reported that people may be more likely to stay in a job they believed to be risky or a job they did not like so as to stay in their community.

The relationship between employee attitudes and community attachment is of particular theoretical importance. As previously mentioned, social psychology has been criticized for ignoring social and cultural circumstances when assessing individual attitudes and behaviour (e.g., Gergen, 1973; Parker, 1990). In particular, the TPB has been criticized with respect to its neglect of the factors associated with the development of attitudes (e.g., Albarracin et al., 2005). The current findings suggest that the social environment (beyond the workplace) may require more of a presence in the TPB. The TPB may be strengthened by including social factors such as community attachment and related social connections.

Subjective Norms

To date, the subjective norm component of the TPB model has been considered a weak predictor of intentions (see Armitage & Conner, 2000; 2001). Some have suggested that the weakness lies in the measurement of the subjective norm component and the conceptualization of norms in the model (Armitage & Conner, 2001). In the present study, subjective norms were captured by two factors, 'Social Influence at Work' and 'External Social Influence' representing two potential sources of subjective norms:

coworkers and significant others beyond the workplace (i.e., family and personal physician).

The 'Social Influence at Work' scale captured employee beliefs about how coworkers felt about using safety equipment in the workplace. Analysis revealed that the length of time spent in the industry was associated with social influence in the workplace. The longer employees had been in the industry, the more likely they were to report that their peers wanted them to use safety equipment. This may suggest that norms held by workers with respect to health and safety at work may become more ingrained as they spend more time together, perhaps due to greater group cohesion. Indeed research suggests that group cohesion can influence the extent to which group members adhere to group norms (Terry et al., 1999). For instance, if safety behaviours are embraced by peers, social influence at work may motivate employees to engage in safety behaviours. Newer workers may not have established relationships with other coworkers and may not engage in the dialogue surrounding equipment use. It may also be the case that newer workers are less concerned about the beliefs of other coworkers than those employees who have been there for a longer period of time.

The second predictor of 'Social Influence at Work' was employee 'Confidence in Controlling Risk at Work'. This scale assessed employee beliefs about their and their coworkers' ability to control risks associated with styrene exposure. The analysis revealed that the extent to which employees reported coworker support for using safety equipment was positively associated with high scores on the 'Confidence in Controlling Risk at Work' scale. Greater reported confidence in dealing with workplace risks was

associated with greater reports by employees that their peers wanted them to use safety equipment in the workplace. This finding suggests that social influence at work may be heightened when colleagues believe they agree on how to handle the risk in the workplace (which may or may not translate into appropriate safety behaviours). Consequently, in times of uncertainty, employees may look to each other for the appropriate course of action (i.e., informational influence). Conversely, lower levels of reported employee confidence in controlling work place risk were associated with a decrease in peer influence. That is, if employees are not confident in dealing with risk and they do not believe their coworkers are confident, social influence at work may be less salient as employees may be less likely to look to each other for how to behave in the workplace.

De Vris and Lechner (2000) suggested that positive social influence in the workplace increases the frequency of safety behaviours by employees. Study 1 participants also acknowledged the importance of social influence in the workplace for establishing safety routines (or unsafe routines), suggesting that coworkers can influence each other in both positive and negative ways. Study 2 findings suggest that when employees have been together for a long period of time, and they feel confident in their and their coworkers' ability to deal with risk in the workplace, coworker influence with respect to safety equipment may be heightened. Under such conditions, ensuring that employees have the proper safety knowledge and are engaging in appropriate safety behaviours may be extremely important for safety outcomes. It may also be the case that if employees feel that they are not sure about how to deal with risk, and this uncertainty

extends to coworkers, the lack of coworker influence regarding the use of safety equipment could act as a buffer for negative behaviours. For example, employees who have been working in the industry for a short period of time may be more likely to identify practices or routines that are not conducive to a safe working environment. As suggested by the OHS Representative in Study 1, young workers are more likely to be aware of their rights as workers and of safety policies and procedures. Consequently, less social influence at the beginning of one's job may prevent new employees from immediately adopting poor workplace behaviours.

The subjective norm component also included the "External Social Influence" scale. This scale assessed the extent to which employees believed their doctor and family were concerned about their safety behaviour at work. This variable identified another aspect of normative social influence that is not immediately present in the workplace but, as suggested by De Vris and Lechner (2000) and Westaby and Lowe (2005), may affect employee safety related behaviour. The results of the present study suggest that external social influence decreases with time associated with the industry. That is, the most recently hired workers reported greater awareness of the concerns of their doctor and their family than those who had been working in the industry for a longer period of time. This very interesting finding suggests that there may be a critical period when external sources of social influence may influence employee behaviours. As suggested by the OHS Representative in Study 1, the involvement of family in motivating workers to engage in safety behaviours has been very important with respect to changing attitudes and behaviours of those working in the fish harvesting industry. However, the extent to

which external social influence is indeed influential may depend on the length of time the employee has already invested in the industry and the bonds established with coworkers. This finding may have significant implications for safety promotion programs. It appears that the time frame and the audience for such programs (those outside the workplace or those inside the workplace) may make a significant impact on their success as the salient subjective norms for employees may differ according to employee tenure.

Perceived Behavioural Control (PBC)

The extent to which employees felt that they (and their coworkers) were confident with respect to controlling health and safety risks (particularly styrene exposure) in their workplace was assessed using the 'Confidence in Controlling Risk at Work' scale. The analysis revealed two predictors of employee confidence in controlling risk. The first predictor was 'Employee Perceptions of Management's Commitment to Safety' suggesting that employees who reported that management was not committed to employee health and safety were also more likely to report that they did not feel confident in controlling risk in their work environment.

The safety climate literature emphasizes the importance of employee perceptions of management's commitment to safety (e.g., Cox & Cheyne, 2000; Zohar, 2003). Such perceptions can influence safety related attitudes, the interaction between employees, and the behaviours they perform at work (Neal & Griffen, 2003). Moreover, the OHS Representative in Study 1 suggested that in times of economic crisis or scarce employment opportunities, management's attitude and commitment toward safety are

the influence of promotional materials on safety behaviour (e.g., Cheung & Chan, 2000). As a follow-up to their initial study on occupational exposure to pesticides among Latino farmers (Arcury, Quandt, Cravey, Elmore, & Russell, 2001), Arcury, Quandt and Russell (2002) used the same qualitative data set (interview questionnaires with 293 farmworkers) to assess the influence of safety information on perceived pesticide health risk and perceived control over the harmful effects of pesticide exposure. Arcury et al. also assessed how perceived risk and control affect farmworker knowledge and safety behaviour. Using the HBM as a framework for instrument development, survey items were largely based on existing instruments. Their analysis of the interview questionnaires took the form of descriptive statistics, largely in the form of means and frequencies. The authors found that knowledge about pesticide safety increased perceived control, but decreased perceived risk. Arcury et al. contend that this observation speaks to the need to find a balance between education and maintaining a sense of risk. Further, perceived risk was not related to safety knowledge and safety behaviour, while perceived control was. Arcury et al. propose that pesticide safety information must address issues of farmworker control over safety issues for safety education to be effective.

While the findings of this study are extremely important as they provide direction for safety communication, Arcury et al. do not take into account environmental and social circumstances outside the work environment (e.g., employment opportunities, job security, etc.). Perceived risk was predefined as risk associated with worker health. Some have argued that risks identified by participants may not correspond to those risks identified by the researcher (e.g., Wilkinson, 2001). For example, while some may

paramount with respect to motivating employees to engage in safety policies and practices. With respect to the current study, analysis of the survey data revealed that employees felt more confident dealing with the risk in their workplace if they also believed that management was committed to providing a safe workplace. Employees seem to feel a sense of security (possibly a false sense of security given that worker knowledge was poor) regarding their health and safety if they believe that management values the health and safety of their employees.

This finding partially supports the contention of Fogarty and Shaw (2003) who reported that management attitudes and actions about safety topics and safety situations had a direct effect on all aspects of the TPB model, attitudes, subjective norms, PBC and behavioural intentions. The current study only found a direct effect of management's commitment to safety on the PBC component, not on all aspects of the model. As suggested by Fogarty and Shaw (2003), it appears that safety climate, particularly, management commitment to safety, is a separate component worth adding to the TPB when exploring safety behaviours in the workplace.

A second predictor of employee confidence in controlling risk at work was 'Anxiety about Styrene Exposure'. Greater employee anxiety about styrene exposure was associated with greater employee confidence in controlling risks at work. This finding suggests that employees who feel worried about their exposure to styrene may be motivated to feel more in control of their surroundings, consequently reporting that they feel in control over the hazards in their workplace. Conversely, those who are less anxious about styrene exposure may be less motivated to feel in control of their

environment. Conner and Abraham (2001) argued that perceived threat may provoke feelings of worry or anxiety about the potential outcomes of performing or not performing behaviour. Findings from Conner and Abraham (2001) indicate that the more anxiety or regret individuals anticipated from not performing a behaviour, the greater their intention to perform the behaviour. However, current findings suggest that one's affective reaction to risk in the work environment may not directly influence behaviour or behaviour intentions so much as it influences how motivated one is to seek control over the environment, or at least perceive control over the risk in the environment. This may or may not translate into behavioural outcomes. For example, the Weyman et al. (2003) findings suggest that greater confidence in dealing with risk among coal miners appeared to affect risk taking behaviours by attenuating perceptions of risk and consequently increasing the propensity for risk-taking behaviour. The results of the current study suggest that confidence in dealing with risk in the workplace was associated with perceptions of risk concerning styrene exposure. Greater perceptions of risk concerning styrene exposure increased employee confidence in the workplace.

Conner and Abraham (2001) also found the personality trait neuroticism to significantly affect PBC, and consequently, indirectly affect behaviour. The current study did not assess personality variables; perhaps doing so in the future would further contribute to our understanding of the development of people's sense of control over behaviour. That being said, employees' perceptions about management's commitment to safety and their affective reactions to risk in the workplace accounted for 51% of the variance in employee perceptions of their ability to control risk in their workplace.

Perceptions of Risk

Employee perceptions of health risks were associated with two components of the model, 'Employees' Perceptions of Management's Response to Safety Issues' scale and 'Perceived Image Risk' scale. The former assessed the extent to which employees believed that management would be receptive to employee concerns about health and safety and respond to unsafe employee behaviours in a positive manner. Employees who reported that management *does not effectively* respond to safety issues were more likely to report that they did not perceive health risks while working with styrene. This finding may suggest that if employees believe that management will not respond to their safety issues, employees may ignore or deny the health risks in their environment, possibly feeling that their issues would not be thoughtfully considered by management or fear the repercussions of bringing up safety issues (e.g., losing their job or being replaced on the job).

As previously mentioned, the extent to which employees perceive risks in their work environment has considerable impact on their safety attitudes and behaviour (Donald & Canter, 1994; Kovacs et al., 2001; Neal, Griffin & Hart, 2000; Rundmo, 1997; Vaughan, 1993). Thus, aspects of the safety climate that negatively affect employees' perceptions of health risks are of great concern. For example, safety promotion campaigns aimed at enhancing employee perceptions of health risk in their work environment (e.g., Cree & Kelloway, 1997; Harvey et al., 2001) may be negated if employees do not believe that management will effectively respond to safety issues in the workplace. Furthermore, research suggests that workplace safety attitudes have been

shown to affect risk perception (e.g., Mearns, Rundmo, Flin, Gordon, & Fleming, 2004; Sjoberg, 2000). Therefore, if employees believe management is apathetic with respect to employee safety, employees may conclude that management is not concerned about the risk or that there are no risks in the workplace to be concerned about. Employee perceptions of management attitudes may be reflected in how employees think about risk. An attempt to assess such notions will be made by exploring potential gaps in communication between management and employees using the data collected in this study. This analysis will be conducted at a later date. In addition, future research should determine if employee beliefs about management are congruent with management reports about their own safety attitudes; at present, this relationship is unclear. For example, it may be the case that management is very concerned about employee safety but there are other factors contributing to employee beliefs concerning unresponsive management.

The second predictor of employee perceptions of health risks was employee perceptions of image risk. Analysis of the survey data revealed that employees reported greater perceptions of health risk when they reported greater concerns regarding their image at work. That is, employees who believed that there are health risks associated with working with styrene were also more likely to believe that their image at work would suffer negative consequences if they brought up safety concerns. These findings are similar to a recent study. Mullen (2004) found that employees were very concerned about maintaining their image at work and were prepared to violate safety policies and procedures (e.g., avoid using safety equipment) to evade criticisms from coworkers. Mullen suggested that the need to maintain a tough image, maintain one's image as a

competent worker, and avoid teasing and harassment from coworkers decreased employee safety behaviour as employees felt that they had to comply with the subjective norms in the workplace (i.e., not wearing safety equipment).

The current study suggests that while employees may acknowledge the risks associated with styrene exposure, they may be less willing to voice their concerns if they believe they will be ostracized or criticized by their coworkers for doing so.

Affective Reactions

Conner and Abraham (2001) demonstrated that the addition of an affective-cognitive component in the TPB contributed significantly to the explained variance in behavioural intentions. Furthermore, recent risk perception literature has advocated for the presence of an emotion component when attempting to understand decision making and risk judgments (Peter & Slovic, 2000; Slovic, 1999; Slovic & Peters, 2006; Slovic, Finucane, Peters, & MacGregor, 2007; Schwarz, 2000).

Analysis of the aforementioned determinants of behaviour revealed that affective reaction, more specifically, employee anxiety about styrene exposure is associated with employee confidence in dealing with workplace risks (PBC). These findings suggest that this affective-cognitive component may play a role in the extent to which an individual is motivated to control risk in their environment. Thus, it is important to further explore the factors influencing affective reactions to risk.

Analysis of data in the present study found two factors associated with employee anxiety about styrene exposure, 'Employee Perceptions of Management's Response to

Safety Issues', and 'Community Attachment'. The former predictor, a component of safety climate, suggests that employees who believe that management does not effectively respond to safety issues are also more likely to report more anxiety about styrene exposure. It may be the case that if employees believe that they can talk to their management about safety issues without any negative repercussions or that management will actively attempt to address their concerns, employees may feel less anxious.

Safety climate has been repeatedly shown to have a significant effect on the safety attitudes and behaviours of employees (e.g., Cox & Cheyne, 2000; Neal & Griffen, 2003; Zohar, 2003). The results of the current study suggest that anxiety about styrene exposure and safety climate are strongly associated with employee perceived control over risk in their work environment. Therefore, it appears that safety climate is associated with PBC both directly and indirectly through affective reactions to risks. This finding accentuates the importance of safety climate (i.e., employee perceptions of management's commitment and response to safety in the workplace) as it relates to the potential determinants of employee safety behaviours.

Employee affective reactions to risk were also associated with employee reports of community attachment. Employees who reported greater community attachment also reported that they were less anxious about styrene exposure. Such findings highlight the importance of the social and cultural environment beyond the workplace as potential factors that influence employee feelings about risk. Employees who are strongly attached to their community may be less likely to report feeling anxious about styrene exposure as

doing so may call into question their willingness to tolerate working in a risky environment.

However, it may be the case, as mentioned in Study 1, that the community is experiencing economic difficulty and alternative employment opportunities are scarce. Obtaining alternative employment may require leaving the community and, consequently, one's family and social networks. Under such conditions (i.e., economic hardship and a feeling of attachment to the community), an employee may be more willing to deny or suppress feelings of anxiety about hazards in their work environment. Previous research suggests that the feelings people have toward their community can impact their perceptions of risk and their behaviours such as remaining in a risky environment (Billig, 2006). Employees who are attached to their community may deny their feelings of anxiety about styrene exposure to avoid thoughts of having to leave their community to find a safer, healthier work environment.

Denying (or ignoring) feelings about risk may attenuate employee beliefs about risks in their workplace and, consequently, may impact employee safety behaviours. Dissonance theory suggests that if we have two conflicting beliefs resulting in unpleasant tension, we attempt to reduce the tension by changing one of the beliefs (e.g., Festinger, 1957, as cited in Kunda, 1999). It may be possible to extend this notion to employee affective reactions to risks in the FBB industry. For example having positive feelings about one's community may conflict with the anxiety an employee is feeling about their work environment, causing unpleasant tension. To reduce this tension, the employee will have to believe that they are not attached to their community or, alternatively, believe that

the health risks in their work environment are nothing to be worried about. Consequently, the employee comes to believe that there is nothing to worry about and the feeling of tension is reduced.

Heightened community attachment coupled with scarce employment opportunity may influence employee affective reactions to their workplace, further affecting employee perceptions of the control they have over the risks in their workplace (PBC), and possibly, employee behaviour (as demonstrated by Conner & Abraham, 2001). On the other hand, those employees who reported less attachment to their community may be more likely to acknowledge feelings of anxiety about styrene exposure as they may be more inclined to engage in thoughts about leaving the community to find alternative employment.

Behaviour

The preceding discussion involved an exploration of the factors affecting the proposed determinants of behaviour. We now turn our attention to the main objective of this study: what are the factors affecting the safety behaviours of employees working in the fibreglass boat-building industry? This study measured self-reported safety behaviours, not intentions to perform the behaviours. The regression analysis revealed only one TPB model component that significantly predicted self-reported safety behaviour: external social influence. Employees who were more likely to agree that their doctor and their family were concerned about their safety behaviours at work were more likely to indicate greater safety compliance in the workplace. Employees' response to the

safety compliance items revealed that they 'sometimes' or 'almost always' (M = 3.77, *SD* = .65)[2] complied with safety standards/practices.

This finding is exciting for several reasons. First, this source of social influence accounted for approximately 31 – 33% of the variance in safety behaviours among these employees. Published meta-analyses of the efficacy of the TPB for predicting behaviours have shown that the model accounts for approximately 39% to 50 % of the variance in intention and 19% to 38% of the variance in behaviour outcomes (Armitage & Conner, 2001; Sutton, 1998). With respect to behaviour, the results from the current study rank quite high among other studies in terms of the amount of variance in self-reported behaviour accounted for.

Secondly, external social influence was the only predictor of employee safety behaviour of all the variables in the model, despite being the most unlikely given the typically weak predictive ability of the subjective norm component in the TPB. There may be several explanations for this. One of the most obvious explanations is that the other potential determinants of behaviour such as risk perception, affective reaction and, most notably, attitudes and PBC (which have previously been found to affect behaviour intentions and behaviours directly) may have been ill defined or poorly measured in this study. Given the exploratory nature of this study, that is a possibility and will need to be assessed in future research.

Another possible explanation for the lack of predictive ability of the other proximal determinants of behaviour is that this study assessed behaviour, not behavioural

[2] Standardized employee scores had a mean of .06 (*SD* = .52)

intention which is usually considered the immediate determinant of behaviour. Attitudes and PBC have been found to directly affect behavioural intentions (e.g., Armitage & Conner, 2000; Conner & Abraham, 2001; Fogarty & Shaw, 2003; Lingard &Yesilyurt, 2003), not actual behaviour. If this study had assessed safety behavioural intentions rather than safety behaviour, the effects of attitudes and PBC may have been evident. However, perhaps in assessing behaviours directly (albeit self-reported safety behaviours) this study has provided insight into actual behaviour and not intentions to perform the behaviour.

All that being said, the background factors that were assessed in this study may also provide clues as to why other more established determinants of behaviour (e.g., attitudes and PBC) did not emerge from the present analysis as predictors of employee safety behaviour. For example, positive employee attitudes about health and safety at work were associated with greater employee knowledge of the health effects of styrene. However, as discussed above, employee responses to questions regarding the health effects of styrene indicated that employees had limited knowledge about such health effects, particularly long term health effects. Consequently, it may be the case that insufficient or inaccurate knowledge about the health effects of styrene may have had an impact on the extent to which attitudes informed safety behaviours. This relationship requires greater consideration in future research of this kind.

The same logic can be applied to the PBC, perceptions of risk and affective reaction components. Each of these components in the proposed model was negatively associated with two components of safety climate (i.e., employee perceptions of management's commitment to safety or employee perceptions of management's response

perceive risk only as it relates to individual health, others may also view risk in terms of social and/or economic risk (e.g., job loss, having to relocate to find work, etc.). Therefore, by trying to remain within the HBM framework it is possible that factors affecting safety knowledge, risk perception, and safety behaviours have been overlooked and information has been lost. Indeed, in a review of the HBM, Sheeran and Abraham (1996) concluded that the variables in the model were weak predictors of health behaviour and suggested that ill-defined constructs may be the reason. Furthermore, this model does not contribute to our understanding regarding the development of the *existing* perception of risk or attitudes and beliefs held by workers about safety behaviours in the workplace.

In a model similar to the HBM, Rogers (1983) proposed a health behaviour model based on adaptive or maladaptive coping. In the Protection Motivation Theory (PMT), degree of coping is determined by protection motivation which in turn is a function of two cognitive appraisal processes: threat and coping. The threat appraisal reflects perceived susceptibility and severity, whereas the coping appraisal reflects perceived response efficacy (usefulness of the response) and self-efficacy (ability to perform the behaviour).

Studies do support the notion that self-efficacy beliefs are positively associated with a variety of health behaviours (Armitage & Conner, 1999; Bandura, 1986). For instance, in a study of hearing protection device (HPD) usage among industrial workers, Melamed, Robinowitz, Feiner, Weisberg, and Riback (1996) found two components of the PMT (i.e., perceived self-efficacy and perceived susceptibility to hearing loss)

to safety issues) and positively associated with the third component, perceived image risk. That is, if employees believed that management was not committed to the health and safety of employees they were more likely to report less confidence in dealing with risk. Employees who believed that management would not respond to safety issues in a positive way were also less likely to report that there were health risks associated with styrene exposure and were less worried about the health risks. Finally, those employees who believed that their image at work would be negatively affected if they brought up safety concerns were more likely to perceive health risks associated with styrene exposure. It stands to reason that if the proximal determinants of behaviour (i.e., attitudes, subjective norms, PBC, risk perception and affective reactions) are important for predicting behavioural outcomes, than the background factors associated with these determinants of behaviour warrant further exploration as they may be affecting the extent to which these proximal determinants of behaviour affect actual behavioural outcomes.

We now return to a further exploration of the sole significant predictor of safety behaviour that emerged in this study. Recall that the background factor associated with external social influence was the length of time working in the industry. More specifically, the analysis revealed that the less time the employee had spent in the industry the more likely they were to report that their doctor and family were concerned about their safety behaviour at work. This finding suggests that the beliefs and concerns of those outside the workplace appear to be more salient to employees who are relatively new to the industry. Moreover, this study suggests that this type of social influence may affect safety behaviours in the workplace.

This finding has important applied and theoretical implications. From an applied perspective, the relationships between employee tenure in the industry, external social influence and safety behaviours may significantly inform health promotion research. For example, as previously alluded to, social support in the form of family and significant others, outside the workplace, may be an important point of contact for improving the safety behaviours of those in hazardous industries. Involving family and significant others (e.g., health care providers) in safety campaigns and information sessions may contribute to enhanced safety among workers through (1) an increase in dialogue about health and safety, and (2) the normative pressure (i.e., behavioural expectations) felt by workers from significant others.

Finally, the finding that the subjective norm component was an important predictor of behaviour in the current study has theoretical significance. As mentioned above, the subjective norm component has often been considered a weak predictor of behavioural intentions and behaviour, prompting some to suggest the reconceptualisation of this component (e.g., see Armitage & Conner, 2000; 2001). The present study identified two potential sources of subjective norms: (1) perceived expectations of coworkers and (2) perceived expectations of those outside the workplace (namely, doctors and family members). Separating these potential sources of subjective norms highlighted the importance of external social influence on employee safety behaviours. Previous studies have found support for family support on safety behaviours in the workplace (De Vris & Lechner, 2000; Westaby & Lowe, 2005). Furthermore, the present study challenges the conclusions of previous findings that the subjective norm component

is not as useful as the attitude and PBC components for assessing behavioural outcomes (e.g., Ajzen, 1991; Armitage & Conner, 2000; 2001). Further scrutiny is required.

Chapter 9

Conclusions

Conclusions

Introduction

The fibreglass boat-building (FBB) industry is embedded within a precarious and ever changing global market. Many small businesses, such as FBB plants, operating in rural NL are essential for the economic well-being of communities and the individuals residing within them. Like many industrial work environments, there may be significant health effects. The negative health effects associated with occupational hazards in these environments can largely be controlled through adherence to safety policies and procedures. However, simply asking employees to abide by safety policies and procedures may not have the desired effect. Indeed, as was learned in the present investigation, the factors affecting employee safety behaviours are diverse and complex.

The following brief discussion will address the challenges and limitations of this study and applied research in general. In addition, the applied and theoretical significance of this study will be discussed along with suggestions for future research.

Challenges and Limitations

Study 1. The applied nature of the study created numerous challenges, one of the greatest being FBB employee recruitment. The intended method of data collection for Study 1 was focus group sessions with employees. It was only after numerous unsuccessful attempts to recruit employees for focus group sessions that a community approach was adopted. Fortunately for the study, this approach proved to have an added benefit. As a result of collecting information from *both* the people working within the

FBB industry (i.e., employees and managers) and those living in the associated communities, factors emerged that had not initially been identified by the investigator or in the literature (e.g., literacy concerns, importance of the industry to the community, community status).

While the community approach resulted in rich qualitative data, there are nonetheless limitations to this approach that affect the extent to which generalizations about the findings can be made. As is typically the case with qualitative research, data collection was reliant on participant willingness to speak about their situations. Consequently, one must be cognizant that the interview data represent a sample of the beliefs and opinions of those living within three communities who were willing to be interviewed and that these beliefs and opinions may not generalize to other residents.

Further, when communities were visited, it was very difficult to gain access to employees for interview purposes. It was clear that those working in the industry were extremely wary of our presence at their worksite, as many thought we were affiliated with Government Services OHS inspectors. It was evident from the beginning of data collection that the topic of safety behaviours was a very sensitive issue for those directly involved in this industry. Nonetheless, all the managers agreed to participate in the study when they were assured that the study was not being conducted for Government Services OHS, but was part of a student's academic program. Even so, employees were still very difficult to access as managers did not want to get involved with soliciting employees to participate. Two of the managers suggested that the employees were too busy to take part in the study. Hence, making initial contact with employees was extremely difficult and,

unfortunately, contact with employees was never established in Community C. As a result of these challenges, employees from all three communities were not represented in Study 1, leaving the question open as to whether there may have been information unique to Community C that was not included. In all, comments made by employees in Study 1 were based on only three employee interviews. While their comments were critical to informing survey development and the interpretation of survey findings, responses from such a small number cannot with any confidence be considered to be representative of responses of FBB employees in the province.

Study 2. Among the variety of challenges raised by Study 2 was finding a balance between creating a survey instrument that could be completed within a reasonable amount of time, yet ensuring coverage of relevant topics. It is true that lengthy surveys may be subject to participant boredom and/or fatigue. However, given the exploratory nature of this investigation, numerous survey items were included, particularly for managers and employees, in an attempt to gain as much information as possible about the circumstances surrounding the safety behaviours of those working in this industry. The subsequent refinement of the employee survey resulted in a significantly reduced number of survey items and thus a more efficient instrument with potential applications for future research related to employee safety behaviour. For example, with minor wording changes, this instrument could be used for exploring employee safety behaviour in other high risk industries such as logging, mining, fishing industries, and so on.

A second challenge of this study was a rather limited sampling frame, or the relatively small number of participants in each interest group *available* to complete the survey. With such a limited pool of potential respondents, it was imperative that everything within reason be done to ensure the highest respondent rate possible. Based on the poor employee response to mail-out packages when attempting to organize focus groups, it was thought that the highest response rate from managers and employees would be obtained by visiting each of the worksites to hand-deliver the surveys and collect them the following day. Surveys were also hand-delivered to Health Care Providers in each of the communities with FBB plants; however they were given stamped envelopes in which to return completed surveys. The FBB plants in Newfoundland that were in operation at the time of Study 2 data collection were in 14 communities scattered across the province (Figure 5.1 in Chapter 5 shows the general locations visited). The trips were completed within a very short time period (October - December 2006) in an attempt to avoid challenging weather conditions while traveling.

During preliminary stages of the study (e.g., idea development, proposal writing, and ethics approval), information provided by various sources (i.e., OHS inspectors, existing business databases) indicated that there were approximately 30 FBB plants on the island portion of the province. It was anticipated that with 30 FBB plants there would be sufficient numbers of managers and employees to complete the intended analyses (i.e., PCA and multiple regression analyses of both manager and employee surveys). However, when it came time to collect data for Study 2, only 14 FBB plants were in operation. Some operations were permanently closed, while others were shut down for an

undetermined time period. Consequently, only 14 potential managers and 54 potential employees were available to complete the surveys. While the response rates for each group were acceptable (9 and 43 completed surveys, respectively), the small sample sizes affected the intended analysis of the manager survey (i.e., Principal Components Analysis of the survey instrument and regression analyses of the data) and required that stringent criteria be adopted for analyzing and interpreting the employee survey findings. Additionally, the multiple regression analyses applied to the employee survey data must be interpreted with caution.

With respect to the health care providers, only 14 out of 54 surveys were returned (26% response rate) suggesting that the resulting sample may not be representative of the population. Due to the small sample size, the HCP survey could not be included in PCA for measurement refinement. Of the 14 returned surveys only one family doctor completed the survey; the remaining surveys were completed by nurses, nurse practitioners, and licensed practical nurses. This is problematic in that the questions in the employee and manager surveys referred to their doctor (e.g., "My doctor has talked to me about the health effects of styrene', 'My doctor constantly reminds me to wear safety equipment at work', and 'My doctor encourages me to use safety equipment at work'). The goal was to compare the responses of employees/managers to these items with those on the HCP survey to determine if there was agreement amongst these groups with regard to the extent of communication between workers and HCP about workplace health and safety (additionally, the intention was to refine the measurement using PCA). However, the low response rate from doctors made this impossible. In hindsight, additional

questions worded with respect to other healthcare professionals should have been included. That being said, in many rural communities the nursing professionals servicing these locations often see patients more frequently than the physicians, as the physician is often practicing in several communities. It is clear that the relationship between primary health care providers and employees needs to be explored in further detail. Future attempts to explore this relationship should ensure that wording on subsequent surveys be changed to refer to any contact with health care providers.

The OHS inspector group was also very small to begin with. At the time of data collection, seven OHS inspectors who were responsible for the inspection of boat-building plants in the province were working with Government Services. Despite several attempts at participant recruitment, only four surveys were completed and returned. Consequently, statistical analysis on these surveys was not performed.

No conclusions can be drawn about the psychometric properties of the manager, OHS inspector, and HCP surveys as small sample sizes prevented the refinement of these instruments. The inability to conduct the intended statistical analyses with the survey data provided by these groups does not mean that the data collected are useless. These data may be considered pilot testing of the surveys. It is possible that these surveys can be further explored (with minor wording changes) by using them to assess the cognitive, social, and cultural factors affecting safety behaviours (and related determinants of behaviour and background factors) of those associated with high risk occupations such as forestry, mining, fish harvesting, offshore oil industries, and so on. Of course this is also

together with noise annoyance had explained 48% of the variance in HPD use. Self-efficacy was the most powerful single predictor of HPD use, accounting for 42% of the variance in outcome.

Melamed et al. also used the components of the PMT (along with noise annoyance) to assess differences between non-HPD users, occasional HPD users, and regular HPD users. Compared to regular users of HPD, non-HPD users had lower perceived susceptibility to hearing loss, considered the loss to have less severe consequences, considered the HPD low in effectiveness for preventing hearing loss, perceived greater barriers to HPD use, and perceived lower efficacy in using HPDs continuously. Non-HPD users perceived less pressure from coworkers and management to wear HPD than did regular HPD users. Similar findings were also observed between occasional HPD users and non-HPD users. Melamed et al. contend that these findings emphasize the role of perceived self-efficacy in interventions aimed at encouraging workers to use HPDs.

Despite encouraging findings, criticisms have emerged regarding the utility of the PMT to predict behaviour. Based on a recent review of the behaviour change literature, the PMT has been shown to lack predictive power for behavioural outcomes (Armitage & Conner, 2000; Milne, Sheeran & Orbell, 2000). Further, this model, like the HBM, does not provide any explanation of the development of existing perceptions of risk or existing attitudes.

Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA), along with its recent extension Theory of Planned Behaviour (TPB; Ajzen, 1988), has been credited as

true of the employee survey data. Assessing the application of these surveys will be included in future research.

Lessons Learned: The Importance of a Dual Method Approach

The significance of approaching the issue of employee safety behaviours in the FBB industry using both qualitative and quantitative methods must not be overlooked. Using purely qualitative or quantitative methods for this study would have been very risky as neither method alone could have provided the information necessary to understand the behaviours of employees in this industry. The qualitative data were essential for providing insight into the issues surrounding those working in the FBB industry. For example, attachment to one's community, beliefs about the future (e.g., the community, the FBB industry, and individual well-being), and the importance of such industries for rural NL were all highlighted through the participant interviews. It was through such an approach that the association of broader community level issues with an individual's willingness to comply with safety behaviours could be seen. The quantitative data validated the findings of Study 1 and highlighted additional factors affecting employee safety behaviours and the proximal determinants of behaviour. In addition, given the sensitive nature of the study, the quantitative approach resulted in a larger response rate from employees than Study 1. It appears that given the confidential and anonymous nature of the survey employees were more willing to express their beliefs and opinions.

This study also demonstrates the usefulness of the dual method approach for instrument development. To create an instrument relevant to the population of interest it was critical to interact with individuals associated with the industry in the initial stages so that the investigator could be reasonably assured that the issues that were important to this population were considered and to consider the lived experiences of the population of interest. This strategy, along with exploring the extant research in the area, contributed to a greater understanding of the issues surrounding those individuals associated with the FBB industry, employees in particular.

Finally, due to the relatively limited employee sample, one might argue that the PCA and multiple regression analyses were perhaps not the most appropriate statistical measures to take with this sample and descriptive statistics may have been more appropriate. However, such an approach would not have provided the same insight with respect to instrument development or the resultant associations between variables in the multiple regression models. As previously discussed, the investigator applied stringent criteria in the use of the PCA and multiple regression analyses and proceeded with the intended analyses. Indeed, future research of this kind will need to be cognizant of the potential changes to an industry that may create challenges for data collection and analyses.

Applied Significance of the Present Findings

From an applied perspective, this study highlights the importance of understanding the factors affecting employee safety behaviour as the findings may inform

health promotion and education campaigns. For example, Study 2 revealed the importance of external social influence (i.e., family and doctors) as it relates to employee safety behaviour. Those employees who believed that their families and doctors were concerned about styrene exposure in their workplace were more likely to report compliance with safety behaviours. Safety promotion activities may therefore be more effective if one includes education regarding the health effects of styrene exposure for family doctors and health care providers.

Both interviews with employees and the employee survey data suggest that the majority of employees working in the FBB industry in NL believe there are health risks associated with styrene exposure even though their knowledge about the health effects of styrene may be insufficient. Consequently, it appears that the notion that employees do not perceive the risks in their workplace and, therefore, do not use safety equipment is not entirely correct. It appears that the extent to which employees perceive risks in their work environment and engage in safety related behaviours may be affected by *other factors*. For example, as demonstrated by this study, employee perceptions about management's response to safety issues and commitment to employee safety, employee's affective reactions to the threat of styrene exposure, and employee community attachment all have either a direct or an indirect effect on employee perceptions of risks. Consequently, this study has demonstrated the importance of understanding the cognitive and social factors affecting perceptions of risks. Doing so also has implications for education and safety campaigns. For example, it appears that creating a positive safety climate is essential for heightened awareness of health risks. This may require training

programs to focus on enhancing the communication between employees and managers so that managers are aware of the concerns of employees and employees feel that they have a commitment from managers to effectively respond to safety concerns.

Results from the current study also suggest that employees are less likely to report feeling anxious about styrene exposure when they report being attached to their community and this has consequences for how they negotiate their feelings about risks in their workplace. Ostensibly, it appears that nothing can be done about such a circumstance; it is hard to argue that the feelings employees have about their community is an appropriate target for OHS. However, it may be the case that education programs that focus on the rights of employees with respect to health and safety may attenuate the effects of this relationship. When employees feel that they have the ability to exercise their rights concerning health and safety in the workplace, something that might be termed "employee efficacy", they may be more likely to do so. Increased awareness of their options may empower those who feel that they have to make a choice between keeping their job (and staying in their community) and voicing their concerns about their workplace. Although OHS education and training programs cover this material with employees, it may be the case that such initiatives need to be carried out more frequently especially for workers in rural NL.

Study 1 raised the issue of low literacy level and the impact this may have on the health and safety of employees. It was suggested that poor literacy skills may affect the extent to which employees will read the Material Safety Data Sheets which provide valuable information regarding the safe handling of hazardous chemicals. The prevalence

of low literacy among workers is not known. Given that the issue emerged based on a statement made by only one participant, generalizations or assumptions cannot be made. However, Statistics Canada (2003) recently assessed proficiencies in literacy, numeracy and problem solving of the Canadian population using the International Adult Literacy and Skills Survey. The data suggest that the average proficiency scores of adults 16 and older in Newfoundland and Labrador (along with New Brunswick and Nunavut) is lower than the Canadian average on all three dimensions. With approximately 50 – 61% of the population between 16 and 65 years of age scoring at a level 1 or level 2 proficiency (out of a possible level 5, the highest proficiency level), it is suggested that a significant portion of this population may have difficulties reaching their full economic and social potential (Statistics Canada, 2003). This issue requires further consideration as literacy levels obviously impact the delivery of education, training, and awareness programs.

Theoretical Significance of the Present Findings

The dual method approach used in this thesis to explore employee safety issues in the FBB industry has contributed to the theoretical advancement of social psychology in general and to the Theory of Planned Behaviour (TPB) in particular. The qualitative data revealed the importance of community well-being, attachment to community, and social bonds for those living in these communities. The importance of the broader social environment was further validated by the survey data. Previous theory development has not included such broad social-cognitive components thereby leaving a void in the TPB.

In this study, the extent to which employees felt attached to their community was associated with employee satisfaction with the workplace and affective reactions to risks.

The inclusion of community related variables, safety climate, knowledge about the health effects of styrene, perceived image risk, and length of employee tenure as part of the TPB provided insight into understanding the factors affecting the proposed determinants of behaviour. These 'background' or 'distal' factors offer some insight as to why only one of a potential six determinants of behaviour significantly predicted safety behaviour. This study has shown that exploring the factors contributing to the development of attitudes, subjective norms, beliefs about behavioural control, perceptions of risk and affective reactions to risk is extremely important with respect to understanding the factors affecting behavioural outcomes.

This study also substantiated the need to reconceptualise the subjective norm component of the TPB to address various types of social influence. Social influence in the workplace and social influence outside of the workplace have a background factor in common (length of employee tenure). Even so, it appears that these two sources of social influence may have different effects on behaviour. In the present study, external social influence was the sole significant predictor of employee safety compliance.

In addition to providing support for reconceptualising the subjective norm component of the TPB, this finding also underscores the importance of social influence beyond the immediate work environment. That is, it appears that the reference group that an individual may refer to when trying to determine the norms associated with appropriate behaviour may not only be the physically present group (i.e., coworkers in

the workplace), it may also include significant others not physically present in the workplace (e.g., family members/family physician). It also seems that the extent to which a particular group can affect employee safety behaviour may be associated with the length of employee tenure. The relationship between employee tenure and social influence (i.e., subjective norms) emphasizes the importance of social relationships on behaviour and the factors informing behaviour. This relationship requires further exploration.

It is also important to note that social psychology, as previously discussed, has been criticized for its heavy fixation on individual cognitive processes and relative neglect of the social and cultural origins of psychological concepts such as those proposed by the TPB (e.g., attitudes, PBC, and subjective norms). This study highlights the importance of exploring social and cultural factors, such as community attachment and community challenges, for providing insight into behaviour and those factors informing behaviour, thereby contributing to the contention that social psychology needs to expand its focus to include broader social factors when attempting to comprehend or anticipate behavioural outcomes.

The factors affecting employee safety behaviour in the NL fibreglass boat-building industry are complex, intricately woven together with individual, social, and cultural circumstances. Small businesses are critical to the well-being and success of rural communities in terms of economic growth and population stability. Safety in the workplace is a sensitive issue for both employees and managers. Simply asking employees why they are not using safety equipment may not contribute to greater

understanding of their behaviour, as there are often reasons for actions that people are not immediately aware of and cannot articulate. Going beyond the immediate work environment and asking questions about the broader social environment has enhanced our understanding of the issues and dilemmas faced by workers. This study contributes to our understanding of health and safety behaviours in hazardous work environments; yet a plethora of work remains to be done. In addition to the suggestions for future research identified above, several notable relationships require more exploration. For example, a clearer understanding of the relationship between managers and employees, particularly with respect to their beliefs about OHS and perceptions of risk at work, is essential. In addition, the extent to which health care providers and employees communicate about OHS in the workplace remains unknown. Also unknown is the extent to which family physicians or primary health care providers are aware of occupational illnesses such as those related to styrene exposure.

To conclude, it appears that cognitive, social and cultural factors are related to employee attitudes, perceived norms, perceptions of control, perceptions of risks, emotional reactions to risks, and the safety behaviours of employees in the NL fibreglass boat-building industry. It is likely these factors affect employees in many other risky industries in rural areas as well. This study has enhanced our understanding of a very complicated issue. The fibreglass boat-building industry can be a hazardous industry, yet it is an industry vital to many rural communities in the province.

The qualitative – quantitative approach used in this study was essential for enhancing our understanding of a "real world" problem. As a consequence of this

methodology, this study has provided insight into employee safety not only by replicating findings of previous work, but by revealing novel areas of interest requiring further exploration. This enquiry into employee safety behaviour contributes to the advancement of theoretical and applied perspectives in the areas of social psychology, community and occupational health and other related fields.

References

Albarracin, D., Johnson, B., & Zanna, M. (2005). *The handbook of attitudes.* Mahwah, NJ: Lawrence Erlbaum

Arcury, T., Quandt, S., Cravey, A., Elmore, R., & Russell, G. (2001). Farmworker reports of pesticide safety and sanitation in the work environment. *American Journal of Industrial Medicine, 39,* 487-498.

Arcury, T., Quandt, S., & Russell, G. (2002). Pesticide safety among farmworkers: Perceived risk and perceived control as factors reflecting environmental justice. *Environmental Health Perspectives, 110,* 233-240.

Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In J. Kuhl & J. Beckman (Eds.), *Action control: From cognition to behaviour* (pp. 11 – 39). New York: Springer-Verlag.

Ajzen, I. (1987). Attitudes, traits, and actions: Dispositional prediction of behavior in personality and social psychology. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (v.20, pp.1 – 63). Boston, MA: Academic Press.

Ajzen, I. (1988). *Attitudes, personality and behaviour.* Milton Keynes, UK: Open University press.

Ajzen, I. (1991). The theory of planned behaviors. *Organizational Behavior & Human Decision Processes. Special Issue: Theories of cognitive self-regulation, 50,* 179-211.

Armitage, C., & Conner, M. (1999). Distinguishing perceptions of control form self-efficacy: predicting consumption of a low-fat diet using the theory of planned behavior. *Journal of Applied Social Psychology, 29,* 72-90.

Armitage, C., & Conner, M. (2000). Social cognition models and health behaviour: A structured review. *Psychology and Health, 15,* 173-189.

Armitage, C., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology, 40,* 471 – 499.

Asch, S.E. (1956). Studies of independence and conformity: A minority of one against a unanimous majority. *Psychological Monographs, 70,* pp.9.

ATSDR, *Toxicological Profile for Styrene;* U.S. Public Health Service, Division of toxicology, Agency for Toxic Substances and Disease Registry: Atlanta, GA, 1992.

being one of the best theories for predicting people's behaviour as a function of their attitudes. The TRA, a social-cognitive model of behaviour change based on expectancy-value theory, proposed by Fishbein and Ajzen (1975) suggests that the proximal determinant of behaviour is the intention to conduct the behaviour. The proximal determinants of intention are attitudes (positive or negative evaluation of the behaviour) and subjective norms (global social influence) (Armitage & Conner, 2000). According to Fishbein and Ajzen (1975), attitudes toward the behaviour and subjective norms have an additive effect on behavioural intentions. Attitudes are a function of the actor's beliefs and values, while the subjective norms are the actor's beliefs concerning the importance others place on the actor's engagement in the behaviour. Compared to other motivational models of behaviour prediction such as the HBM, the TRA/TPB emphasizes a normative component (i.e., subjective norms) to the attitude-behaviour relationship (Dejoy, 1996), providing a social account of normative influence on behaviour (Salovey, Rothman, & Rodin, 1998).

As another defining characteristic, the Fishbein and Ajzen (1975) model emphasized the role of behavioural intention in mediating the effects of attitudes on behaviour, suggesting the behaviour in question is restricted to volitional behaviours (Eagly & Chaiken, 1993). Ajzen (1985) extended the theory to include those behaviours that are not wholly under the individual's control. Ajzen (1985) argued that an important aspect of intending to perform a behaviour was the amount of control individuals believed they had over performing the behaviour (perceived behavioural control or PBC), a component similar to the self-efficacy component of the HBM and the PMT. The

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice Hall.

Barling, J., Loughlin, C., & Kelloway, E. (2002). Developing and testing a model of safety specific transformational leadership and occupational safety. *Journal of Applied Psychology, 87,* 488-496.

Barrett, J., Haslam, R., Lee, K., & Ellis, M. (2005). Assessing attitudes and beliefs using the stage of change paradigm – case study of health and safety appraisal within a manufacturing company. *International Journal of Industrial Ergonomics, 35,* 871-887.

Bellrose, C., & Pilisuk, M. (1991). Vocational risk tolerance and perceptions of occupational hazards. *Basic and Applied Social Psychology, 12,* 303-323.

Billig, M. (2006). Is my home my castle? Place attachment, risk perception and religious faith. *Environment and Behavior, 38,* 248-265.

Brace, N., Kemp, R. and Snelgar, R. (2003). *SPSS for Psychologists: A Guide to Data Analysis using SPSS for Windows, 2nd edition.* Mawah, NJ: Lawrence Erlbaum.

Breslin, C., & Mustard, C. (2003). Factors influencing the impact of unemployment on mental health among young and older adults in a longitudinal, population-based survey. *Scandinavian Journal of Work, Environment and Health, 29,* 9-14.

Brodsky, A. (1996). Resilient single mothers in risky neighbourhoods: Negative psychological sense of community. *Journal of Community Psychology, 24,* 347-363.

Brodsky, A., O'Campo, P., & Aronson, R. (1999). PSOC in community context: Multi-level correlates of a measure of psychological sense of community in low-income, urban neighbourhoods. *Journal of Community Psychology, 27,* 659-679.

Burholt, V. (2006). 'Adref': Theoretical contexts of attachment to place for mature and older people in rural North Wales. *Environment and Planning, 38,* 1095-1114.

Burholt, V., & Naylor, D. (2005). The relationship between rural community type and attachment to place of older people living in North Wales, UK. *European Journal of Aging, 2,* 109-119.

Campagna, D., Mergler, D., Huel, G., Belanger, S.; Truchon, G., Ostiguy, C.; Drolet, D. (1995). Visual dysfunction among styrene-exposed workers. *Scandinavian Journal of Work Environmental and Health, 21,* 382-391.

Castillo, L., Baldwin, M., Sassine, M., Mergler, D., (2001). Cumulative exposure to styrene and visual functions. *American Journal of Industrial Medicine, 39,* 351-361.

Chavis, D., Hogge, J., McMillan, D. & Wandersman, A. (1986). Sense of community through Brunswik's lens: A first look. *Journal of Community Psychology, 14,* 24-40.

Cheung, C. & Chan, C. (2000). Learning to work safely with reference to a social-cognitive model. *Social Behavior and Personality, 28,* 293-308.

Cheyne, A., Oliver, A., Tomas, J.M., & Cox, S. (2002). The architecture of employee attitudes to safety in the manufacturing sector. *Personnel Review, 31,* 649-670.

Chipuer, D., & Pretty, G. (1999a). Sense of community: Advances in measurement and application. *Journal of Community Psychology, 27,* 635-642.

Chipuer, H., & Pretty, G. (1999b). A review of the Sense of Community Index: Current uses, factor structure, reliability, and further development. *Journal of Community Psychology, 27,* 643-658.

Cialdini, R. & Trost, M. (1998). Social influence: Social norms, conformity, and compliance. In D. T. Gilbert, S. T. Fiske, & G. Linzey (Eds.), *The Handbook of Social Psychology* (4th ed.), (vol.2, pp. 151 – 192). Boston, MA: McGraw-Hill Companies, Inc.

Conner, M., & Abraham, C. (2001). Conscientiousness and the theory of planned behavior: Toward a more complete model of the antecedents of intentions and behavior. *Personality and Social Psychology Bulletin, 27,* 1547-1561.

Cox, S., & Cheyne, A., (2000). Assessing safety culture in offshore environments. *Safety Science, 34,* 1-3.

Cox, S., & Cox, T. (1991). The structure of employee attitudes to safety: A European example. *Work and Stress, 5,* 93-106.

Cox, S. & Flin, R. (1998). Safety culture: Philosopher's stone or man of straw? *Work and Stress, 12,* 189-201.

Cree, T. & Kelloway, K. (1997). Responses to occupational hazards: Exit and participation. *Journal of Occupational Health Psychology, 2,* 304-311.

Dake, K. (1991). Orienting dispositions in the perception of risk: An analysis of contemporary worldviews and cultural biases. *Journal of Cross-Cultural Psychology, 22,* 61-82.

DeJoy, D. (1996). Theoretical models of health behaviour and workplace self-protective behaviour. *Journal of Safety Research, 27,* 61-72.l

DeJoy, D. (1989). The optimism bias and traffic accident risk perception. *Accident Analysis and Prevention, 21,* 333-340.

DeVris, H & Lechner, L. (2000). Motives for protective behavior against carcinogenic substances in the workplace: A pilot study among Dutch workers. *Journal of Occupational and Environmental Medicine, 42,* p. 88.

Dewey, M. E. (1983). Coefficients of agreement. *British Journal of Psychiatry, 143,* 487-489.

Dolan, A. H., Taylor, M., Neis ,B., Eyles, J., Ommer, R., Schneider, D. C., Montevecchi,W. (2005). Restructuring and health in Canadian coastal communities: A social-ecological framework of restructuring and health. *Eco-Health, 2,* 1-14.

Donald, I., & Canter, D. (1994). Employee attitudes and safety in the chemical industry. *Journal of Loss Prevention in the Process Industry, 7,* 203-208.

Dooley, D. (2003). Unemployment, underemployment, and mental health: Conceptualizing employment status as a continuum. *American Journal of Community Psychology, 32,* 9-20.

Dooley, D., Fielding, J., & Levi, L. (1996). Health and unemployment. *Annual Review of Public Health, 17,* 449-465.

Douglas, M. (1985). *Risk acceptability according to the social sciences.* New York: Russell Sage Foundation.

Douglas, M., & Wildavsky, A. (1982). *Risk and culture: An essay on selection of technological and environmental dangers.* Berkeley: California University Press.

Eagly, A., & Chaiken, S (1993). *The psychology of attitudes.* Fort Worth, TX: Harcourt Brace Jovanovich.

Eakin, J. (1992) Leaving it up to the workers: sociological perspectives on the management of health and safety in small workplaces. *International Journal of Health Services, 22,* 689–704.

Eiser, R. (2001). Attitudes, decisions and perceptions of risk: A social psychological analysis. In G. Boehm & J. Nerb (Eds.), *Environmental risks: Perception, evaluation and management. Research in social problems and public policy, vol. 9* (pp. 109-135). US: Elsevier Science/JAI Press.

Elmore, R. & Arcury, T. (2001). Pesticide exposure beliefs among Latino farmworkers in North Carolina's Christmas tree industry. *American Journal of Industrial Medicine, 40,* 601-609.

Fekadu, Z., & Kraft, P. (2002). Expanding the theory of planned behavior: The role of social norms and group identification. *Journal of Health Psychology, 7,* 33 – 43.

Ferguson, E., & Cox, T. (1993). Exploratory factor analysis: A users' guide. *International Journal of Selection and Assessment, 1,* 84-94.

Finucane, M., Alhakami, A., Slovic, P., & Johnson, S. (2000). The affect heuristic in judgements of risks and benefits. *Journal of Behavioral Decision Making, Vol 13*(1), 1-17.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behaviour: An introduction to theory and research.* Reading, MA: Addison-Wesley.

Fishbein, M., Triandis, H. C., Kanfer, F. H., Becker, M. H., Middlestadt, S. E., & Eichler, A. (2001). Factors influencing behaviour and behaviour change. In A. Baum, T. Revenson, & J. Singer (Eds.), *Handbook of health psychology,* (109-135). Hillside, NJ: Lawrence Erlbaum.

Fischhoff, B. (1994). Acceptable risk: A conceptual proposal. *Risk: Health, Safety & Environment, 1,* 1-28.

Fischhoff, B., Slovic, P., Lichtenstein, S., Read, S., & Coombs, B. (1978). How safe is safe enough? A psychometric study of attitudes toward technological risks and benefits. *Policy Sciences, 8,* 127-152.

Flodin U, Ekberg K, Anderson L (1989). Neuropsychiatric effects of low exposure to styrene. *British Journal Industrial Medicine, 46,* 805-808.

Flynn, J., Slovic, P., & Mertz, C. (1994). Gender, race, and perception of environmental health risks. *Risk Analysis, 14,* 1101-1108.

Fogarty, G., & Shaw, A. (2003). Safety climate and the Theory of Planned Behaviour: Towards the prediction of unsafe behaviour. *Proceedings of the 5th Australian Industrial and Organizational Psychology Conference, 26-29 June, Melbourne,*

Australia.

Fowler, F. (1993). Designing and evaluating survey questionnaires. In F. J. Fowler, Jr. (Ed.), *Survey Research Methods (2nd Ed)* (pp. 94-104). Newbury Park, CA: Sage Publications, Inc.

Fowler, K. (2007). School life and community economic challenge: A Newfoundland case study. *Canadian Journal of Education, 30,* 239-268.

Fraser, C. (1994). Attitudes, social representations and widespread beliefs. *Papers in Social Representations, 3,* 13-25.

Garcia, K., & Mann, T. (2003). From I wish to I will: Social-cognitive predictors of behavioral intentions. *Journal of Health Psychology, 8,* 347 – 360.

Gergen, K. J. (1973). Social psychology as history. *Journal of Personality and Social Psychology, 26,* 309-320.

Glendon, A. I., & Stanton, N. A. (2000). Perspectives on safety culture. *Safety Science, 34,* 193-214.

Griffin, M., & Neal., A. (2000). Perceptions of safety at work: A framework for linking safety climate to safety performance, knowledge, and motivation. *Journal of Occupational Health Psychology, 5,* 347-358.

Guldenmund, F. (2000). The nature of safety culture: A review of theory and research. *Safety Science, 34,* 215-257.

Hagger, M. S., Chatzisarantis, N., & Biddle, S. (2001). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport & Exercise Psychology, 24,* 3-32

Hair, J., Tatham, R., Anderson, R., & Black, W. (1998). *Multivariate Data Analysis (5th ed).* Upper Saddle, NJ: Prentice Hall.

Harvey, J., Bolam, H., Gregory, D., & Erdos, G. (2001). The effectiveness of training to change safety culture and attitudes within a highly regulated environment. *Personnel Review, 30,* 615-636.

Hidalgo, M. C., & Hernandez, B. (2001). Place attachment: conceptual and empirical questions. *Journal of Environmental Psychology, 21,* 273-281.

Howarth, C. (2006). How social representations of attitudes have informed attitude theories: The consensual and the reified. *Theory and Psychology, 16,* 691-714.

Howse, D., Gautrin, D., Neis, B. Cartier, A., Horth-Susin, L., Jong, M., & Swanson M. (2006). Gender and snow crab occupational asthma in Newfoundland and Labrador, Canada. *Environmental Research, 101,* 163-174.

Irwin, A., Simmons, P., & Walker, G. (1999). Faulty environments and risk reasoning: The local understanding of industrial hazards. *Environment and Planning, 31,* 1331-1326.

Janz, N., & Becker, M. H. (1984). The health belief model: A decade later. *Health Education Quarterly, 11,* 1–47.

Joffé, H. (2003). Risk: From perception to social representation. *British Journal of Social Psychology, 42,* 55-73.

Joffé, H. (1996). Social representations of AIDS: A social representational approach. *British Journal of Medical Psychology, 69,* 169-190.

Johnston, K., & White, K. (2003). Binge-drinking: A test of the role of group norms in the theory of planned behavior. *Psychology and Health, 18,* 63 – 77.

Julien, D., Mergler, D., Baldwin, M., Sassine, M., Cormier, N., Chartrand, E., & Belanger, S. (2000). Beyond the workplace: An exploratory study of the impact of workplace exposure on marital relations. *American Journal of Industrial Medicine, 37,* 316-323.

Katz, A., & Mishler, E. (2003). Close encounters: Exemplars of process-oriented qualitative research in health care. *Qualitative Research, 3,* 35-56.

Kasperson, R. (1992). The social amplification of risk: Progress in developing an integrative framework. In S. Krimsky & D. Golding (Eds.), *Social theories of risk* (pp. 157-178). Westport, CT: Praeger.

Kasperson, R., Renn, O., Slovic, P., Brown, H., Emel, J., Goble, R., Kasperson, J., & Ratick, S. (1988). The social amplification of risk: A conceptual framework. *Risk Analysis, 8,* 177-187.

Kelley, H. H., & Shapiro, M., M. (1954). An experiment on conformity to group norms where conformity is detrimental to group achievement. *American Sociological Review, 19,* 667 – 677.

Kerlinger, F., & Lee, H. (2000). *Foundations of behavioral research (4th ed).* New York: Harcourt College Publishers.

Kovacs, D., Fischhoff, B., & Small, M. (2001). Perceptions of PCE use by dry cleaners and dry cleaning customers. *Journal of Risk Research, 4,* 353-375.

Kraus, N., Malmfors, T. & Slovic, P. (1992). Intuitive toxicology: Expert and lay judgments of chemical risks. *Risk Analysis, 12,* 215-232.

Kunda, Z. (1999). Hot cognition: The impact of motivation and affect on judgement. In *Social cognition: Making sense of people,* pp.211-264. Cambridge, MA: MIT Press.

Lavis, J., Mustard, C., Payne, J., & Farrant, M. (2001). Work related population health indicators. *Canadian Journal of Public Health, 92,* 72-78.

Lee, T. (1996). Perceptions, attitudes, and behaviour: The vital elements of safety culture. *Health and Safety, October,* 1-15.

Lincoln, Y., & Denzin, N. (1994). The fifth moment. In N. Denzin & Y. Lincoln (Eds), *The handbook of qualitative research.* Thousand Oaks: Sage Publications.

Lingard, H., & Yesilyurt, Z. (2003). The effect of attitudes on the occupational safety actions of Australian construction workers: The results of a field study. *Journal of Construction Research, 4,* 59-69.

Lombard, M., Snyder-Duch, J., Campanella Bracken, C. (2002). Content analysis in mass communication: Assessment and reporting of intercoder reliability. *Human Communication Research, 28,* 587–604.

Lupton, D. (1999). *Risk.* London: Routledge.

MacGregor, D., Slovic, P. & Malmfors, T. (1999). How exposed is exposed enough? Lay inferences about chemical exposure. *Risk Analysis, 19,* 649-659.

Madden, T., Ellen, P., & Ajzen, I. (1992). A comparison of the theory of planned behavior and the theory of reasoned action. *Personality and Social Psychology Bulletin, 18,* 3-9.

Mantler, J., Matejicek, A., Matheson, K., & Anisman, H. (2005). Coping with employment uncertainty: A comparison of employed and unemployed workers. *Journal of Occupational Health Psychology, 10,* 200-209.

Marris, C., Langford, I., & O'Riordan, T. (1998). A quantitative test of the cultural theory of risk perceptions: Comparison with the psychometric paradigm. *Risk Analysis, 18,* 635-647.

Masuda, J., & Garvin, T. (2006). Place, culture, and the social amplification of risk. *Risk Analysis, 26,* 437-454.

Mayhew, C. (1997). Small business OHS information provision. *Journal of Occupational Health and Safety, 13,* 361-373.

Mayhew, C. (2002). OHS challenges in Australian small businesses: Old problems and emerging risks. *Safety Science, 6,* 26-37.

Mayhew, C., & Quinlan, M. (1997). Subcontracting and OHS in the residential building sector. *Industrial Relations Journal, 28,* 192-205.

Mayhew, C., & Quinlan, M. (2001). The effects of changing patterns of employment on reporting occupational injuries and making worker' compensation claims. *Safety Science, 5,* 1-12.

Mays, N., & Pope, C. (1995). Qualitative research: Rigour and qualitative research. *British Medical Journal, 311,* 109-112.

McMillan, D. & Chavis, D. (1986). Sense of community: A definition and theory. *Journal of Community Psychology, 14,* 6-23.

Mearns, K., Flin, R., Gordon, R., & Fleming, M. (1998). Measuring safety climate on offshore installations. *Work and Stress, 12,* 238-254.

Mearns, K., Rundmo, T., Flin, R., Gordon, R., & Fleming, M. (2004). Evaluation of psychosocial and organizational factors in offshore safety: A comparative study. *Journal of Risk Research, 7,* 545-561.

Melamed, S., Rabinowitz, S., Feiner, M., Weisberg, E., & Ribak, J. (1996). Usefulness of the protection motivation theory in explaining hearing protection device use among male industrial workers. *Health Psychology, 15,* 209-215.

Mertz, C.K., Slovic, P., & Purchase, I. F. H. (1998). Judgments of chemical risks: Comparisons among senior managers, toxicologists, and the public. *Risk Analysis, 18,* 391-404.

Milne, S., Sheeran, P., & Orbell, S. (2000). Prediction and intervention in health-related behavior: A meta-analytic review of protection motivation theory. *Journal of Applied Social Psychology, 30,* 106–143.

Moscovici, S. (1972). Theory and society in social psychology. In J. Israel & H. Tajfel (Eds.), *The context of social psychology: A critical assessment* (pp.17–68). London: Academic Press.

Moscovici, S. (1988). Notes towards a description of social representations. *European Journal of Social Psychology, 18*, 211–250.

Mustard, C., Vermeulen, M., & Lavis, J. (2003). Is position in the occupational hierarchy a determinant of decline in perceived health status? *Social Science & Medicine, 57*, 2291-2304.

Neal, A., & Griffin, M. (2003). Safety climate and safety at work. In J. Barling & M. Frone (Eds), *The psychology of workplace safety* (pp.15-34). Washington, DC: American Psychological Association.

Neal, A., Griffin, M., & Hart, P. (2000). The impact of organizational climate on safety climate and individual behaviour. *Safety Science, 34*, 99-109.

Neuman, W.L. (2006). *Social research methods: Qualitative and quantitative approaches (6th Ed)*. New York: Pearson.

Newfoundland and Labrador Statistics Agency (2001). Community accounts. Retrieved January 15th, 2004 from http://www.communityaccounts.ca.

Nunnelly, J. C. (1967). *Psychometric theory* (1st ed.). New York: McGraw Hill

Nunnelly, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw Hill.

Orbst, P., & White, K. (2004). Revisiting the Sense of Community Index: A confirmatory factor analysis. *Journal of Community Psychology, 32*, 691-705.

Orton, B., Sjoberg, L., Jung, J., Urge-Vorsatz, D., & Tamassyne-Biro, M. (2001). Risk perception by industrial radiographers: Hungary and the UK compared. *Journal of Risk Research, 4*, 17-29.

Ostrom, L., Wilhelmsen, C., & Kaplan, B. (1993). Assessing safety culture. *Nuclear Safety, 34*, 163-172.

Parker, I. (1987). 'Social representations': Social psychology's (mis)use of sociology. *Journal for the Theory of Social Behaviour, 17*, 447–469.

Parker, S., Axtell, C., & Turner, N. (2001). Designing a safer workplace: Importance of job autonomy, communication quality, and supportive supervisors. *Journal of Occupational Health Psychology, 6*, 211-228.

Pedhazur, E., & Schmelkin, L. (1991). *Measurement, design, and analysis: An integrated approach.* Hillsdale, NJ: Lawrence Erlbaum.

Peters, E., & Slovic, P. (1996). The role of affect and worldviews as orienting dispositions in the perception and acceptance of nuclear power. *Journal of Applied Social Psychology, 5,* 1427-1453.

Pidgeon, N.F. (1991). Safety culture and risk management in organizations. *Journal of Cross-Cultural Psychology, 22,* 129-140.

Pollnac, R., Poggie, J., & Cabral, S. (1998). Thresholds of danger: Perceived risk in a New England fishery. *Human Organization, 57,* 53-59.

Pooley, J., Cohen, L., & Pike, L. (2005). Can sense of community inform social capital? *The Social Science Journal, 42,* 71-79.

Power, N., Neis, B., Brennan S., & Binkley, M. (2006). Newfoundland and Labrador fish harvesters' perceptions of risk. *In SafeCatch: Final report submitted to the National SAR Secretariat New Initiatives Fund.*

Probst, T. (2002). Layoffs and tradeoffs: Production, quality and safety demands under the threat of job loss. *Journal of Occupational Health Psychology, 7,* 211-220.

Probst, T. (2004). Safety and insecurity: Exploring the moderating effect of organizational safety climate. *Journal of Occupational Health Psychology, 9,* 3-10.

Probst, T., & Brubaker, T. (2001). The effects of job insecurity on employee safety outcomes: Cross-sectional and longitudinal explorations. *Journal of Occupational Health Psychology, 6,* 139-159.

Prochaska, J., & DiClemente, C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting Psychology, 51,* 390-395.

Prochaska, J., DiClemente, C., & Norcross, J. (1992). In search of how people change: Applications to addictive behaviours. *American Psychologist, 47,* 1102 – 1114.

Prochaska, J., Norcross, J., & DiClemente, C. (1994). *Changing for good.* William Morrow & Co. Inc: New York.

Purkhardt, S.C. (1993). *Transforming social representations: A social psychology of common sense and scienc*e. London/New York: Routledge.

ensuing theory, TPB, resulted in three determinants of behavioural intention: attitude toward the behaviour, subjective norms, and PBC. PBC can also exert an independent effect on behaviour (see Figure 1.1). As Figure 1.1 suggests, these determinants of behaviour may not be mutually exclusive. For example, one's expressed attitude may include a belief about behavioural control (e.g., people should take responsibility for their safety) and consequently mediate one's own perceived behavioural control. Similarly, if one's attitude suggested that social norms were important in terms of workplace behaviours the association between attitudes and subjective norms would be plausible. For further review of the TRA and the TPB, please refer to Fishbein and Ajzen (1975), Eagly and Chaiken (1993) and/or Madden, Ellen and Ajzen (1992).

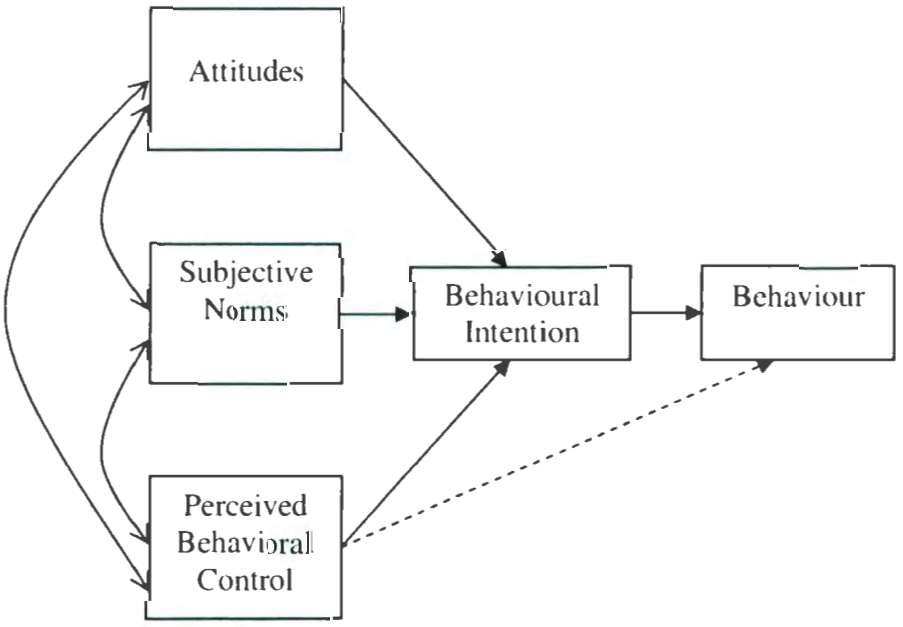

Figure 1.1 - Theory of Planned Behavior.

Quandt, S., Arcury, T., Austin, C., & Cabrera, L. (2001). Preventing occupational exposure to pesticides: Using participatory research with Latino farmworkers to develop an intervention. *Journal of Immigrant Health, 3,* 85-96.

Quandt, S., Arcury, T., Austin, C., & Saavedra, R. (1998). Farmworker and farmer perceptions of farmworker agricultural chemical exposure in North Carolina. *Human Organization, 57,* 359-368.

Quinlan, M. (1999). The implications of labour market restructuring in industrialized societies for occupational health and safety. *Economic and Industrial Democracy, 20,* 427- 460.

Quinlan, M., Mayhew, C., & Bohle, P. (2001). The global expansion of precarious employment, work disorganization, and consequences for occupational health: A review of recent research. *International Journal of Health Services, 31,* 335-414.

Rea, L. M., & Parker, R. A. (1992). Designing effective questionnaires: Basic guidelines. In L. M. Rea & R. A. Parker (Eds.), *Designing and conducting survey research: A comprehensive guide* (pp. 33-55). San Francisco, CA: Jossey-Bass Inc.

Rippl, S. (2002). Cultural theory and risk perception: A proposal for a better measurement. *Journal of Risk Research, 5,* 147–165.

Roger, R. W. (1983). Cognitive and physiological processes in fear-based attitude change: A revised theory of protection motivation. In J. Cacioppo & R. Petty (Eds.), *Social psychophysiology: A sourcebook* (pp. 153-176). New York, NY: Guilford.

Rundmo, T. (2000). Safety climate, attitudes, and risk perception in Norsk Hydro. *Safety Science, 34,* 47-59.

Rundmo, T. (1996). Associations between risk perception and safety. *Safety Science, 24,* 197-209.

Rundmo, T. (1997). Associations between risk perceptions and safety. *Safety Science, 24,* 197-209.

Rundmo, T. (1992a). Risk perception and safety on offshore petroleum platforms – Part I: Perception of risk. *Safety Science, 15,* 39-25.

Rundmo, T. (1992b). Risk perception and safety on offshore petroleum platforms – Part II: Perceived risk, jobs stress, and accidents. *Safety Science, 15,* 53-68.

Ruiter, R., Abraham, C., & Kok, G. (2001). Scary warnings and rational precautions: A review of the psychology of fear appeals. *Psychology and Health, 16,* 613-630.

Saha, A., Kulkarni, P., Chaudhuri, R., & Saiyed, H. (2005). Occupational injuries: Is job security a factor? *Indian Journal of Medical Sciences, 59,* 375-381.

Salovey, P., Rothman, A., & Rodin, J. (1998). Health behavior. In G. Daniel, S. Fiske, Gardner, L., *The handbook of social psychology,* Vols. 1 and 2 (4th ed.). New York, NY, US: McGraw-Hill, pp. 633-683.

Sarson, S. (1974). The psychological sense of community: Prospects for a community psychology. San Francisco: Jossey-Bass.

Schwarz, N. (2000). Social judgment and attitudes: Warmer, more social, and less conscious. *European Journal of Social Psychology, 30,* 149-176.

Sheeran, P., & Abraham, C. (1996). The health belief model. In M. Conner & P. Norman (Eds.), *Predicting health behaviour: Research and practice with social cognition models,* (pp. 23-61). Buckingham, England: Open University Press.

Siu, O., Phillips, D., & Leung, T. (2004). Safety climate and safety performance among construction workers in Hong Kong: The role of psychological strains as mediators. *Accident and Prevention, 36,* 359-367.

Sliwindka-Kowalska, M., Zamysolowska-Szmytke, W., Kotylo, P., Fiszer, M., Wesolowski, W., Pawlaczyk-Luszczynska, M. (2003). Ototoxic effects of occupational exposure and co-exposure to styrene and noise. *Journal of Occupational and Environmental Medicine, 45,* 15-25.

Slovic, P. (1987). Perceptions of risk. *Science, 236,* 280-285.

Slovic, P. (1999). Trust, emotion, sex, politics, and science: Surveying the risk-assessment battlefield. *Risk Analysis, 19,* 689-701.

Slovic, P., Finucance, M., Peters, E., & MacGregor, D. (2007). The affect heuristic. *European Journal of Operational Research, 177,* 1333-1352.

Slovic, P., Fischhoff, B., & Lichtenstein, S. (2000). Rating the risks. In P. Slovic (Ed.), *Risk Perception* (pp. 104-120). London: Earthscan.

Slovic, P., Malmfors, T., Drewski, D., Mertz, C., Neil, N., & Bartlett, S. (1995). Intuitive toxicology II: Expert and lay judgments of chemical risks in Canada. *Risk Analysis, 15,* 661-575.

Slovic, P., Malmfors, T., Mertz, C., Neil, N., & Purchase, I. (1997). Evaluation chemical risks: Results of the survey of British Toxicology Society. *Human and Experimental Toxicology, 16,* 289-304.

Slovic, P. & Peters, E. (2006). Risk perception and affect. *Current Directions in Psychological Science, 15,* 332-325.

Slovic, P., Peters, E., Finucane, M., & MacGregor, D. (2005). Affect, risk and decision making. *Health Psychology, 24,* S35-S40.

Sjöberg, L. (1993). *Life-styles and risk perception* (Rhizikon: Risk Research Report No. 14). Centre for Risk Research, Stockholm School of Economics.

Sjoberg, L., (2000). Factors in risk perception. *Risk Analysis, 20,* 1-11.

Sjoberg, L. (2002). Are received risk perception models alive and well? *Risk Analysis, 22,* 265-269.

Sjoberg, L., & Drottz-Sjoberg, B. (1991). Knowledge and risk perception among nuclear power plant employees. *Risk Analysis, 11,* 607-618.

Statistics Canada (2003). *Building on our competencies: Canadian results of the International Adult Literacy and Skills Survey.* Retrieved November 25, 2007 at http://www.nald.ca/fulltext/booc/booc.pdf.

Suruda, A., & Wallace, D. (1996). Fatal work-related injuries in the US chemical industry 1984-1989. *International Archives Occupation, Environment and Health, 68,* 425-428.

Sutton, S. (1998). Predicting and explaining intentions and behavior: How well are we doing? *Journal of Applied Social Psychology, 28,* 1317 – 1338.

Sverke, M., Hellgren, J., & Naswall, K. (2002). No security: A meta-analysis and review of job insecurity and its consequences. *Journal of Occupational Health Psychology, 7,* 242-264.

Tabachnick, B., & Fidell, L. (1996). *Using multivariate statistics* (3rd ed). New York, NY: HarperCollins College Publishers.

Tabachnick, B., & Fidell, L. (2007). *Using multivariate statistics* (5th ed). New York, NY: Pearson.

Terry, D., & Hogg, M. (1996). Group norms and the attitude-behavior relationship: A role for group identification. *Personality and Social Psychology Bulletin, 22,* 776 – 793.

Terry, D., Hogg, M., & Duck, J. (1999). Group membership, social identity, and attitudes. In D. Abrams & M. Hogg (Eds.), *Social identity and social cognition,* pp. 280 – 314. Malden, MA.: Blackwell Publishers.

Tompa, E., Scott-Marshall, H., Dolinschi, R., Trevithick, S., & Bhattacharyya, S. (2007). Precarious employment experiences and their health consequences: Towards a theoretical framework. *Work,* 28, 209-224.

Urlings, I., Nuboer, I, & Dul, J. (1990). A method for changing the attitudes and behaviour of management and employees to stimulate the implementation of ergonomic improvements. *Ergonomics, 33,* 629-637.

Varonen, U., & Mattila, M. (2000). The safety climate and its relationship to safety practices, safety of the work environment and occupational accidents in eight wood-processing companies. *Accident Analysis and Prevention, 32,* 761-769.

Vaughan, E. (1993). Chronic exposure to an environmental hazard: Risk perceptions and self-protective behaviour. *Health psychology, 12,* 74-85.

Wahlberg, A. (2001). The theoretical features of some current approaches to risk perception. *Journal of Risk Research, 4,* 237-250.

Weinstein, N., D., (1984). Why it won't happen to me: Perceptions of risk factors and unacceptability. *Health Psychology, 3,* 431-457.

Weinstein, N. D., & Klein, W. M. (1996). Unrealistic optimism: present and future. *Journal of Social and Clinical Psychology, 15,* 1-8.

Weinstein, N. D., & Nicholich, M. (1993). Correct and incorrect interpretations of correlations between risk perceptions and risk behaviours. *Health Psychology, 12,* 235-245.

Westaby, J., & Lowe, J. K. (2005). Risk-taking orientation and injury among youth workers: Examining the social influence of supervisors, coworkers, and parents. *Journal of Applied Psychology, 90,* 1027-1035.

Weyman, A., Clarke, D., & Cox, T. (2003). Developing a factor model of coal miners' attributions on risk-taking at work. *Work and Stress, 17,* 306-320.

Williamson, A., Feyer, A., Cairns, D., & Biancotti, D. (1997). The development of a measure of safety climate: The role of safety perceptions and attitudes. *Safety Science, 25,* 1-3.

Wilkinson, I. (2001). Social theories of risk perception: At once indispensable and insufficient. *Current Sociology, 49,* 1-22.

Yzer, M., Siero, F., & Buunk, B. (2001). Bringing up condom use and using condoms with new sexual partners: Intentional or habitual? *Psychology & Health, 16,* 409-421.

Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist, 35,* 151–175.

Zohar, D. (2003). Safety climate: Conceptual and measurement issues. In J. C. Quick & E. Tetrick (Eds.), *Handbook of occupational health psychology* (pp.123-142). Washington, DC: American Psychological Association.

Appendices

Appendix A

Participant Consent Form for Study 1

Consent Form for Social Science Research

Dear Participant, August, 2005

I am a graduate student in psychology at Memorial University of Newfoundland working on a PhD project concerning issues related to the fiberglass boat-building industry. Specifically, I am seeking an opportunity to talk to members of your community that have a direct or indirect association with the fiberglass boat-building industry about their experiences, beliefs, and attitudes with respect to this industry. I would like to invite you to participate by taking part in a group discussion or a one on one interview.

Participation in this group discussion or interview is completely voluntary. Should you choose to take part in this study you are free to leave the discussion or interview at any time and you do not have to answer any questions you do not feel comfortable answering.

If you want to take part in this study, please sign the attached sheet. Keep the cover sheet for your information. The group discussion or interview will be tape recorded so that your comments are not lost or forgotten. A typed copy of the discussion or interview will not include any names of participants or individuals mentioned during the discussion or interview. Tapes and typed copies of the discussion or interview will be stored at a secure location.

All information provided by you will be treated as strictly confidential by the research team. Names of people, including yourself, communities, or places of work will be removed from the discussion or interview during the transcription process. With respect to group discussions, I will also ask each participant to respect each other's privacy, but I cannot guarantee that they will do so. It is possible that responses or comments that you make may contribute to changes in the industry.

The proposal for this research has been approved by the Interdisciplinary Committee on Ethics in Human Research (ICEHR). If you have any ethical concerns about this research that are not dealt with by myself (Stacey Wareham) or my supervisor (Dr. Christine Arlett), you may contact ICEHR at icehr@mun.ca or by telephone at (709) 737-8368.

If you have any questions or concerns about your participation in this study you may contact me at (709) 726-6976 or my supervisor, Dr. Christine Arlett, at (709) 737-8496.

Thank you very much for your time and cooperation.

Sincerely,

Stacey Wareham

PhD Student at Memorial University

Dr. C. Arlett, Supervisor

Signature Page

This sheet is to be signed by you, the participant, if you decide to participate. Please read it carefully:

I have read the information sheet.

I understand that I am free to withdraw from the study

- at any time
- without having to give a reason

I understand that it is my choice to be in the study and that I may not benefit.

I agree to have the group discussions or interview tape-recorded

I understand that information provided in the group discussion or interview may be included in a written report that will be made available to the public.

I agree to take part in this study.

_____ _____

Signature of participant Date

Appendix B

Interdisciplinary Committee on Ethics for Human Research (ICEHR)

Approval Documents

Document 1 – Receipt of Ethics Proposal by ICEHR

Memorial
University of Newfoundland

November 29, 2004

TO: Ms. Stacy Warcham, Department of Psychology

FROM: Secretary, Interdisciplinary Committee on Ethics in Human Research

SUBJECT: **Proposal entitled:** ***"Risk perception and behavioural intentions with respect to styrene: a community based comparison"***

This will acknowledge receipt of the above referenced proposal which you have forwarded for ethics review by the Interdisciplinary Committee on Ethics in Human Research (ICEHR).

Your proposal has been assigned the ICEHR file reference number **2004-185-033-SC**.

Dr. Patricia Canavan
Secretary, ICEHR

ICEHR Document 2 – ICEHR Proposal Recommendations

Memorial
University of Newfoundland

January 17, 2005

ICEHR No. 2004/05-033-SC

Ms. Stacey Wareham
Department of Psychology
Memorial University of Newfoundland

Dear Ms. Wareham

Thank you for submitting for review the proposal for the research project entitled *"Risk perception and behavioral intentions with respect to styrene: a community based comparison"* in which you are listed as the principal investigator.

The Interdisciplinary Committee on Ethics in Human Research (ICEHR) is appreciative of the ongoing efforts of researchers to attend to ethical responsibilities. The Committee has reviewed your proposal and is in agreement that the study is consistent with the guidelines of the Tri-Council Policy Statement, with the notable exception of some needed attention to the consent form. On the one hand, the Committee is in agreement that the study could proceed with the following recommended changes to the consent form:

1. Identify the researcher as a Ph.D student and the supervisor as supervisor, unless you are co-investigators.
2. The proper review committee to refer to is the Interdisciplinary Committee on Ethics in Human Research (ICEHR) not HIC.
3. A statement about payment in the consent form for Study 1.
4. If you intend to use the checklist format for the consent form, participants should be given the option to agree (or not) to being tape recorded.
5. The last item on the participant section for the consent form for Study 1 should also include a statement about confidentiality.
6. Some careful attention should be given to the structure of the form. For example, the information about voluntary participation has been stuck under the heading of 'Risks'.

Results of meta-analyses of the efficacy of the TPB for predicting a wide range of behaviours show that the model accounts for approximately 39% to 50 % of the variance in intention and 19% to 38% of the variance in behaviour (Armitage & Conner, 2001; Sutton, 1998). As previously stated, compared to other models of behavioural prediction (HBM, Social Cognitive Theory (SCT), and PMT), the TPB appears to be the superior model for predicting intentions and behaviour (Armitage & Conner, 2000). For example, the TPB has been successfully utilized to predict various health behaviours such as binge-drinking among university students (Johnson & White, 2003), breast self-examinations (Garcia & Mann, 2003), exercise behaviours (e.g., Hagger, Chatzisarantis, & Biddle, 2001), condom use (Yzer, Siero, & Buunk, 2001), dieting behaviours (Garcia & Mann, 2003), and contraception use (Fekadu & Kraft, 2002).

More relevant to the present study and within the framework of the TRA, Lingard and Yesilyurt (2003) assessed the effects of attitudes on construction worker safety behaviours. More specifically, Lingard and Yesilyurt assessed the effect of first aid training on the development of positive safety attitudes and the transferability of these attitudes to observed safety behaviours. A multiple baseline experimental research design was used whereby first aid training was introduced to various workplaces on a staggered basis. Structured interviews were conducted with participants before and after the introduction of the first aid training. In addition, workplace behaviours were observed at each location before and after the training and recorded using a behaviour rating scale. Several themes emerged from the interviews including attribution of occupational injury or illness, probability of having an injury, and behavioural intentions. Qualitative analysis

7 Because focus groups are being used, there is a limit to confidentiality. While you may do everything possible to respect confidentiality, focus group participants may not Be careful about the limits of confidentiality being promised

The Committee would like to point out that the consent form is unnecessarily complicated, and, in some respects inappropriate for the study proposed The statement about liability and the checklist format (agree/not) are not necessary. Likewise, the first paragraph and the list of researcher duties is not necessary Consequently, we are presenting the option of revising and resubmitting the consent form for comment

Please advise the Committee of which course of action you would like to pursue If there are further questions you may address them to Dr Russ Adams (michelem@mun ca). Faculty of Science representative or Dr Tim Seifert, Chair, ICEHR, (tseifert@mun ca)

We look forward to hearing from you and to bringing this matter to an expedient conclusion

Yours sincerely,

T Seifert, Ph D
Chair, Interdisciplinary Committee on
Ethics in Human Research

TS en
cc. Dr R Adams
Supervisor

ICEHR Document 3 – ICEHR Ethics Approval

Memorial
University of Newfoundland

February 24, 2005

ICEHR No. 2004-05-033-SC

Ms. Stacey Wareham
Department of Psychology
Memorial University of Newfoundland

Dear Ms. Wareham:

Thank you for your correspondence of February 15, 2005 addressing the issues raised by the Interdisciplinary Committee on Ethics in Human Research (ICEHR) concerning your research project "*An investigation of behavioural outcomes with respect to substance use in community based samples*".

ICEHR has received your response and is satisfied that the concerns raised by the Committee have been adequately addressed. The Committee grants full approval for the conduct of this research in accordance with the proposal and revisions submitted.

The Committee is appreciative of the ongoing efforts to ensure the protection and rights of research participants. If you should make any other changes either in the planning or during the conduct of the research that may affect ethical relations with human participants, these should be reported to the ICEHR in writing for further review.

This approval is valid for one year from the date on this letter. If the research should carry on for a longer period it will be necessary for you to present to the Committee annual reports by the anniversaries of this date describing the progress of the research and any changes that may affect ethical relations with human participants.

We wish you success with your research.

Yours sincerely,

[illegible]

Interdisciplinary Committee on
Ethics in Human Research

/sc

ICEHR Document 4 – ICEHR Approval of Changes to Study 1 Interview Guide and Consent Form

Memorial
University of Newfoundland

July 13, 2005

ICEHR No. 2004/05-033-SC

Ms. Stacey Wareham
Department of Psychology
Memorial University of Newfoundland

Dear Ms. Wareham

The Interdisciplinary Committee on Ethics in Human Research (ICEHR) has reviewed the proposed revisions as outlined in your letter dated July 5, 2005 for the project entitled "*Risk perception and behavioral intentions with respect to styrene: a community based comparison*", and is pleased to give its approval to these changes as requested.

If you should make any other changes either in the planning or during the conduct of the research that may affect ethical relations with human participants, these should be reported to the ICEHR in writing for further review.

We wish you well with your research.

Yours sincerely,

T. Seifert, Ph.D.
Chair, Interdisciplinary Committee on Ethics in Human Research

TS/jp

cc Supervisor

ICEHR Document 5 – ICEHR Ethics Approval Extended

From: Noseworthy, Elizabeth
Sent: Friday, March 24, 2006 10:37 AM
To: Stacey Wareham
Cc:
Subject: RE: Annual Status Report for ICEHR

Appendix C

Sample Interview Guide for Study 1

Community Information/Background

1. What is it like to live in this community?
2. Is the community growing?
3. How important is this industry to your community?
    a. Does the industry employ many people in this community?
    b. What are the effects of this industry on your community?
    c. How long has this industry been here?
    d. How long have you worked in this industry? (Relevant for those working or have worked in the industry)
4. Describe a typical day at your workplace. (Relevant for those working or have worked in the industry)

Perceptions of Risk

5. Do you think working in the fiberglass boat-building industry is a risky job?
    a. What are the risks?
    b. If yes, why do you think people continue to work in a risky environment?
    c. If no, why not?

6. Do you think people in this industry are at risk?
    a. Why or why not?
    b. What are the risks associated with working in this industry?

Knowledge of the effects of styrene

7. Do you know about the chemical used to make fiberglass boats?
    a. What do you know about it?
8. Are you aware of any health risk associated with working in this industry?
9. Do you feel OHS or managers have sufficiently informed workers of the health risks associated with fiberglass boat-building?
10. What does exposure mean to you?
11. When do you think workers are exposed to styrene?

Environmental/social constraints

12. What types of safety equipment are relevant to this work environment?
13. Do workers have to provide their own safety equipment?
14. Do workers wear the safety equipment provided to them?
    a. If so, why? How often?
    b. If not, why?

Social Influence

15. Do family members encourage family members who work in the industry to use safety equipment?
16. Do employers encourage workers to use safety equipment?
17. What are the factors that influence a worker's use of safety equipment?
18. Do you think coworkers influence a worker's use of safety equipment?
19. Are there other factors that may affect whether or not a worker will use safety equipment?

Attitudes toward styrene

20. Do you believe working in the fiberglass boat-building industry can be hazardous to a person's health?
    a. If so, what are they hazards? If not, why?
    b. Do you believe exposure to styrene can be hazardous a worker's health? Why or why not?
21. Do you believe that using the safety equipment will decrease a worker's risk of exposure to styrene?
22. Do you believe that styrene is associated with negative health effects?
    a. Why or why not?
    b. If yes, what types of health problems?
23. Do you believe the information provided to workers by Occupational Health and Safety personnel and employers about the effects of styrene exposure?
24. Are people concerned about the health effects of styrene?
    Why or why not?

Appendix D.1

Employee Survey for Study 2

Assessing Employee, Beliefs, Knowledge, Behaviors, and Perceptions of Risk about the Fiberglass Boat-Building Industry in Newfoundland and Labrador

Please place an X in the box that best represents your level of agreement with each of the following statements. PLEASE NOTE: THERE ARE QUESTIONS ON THE BACK OF EACH PAGE.

Community Status

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	My community is growing	☐	☐	☐	☐	☐
2.	The fiberglass boat-building industry is very important for the success of this community	☐	☐	☐	☐	☐
3.	Many people are leaving my community	☐	☐	☐	☐	☐
4.	People here fear that this community will not survive	☐	☐	☐	☐	☐
5.	It is difficult to keep young people in the community	☐	☐	☐	☐	☐
6.	I am hopeful about the future of my community	☐	☐	☐	☐	☐

Community Attachment

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	I will take any job that allows me to stay in my community	☐	☐	☐	☐	☐
2.	I have a lot of freedom here to do the things that I enjoy	☐	☐	☐	☐	☐

Community Attachment

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
3.	My community means a lot to me	☐	☐	☐	☐	☐
4.	I am very attached to my community	☐	☐	☐	☐	☐
5.	I identify strongly with my community	☐	☐	☐	☐	☐
6.	I feel no commitment to my community	☐	☐	☐	☐	☐
7.	I have a lot of fond memories in my community	☐	☐	☐	☐	☐
8.	I have a special connection to my community and the people living here	☐	☐	☐	☐	☐
9.	I want my children to grow up in my community	☐	☐	☐	☐	☐

Sense of Community

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	I feel at home in my community	☐	☐	☐	☐	☐
2.	I think my community is a good place for me to live	☐	☐	☐	☐	☐
3.	It is important to me to live in this community	☐	☐	☐	☐	☐
4.	I care about what my neighbors think about my actions	☐	☐	☐	☐	☐
5.	I have no influence over what my community is like	☐	☐	☐	☐	☐

Sense of Community

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
6.	My neighbors and I want the same thing from this community	☐	☐	☐	☐	☐
7.	People in my community do not share the same community values as me	☐	☐	☐	☐	☐
8.	Very few of my neighbors know me	☐	☐	☐	☐	☐
9.	If there is a problem in my community, people here can get it solved	☐	☐	☐	☐	☐
10.	The people who live in my community get along well	☐	☐	☐	☐	☐

Safety Knowledge

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	I know who to ask if I am not sure about the safe way to complete a task	☐	☐	☐	☐	☐
2.	I feel free to request additional safety training if I think it is needed	☐	☐	☐	☐	☐
3.	I know the safe way to complete my work	☐	☐	☐	☐	☐
4.	I believe wearing a mask or respirator is part of the safety equipment required for my job	☐	☐	☐	☐	☐
5.	I believe I know the correct way to use a respirator/mask	☐	☐	☐	☐	☐

Safety Knowledge

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
6.	I read the MSDS (Material Safety Data Sheets) when I have to work with chemicals	☐	☐	☐	☐	☐
7.	The MSDS sheets are easy to read	☐	☐	☐	☐	☐
8.	I understand the information provided in the MSDS sheets	☐	☐	☐	☐	☐
9.	The MSDS sheets provide valuable information about the chemicals I use at work	☐	☐	☐	☐	☐
10.	I received safety training before I started my job	☐	☐	☐	☐	☐
11.	I believe I know when the filter in my mask/respirator needs to be replaced	☐	☐	☐	☐	☐
12.	I keep my chin area clean shaven if I know I will be using a respirator	☐	☐	☐	☐	☐
13.	I have received safety training during my employment with this company	☐	☐	☐	☐	☐
14.	I have received formal training (trade school or training program) on how to construct fiberglass boats/products	☐	☐	☐	☐	☐

revealed strikingly different attitudes regarding occupational safety before and after training. Before training, the majority of participants believed accidents occurred as a result of carelessness/complacency (other workers), inexperience (other workers), and chance events (self). Most participants also expressed an unrealistic optimistic belief that an injury would not happen to them. Further, a strong 'production orientation' attitude was an acceptable reason for risk-taking behaviour. After completion of the safety training some attitudes appeared to change in that workers were likely to perceive carelessness and complacency of workers and *self* as reasons for accidents. However, workers still attributed inexperience of other workers and not themselves as reasons for workplace accidents. Further, workers' attitudes changed in that they perceived a greater probability of a workplace injury happening to them. Workers appeared to change their attitudes toward the behaviours they were willing to perform. After training, the majority of participants reported they were unwilling to take risk to 'get the job done', more likely to consider the costs and benefits of taking the risk, and felt they were now more aware of the consequences of taking the risk.

With respect to actual behaviour change, the behaviour rating scale assessed employee actions before and after first aid training in four safety categories: use of tools, access to heights, the use of personal protective equipment, and manual handling. Results indicated improvement in all categories with the exception of manual handling. Lingard and Yesilyurt argue that the safety training led to a change in safety attitudes and this attitude change transferred to actual behavioural change, lending support to the TRA. However, the behaviour change was not universal. Lingard and Yesilyurt suggest that

Safety Knowledge

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
15.	I believe I have been properly fitted for a respirator	☐	☐	☐	☐	☐
16.	I have been given training on how to use a respirator	☐	☐	☐	☐	☐

Safety Motivation

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	There is no incentive for me to follow the safety policies at my work	☐	☐	☐	☐	☐
2.	I am not rewarded for being safe	☐	☐	☐	☐	☐
3.	My supervisor praises me when he or she sees that I am following proper safety procedures	☐	☐	☐	☐	☐
4.	When I ignore safety rules my supervisor reprimands me	☐	☐	☐	☐	☐
5.	The owner/manager of this company takes employee health and safety very seriously	☐	☐	☐	☐	☐
6.	I feel anxious about talking with my manager/supervisor about safety issues	☐	☐	☐	☐	☐

Safety Motivation

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
7.	I worry about losing my job or being replaced if I bring up concerns about health and safety with my boss	☐	☐	☐	☐	☐
8.	Wearing the mask while working is very uncomfortable	☐	☐	☐	☐	☐
9.	Management know employees take risk while they work but they are not bothered by it	☐	☐	☐	☐	☐
10.	Wearing safety glasses does not slow down my work	☐	☐	☐	☐	☐
11.	Management will turn a blind eye to rules being broken to get the job done	☐	☐	☐	☐	☐
12.	Although management say they put safety first no one really believes them	☐	☐	☐	☐	☐
13.	Sometimes workers are afraid to turn down a job that they consider to be risky because they think they will be labeled trouble makers	☐	☐	☐	☐	☐

Safety Motivation

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
14.	Wearing a mask/respirator slows down my work	☐	☐	☐	☐	☐
15.	I often feel under pressure to meet deadlines	☐	☐	☐	☐	☐
16.	Health and safety concerns are more valued at my workplace than production concerns	☐	☐	☐	☐	☐
17.	The cost of better ventilation for the plant exceeds the company profits	☐	☐	☐	☐	☐
18.	I have been informed about the health effects of styrene	☐	☐	☐	☐	☐

		No	Sometimes	Yes
19.	I am provided free safety glasses	☐	☐	☐
20.	I am provided free work gloves	☐	☐	☐
21.	I am provided free face masks	☐	☐	☐
22.	I am provided free charcoal filters for the breathing mask	☐	☐	☐
23.	This company has monthly safety meetings	☐	☐	☐

Feelings and Beliefs about Working in the Fiberglass Boat-Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	I believe the use of styrene is regulated properly at my workplace	☐	☐	☐	☐	☐
2.	I do not believe that working with styrene is hazardous to my health	☐	☐	☐	☐	☐
3.	I feel safe when working with styrene	☐	☐	☐	☐	☐
4.	I do not believe that styrene is harmful because of my own experience working here	☐	☐	☐	☐	☐
5.	I have not had negative health experiences while working with styrene	☐	☐	☐	☐	☐
6.	I believe styrene is hazardous to my health because science says that is the case	☐	☐	☐	☐	☐
7.	I believe Occupational Health and Safety personnel need to do more to ensure my working environment is safe	☐	☐	☐	☐	☐
8.	I believe Occupational Health and Safety personnel are unaware of the problems the safety equipment causes to my ability to complete my work	☐	☐	☐	☐	☐

Feelings and Beliefs about Working in the Fiberglass Boat-Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
9.	I believe that Occupational Health and Safety personnel should visit my workplace more often	☐	☐	☐	☐	☐
10.	I believe my working environment could be a safer place to work	☐	☐	☐	☐	☐
11.	I believe I do everything I can to ensure my health and safety at work	☐	☐	☐	☐	☐
12.	I believe my coworkers do everything they can to ensure their health and safety at work	☐	☐	☐	☐	☐
13.	I believe my coworkers are concerned about their health and safety at work	☐	☐	☐	☐	☐
14.	I am concerned about my own health and safety at work	☐	☐	☐	☐	☐
15.	I believe health care professionals in my community are aware of the health effects of styrene	☐	☐	☐	☐	☐
16.	I believe the health care professionals in my community can recognize the symptoms of having been over-exposed to styrene	☐	☐	☐	☐	☐

Feelings and Beliefs about Working in the Fiberglass Boat-Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
17.	I believe the WHMIS training was useful	☐	☐	☐	☐	☐
18.	I am satisfied with my job	☐	☐	☐	☐	☐
19.	I feel I have control over my own safety at work	☐	☐	☐	☐	☐

Perceived Risk with Working in the Fiberglass Boat Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	I work in a risky environment	☐	☐	☐	☐	☐
2.	The health risks of working with styrene are low	☐	☐	☐	☐	☐
3.	I sometimes worry that working with styrene will make me sick	☐	☐	☐	☐	☐
4.	If I do not feel sick, then the styrene does not pose a threat to my health	☐	☐	☐	☐	☐
5.	If I cannot smell the styrene, I am not at risk for over-exposure	☐	☐	☐	☐	☐
6.	I worry that I may get sick in the future because I work with styrene	☐	☐	☐	☐	☐

Perceived Risk with Working in the Fiberglass Boat Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
7.	I know people who have gotten sick while working with styrene	☐	☐	☐	☐	☐
8.	This is a healthy place to work	☐	☐	☐	☐	☐
9.	I believe working with styrene poses a threat to my health	☐	☐	☐	☐	☐
10.	I believe I have a good understanding of the risks associated with working with styrene	☐	☐	☐	☐	☐
11.	If I think I will get hurt or ill when doing a job then I will not take the risk	☐	☐	☐	☐	☐
12.	I believe I know the risks and I am skilled enough to take account of them to avoid injury or illness	☐	☐	☐	☐	☐
13.	I believe I know all the risk associated with working with styrene	☐	☐	☐	☐	☐
14.	I believe my coworkers have a good understanding of the risks associated with working with styrene	☐	☐	☐	☐	☐

Perceived Risk with Working in the Fibreglass Boat-Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
15.	If my coworkers think they will get hurt or ill when doing a job then they will not take the risk	☐	☐	☐	☐	☐
16.	I believe my coworkers know the risks and they are skilled enough to take account of them and avoid injury or illness	☐	☐	☐	☐	☐
17.	I believe my coworkers know all the risk associated with working with styrene	☐	☐	☐	☐	☐

Social Influence

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	My coworkers think working with styrene is dangerous to their health	☐	☐	☐	☐	☐
2.	My coworkers want me to use safety equipment	☐	☐	☐	☐	☐
3.	My family encourages me to use safety equipment at work	☐	☐	☐	☐	☐
4.	My employer strongly insists on the use of safety equipment	☐	☐	☐	☐	☐
5.	I often remind my coworkers to use their safety equipment	☐	☐	☐	☐	☐
6.	My family is concerned about how styrene will affect my health	☐	☐	☐	☐	☐

Social Influence

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
7.	My coworkers do not see the value of using safety equipment	☐	☐	☐	☐	☐
8.	I see the value of using safety equipment	☐	☐	☐	☐	☐
9.	I feel that my boss is concerned about the health of his/her employees	☐	☐	☐	☐	☐
10.	I find it difficult to behave safely at work when my coworkers are not behaving safely	☐	☐	☐	☐	☐
11.	My boss constantly reminds me to use safety equipment	☐	☐	☐	☐	☐
12.	My boss does not see the value of using safety equipment	☐	☐	☐	☐	☐
13.	My coworkers and I often discuss health and safety issues as it relates to our workplace	☐	☐	☐	☐	☐
14.	My boss and I discuss health and safety issues as it relates to our workplace often	☐	☐	☐	☐	☐
15.	I care about what my coworkers think about my safety behavior	☐	☐	☐	☐	☐
16.	I care about what my family thinks about my safety behavior at work	☐	☐	☐	☐	☐

Social Influence

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
17.	My doctor encourages me to wear safety equipment at work	☐	☐	☐	☐	☐
18.	My doctor constantly reminds me to wear safety equipment at work	☐	☐	☐	☐	☐
19.	My doctor has talked to me about the health effects of styrene	☐	☐	☐	☐	☐
20.	Safety issues are kept under the table at my workplace	☐	☐	☐	☐	☐
21.	People seldom raise safety issues at my workplace	☐	☐	☐	☐	☐
22.	My image at work would be hurt if I brought up safety concerns	☐	☐	☐	☐	☐
23.	My coworkers would think badly of me if I brought up safety concerns	☐	☐	☐	☐	☐
24.	I would not think badly of a coworker for bringing up safety concerns at work	☐	☐	☐	☐	☐

The Health Effects of Working with Styrene

Excessive exposure to styrene…		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	Is related to reduced color vision	☐	☐	☐	☐	☐
2.	Is not related to hearing loss	☐	☐	☐	☐	☐

some behaviours may be perceived by the worker as not being in their personal control and suggest that the TPB may explain why the behaviour changes in the study were not universal. That is, issues affecting a worker's perceived ability to control safety related behaviours (e.g., knowledge, skill, access to materials, etc.) may affect their intentions to perform safety related behaviours. However, as with the aforementioned studies on workplace behaviour change, Lingard and Yesilyurt acknowledge that external issues and situational circumstances may affect perceived behavioural control. For instance, they suggest that precariousness of the industry (i.e., competition for work, unpredictable work hours, etc.) may create circumstances that affect the performance of safety behaviours. Lingard and Yesilyurt suggest that their study requires an extensive quantitative component to further clarify the factors affecting attitude and behaviour change.

Despite their utility for predicting behaviour, the TRA and TPB are not without criticism. In particular, concerns have emerged regarding the subjective norm component as it has been found to be a weak predictor of intentions (see Armitage & Conner, 2000; 2001). In fact, Ajzen (1991) himself reports that in the majority of existing tests of the TPB, the subjective norm – behavioural intention link was weak or non-significant. This may be the reason why Lingard and Yesilyurt (2003) did not include the subjective norm component as part of their model of behaviour change.

Several explanations have been offered for the weak relationship observed between the subjective norms and behavioural intentions components of the model. Ajzen (1991) suggests that intentions are primarily influenced by personal factors (i.e.,

The Health Effects of Working with Styrene

Excessive exposure to styrene…		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
3.	Is related to changes in mood	☐	☐	☐	☐	☐
4.	Is not related to depression	☐	☐	☐	☐	☐
5.	Is related to aggression	☐	☐	☐	☐	☐
6.	Is related to hair loss	☐	☐	☐	☐	☐
7.	Is not related to lung problems	☐	☐	☐	☐	☐
8.	Does not cause skin irritation	☐	☐	☐	☐	☐
9.	Causes eye irritation	☐	☐	☐	☐	☐

Please place an X next to the response that best gives your answer to the following question:

10. Do you think working with styrene has affected your mood?

Yes ☐

Maybe ☐

No ☐

The Health Effects of Working with Styrene

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
11.	Since I began working with styrene I find myself to be more irritable/ moody	☐	☐	☐	☐	☐
12.	Working with styrene has affected my relationships with my coworkers	☐	☐	☐	☐	☐
13.	Working with styrene has affected my relationships with family	☐	☐	☐	☐	☐
14.	Excessive exposure to styrene has affected my ability to make good decisions	☐	☐	☐	☐	☐
15.	Family members have commented about changes in my mood since I started working with styrene	☐	☐	☐	☐	☐
16.	Coworkers have commented about changes in my mood since I started working with styrene	☐	☐	☐	☐	☐
17.	I have noticed changes in my coworkers' mood that I believe is related to styrene exposure	☐	☐	☐	☐	☐
18.	I have noticed changes in my coworkers' personality that I believe is related to styrene exposure	☐	☐	☐	☐	☐
19.	I have noticed changes in my mood that I believe is related to styrene exposure	☐	☐	☐	☐	☐

The Health Effects of Working with Styrene

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
20.	I believe my health has gotten worse since I began working with styrene	☐	☐	☐	☐	☐
21.	I have experienced a work related illness that I believe is due to exposure to styrene	☐	☐	☐	☐	☐
22.	I have seen people get sick while working with styrene	☐	☐	☐	☐	☐
23.	I have experienced a work related injury since I began working here	☐	☐	☐	☐	☐
24.	I believe I can recognize the symptoms related to styrene exposure	☐	☐	☐	☐	☐

Company/ Plant Status

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	The amount of work at this plant has decreased	☐	☐	☐	☐	☐
2.	This plant is often busy	☐	☐	☐	☐	☐
3.	This plant is seasonal	☐	☐	☐	☐	☐
4.	This plant operates all year round	☐	☐	☐	☐	☐

Job Security

1.	My job security is good	☐	☐	☐	☐	☐
2.	I feel it is likely that I might lose my job in the years to come	☐	☐	☐	☐	☐
3.	I fear not having a job	☐	☐	☐	☐	☐
4.	I fear losing this job	☐	☐	☐	☐	☐
5.	I feel like I could easily be replaced by someone else at my job	☐	☐	☐	☐	☐
6.	The number of hours I work at this company changes quite often	☐	☐	☐	☐	☐
7.	I feel that the future of this company is uncertain	☐	☐	☐	☐	☐

Perceived Alternative Employment Opportunities

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	There are very few jobs available for me in my community	☐	☐	☐	☐	☐
2.	I take pride in my work	☐	☐	☐	☐	☐
3.	I would continue to work at this job even if there were other job opportunities	☐	☐	☐	☐	☐

Perceived Alternative Employment Opportunities

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
4.	I feel like I have no other choice but to work at this job	☐	☐	☐	☐	☐
5.	I work here because I like building fiberglass boats/products	☐	☐	☐	☐	☐
6.	I will take almost any job to make money	☐	☐	☐	☐	☐

***Please answer the following questions. **Notice that your response options have changed.**

Safety Behaviors at Work

How often do you….		Never	Almost Never	Sometimes	Almost Always	Always
1.	Use a respirator/mask when working with styrene?	☐	☐	☐	☐	☐
2.	Wear safety glasses when grinding?	☐	☐	☐	☐	☐
3.	Wear safety glasses when spraying?	☐	☐	☐	☐	☐
4.	Wear protective gloves while you work with styrene?	☐	☐	☐	☐	☐
5.	Have your work clothes cleaned/washed everyday?	☐	☐	☐	☐	☐
6.	Ignore safety rules and regulations at work when working with styrene?	☐	☐	☐	☐	☐

Safety Behaviors at Work

How often do you....		Never	Almost Never	Sometimes	Almost Always	Always
7.	Take shortcuts in safety guidelines related to styrene use or handling in order to get the job done faster?	☐	☐	☐	☐	☐
8.	Clean your respirator after every use?	☐	☐	☐	☐	☐

Health Care Usage and Satisfaction with Health Care

1. Do you have a regular medical doctor? Yes _____ No _____

If "No", why do you not have a regular medical doctor? Check all that apply to you.

_____ No medical doctors available in the area

_____ Medical doctors in the area are not taking new patients

_____ I have not tried to contact one

_____ I had a medical doctor who left the area or retired

_____ I do not believe the medical doctors are competent

_____ Other – Please specify _____

2. Have you seen a doctor in the last 12 months? Yes _____ No _____

3. Have you seen a doctor in the last 12 months for an injury or illness that you thought might be work related? Yes _____ No _____ Unsure _____

4. Where did the most recent contact with a health care provider take place?

_____ Doctor's office
_____ Hospital Emergency room
_____ Hospital outpatient clinic
_____ Walk-in clinic
_____ Appointment clinic
_____ Community health centre
_____ At work
_____ At home
_____ Over the telephone

_____ Other – Please Specify _____

5. During the last 12 months was there ever a time when you felt that you needed health care but you didn't receive it? Yes _____ No_____

If "Yes", why didn't you get health care? Please check all that apply to you.

_____ No medical doctors available in the area
_____ Medical attention not available when required
_____ Personal/family responsibilities
_____ Felt doctor's advice /treatment would be inadequate
_____ Cost
_____ Doctor didn't think it was necessary I needed treatment
_____ Didn't get around to it or didn't bother
_____ Unable to leave the house because of a health problem
_____ Rural communities are difficult to service
_____ Other – Please Specify _____

_____ Transportation problems
_____ Wait time too long
_____ Language problems
_____ Dislikes/afraid of doctors
_____ Decided not to seek care
_____ I was too Busy
_____ Didn't know where to go
_____ Distance

6. Thinking of the most recent time, what was the type of care that you needed?

_____ Treatment of a physical health problem
_____ Treatment of an emotional or mental health problem
_____ A regular check-up
_____ Treatment of an injury
_____ Treatment of a workplace injury or illness
_____ Other – Please Specify _____

7. Thinking of the most recent time, where did you try to get the medical care you were seeking?

_____ Doctor's office
_____ Hospital emergency room
_____ Hospital outpatient clinic
_____ Walk-in clinic
_____ Community health centre
_____ Other – Please Specify _____

9. Overall, how would you rate the **availability** of health care services in your community?

_____ Excellent _____ Good _____ Fair _____ Poor

9. Overall, how would you rate the **quality** of health care services in your community?

_____ Excellent _____ Good _____ Fair _____ Poor

10. Overall, how would you rate the **availability** of health care in your community as it relates to workplace injury or illness?

_____ Excellen t _____ Good _____ Fair _____ Poor

11. Overall, how would you rate the **quality** of health care in your community as it relates to workplace injury or illness?

_____ Excellent _____ Good _____ Fair _____ Poor

Additional Comments:

_____

_____

_____

_____

_____

_____

PLEASE DO NOT FORGET TO COMPLETE THE LAST PAGE...

1. How long (in total) have you been working in the boat building and repair industry? (Please specify if it is **years or months**) _____

2. How long have you been with your current employer? (Please specify if it is **years or months**) _____

3. What is your position or job title at your work? _____

4. Is part of your job to work with styrene? ☐ Yes ☐ No ☐ Sometimes

5. On average, how many hours a day do you work with styrene? _____ Hours

6. On average, how many hours a day are you exposed to styrene even if you are not working with it? _____ Hours

7. How many months of the year do you work at a fiberglass boat-building Plant? _____ months

8. Age: _____

9. Sex: _____

10. Marital Status:

_____ Single
_____ Common Law
_____ Married
_____ Divorced/Separated
_____ Widowed
_____ Other

11. Do you have a child or children? _____ Yes _____ No

12. Please indicate the highest level of education that you have completed.

_____ Elementary School
_____ High School
_____ Community College/Trade School
_____ Other (Please specify:_____)
_____ University (Undergraduate)
_____ University (Graduate Master's Degree)
_____ University (Graduate PhD)

13. Please indicate your approximate income from your job.

_____ Less than $15,000
_____ $15, 000 to $29,999
_____ $30,000 to $49, 999
_____ $50,000 to $79,999
_____ $80, 000 or more

14. Are there other members in your household contributing to the household income?

Yes ☐ No ☐ Sometimes ☐

15. To your knowledge, how many people live in your community? _____

16. Have you completed the WHMIS program? _____ Yes _____ No

Appendix D.2

Manager Survey for Study 2

Assessing Beliefs, Knowledge, Behaviors and Perceptions of Risk about the Fiberglass Boat-Building Industry in Newfoundland and Labrador

Please place an X in the box that best represents your level of agreement with each of the following statements. PLEASE NOTE: There are questions on the back of each page.

Community Status

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	My community is growing	☐	☐	☐	☐	☐
2.	The fiberglass boat-building industry is very important for the success of this community	☐	☐	☐	☐	☐
3.	Many people are leaving my community	☐	☐	☐	☐	☐
4.	People here fear that this community will not survive	☐	☐	☐	☐	☐
5.	It is difficult to keep young people in the community	☐	☐	☐	☐	☐
6.	I am hopeful about the future of my community	☐	☐	☐	☐	☐

Community Attachment

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	I will take any job that allows me to stay in my community	☐	☐	☐	☐	☐
2.	I have a lot of freedom here to do the things that I enjoy	☐	☐	☐	☐	☐
3.	My community means a lot to me	☐	☐	☐	☐	☐

attitude and perceived behavioural control); therefore, the link between subjective norms and behavioural intentions is weak. Armitage and Conner (2001) suggest that the explanation lies with the measurement of the subjective norm component (use of single item measures as opposed to multi-item scales) and the conceptualization of norms in the model. Others contend that the attitude and subjective norm components are not as independent as previously thought, raising the possibility of cross-over effects. Further, the relationship of individual difference variables to the susceptibility of normative influence needs clarification (Terry & Hogg, 1996; Fekadu & Kraft, 2002).

While the TPB attempts to 'socialize attitudes' through the subjective norm component, it is still heavily centered on an individual perspective (Howarth, 2006) and does not take into account social influence from a larger social context (Joffé, 1996). Cultural and social environments and their consequences for the individual are not sufficiently considered. For example, issues surrounding individual economic status, community well-being and social interactions may affect individual behavioural intentions in addition to attitudes and the perceived expectations of others (e.g., Fowler, 2007). Due to the nature of the present study - the precarious employment of boat-building workers in a precarious industry - it is necessary to extend this model beyond the original constructs and incorporate a macro level approach to understanding individual behaviour. This issue will be revisited in a later section.

The TPB has also been criticized with respect to the origins of the attitudes, subjective norms and beliefs about behavioural control (e.g., Albarracin, Johnson, Zanna, 2005) in that there is no account of other factors affecting these determinants of the

Community Attachment

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
4.	I am very attached to my community	☐	☐	☐	☐	☐
5.	I identify strongly with my community	☐	☐	☐	☐	☐
6.	I feel no commitment to my community	☐	☐	☐	☐	☐
7.	I have a lot of fond memories in my community	☐	☐	☐	☐	☐
8.	I have a special connection to my community and the people living here	☐	☐	☐	☐	☐
9.	I want my children to grow up in my community	☐	☐	☐	☐	☐

Sense of Community

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	I feel at home in my community	☐	☐	☐	☐	☐
2.	I think my community is a good place for me to live	☐	☐	☐	☐	☐
3.	It is important to me to live in this community	☐	☐	☐	☐	☐
4.	I care about what my neighbors think about my actions	☐	☐	☐	☐	☐
5.	I have no influence over what my community is like	☐	☐	☐	☐	☐

Sense of Community

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
6.	My neighbors and I want the same thing from this community	☐	☐	☐	☐	☐
7.	People in my community do not share the same community values as me	☐	☐	☐	☐	☐
8.	Very few of my neighbors know me	☐	☐	☐	☐	☐
9.	If there is a problem in my community, people here can get it solved	☐	☐	☐	☐	☐
10.	The people who live in my community get along well	☐	☐	☐	☐	☐

Safety Knowledge

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	I know who to ask if I am not sure about the safe way to complete a task	☐	☐	☐	☐	☐
2.	I feel free to request or seek out additional safety training if I think it is needed	☐	☐	☐	☐	☐
3.	I know the safe way to complete my work	☐	☐	☐	☐	☐
4.	I believe wearing a mask or respirator is part of the safety equipment required for my job	☐	☐	☐	☐	☐

Safety Knowledge

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
5.	I believe I know the correct way to use a respirator/mask	☐	☐	☐	☐	☐
6.	I read the MSDS (Material Safety Data Sheets) when I have to work with chemicals	☐	☐	☐	☐	☐
7.	The MSDS sheets are easy to read	☐	☐	☐	☐	☐
8.	I understand the information provided in the MSDS sheets	☐	☐	☐	☐	☐
9.	The MSDS sheets provide valuable information about the chemicals I use at work	☐	☐	☐	☐	☐
10.	I received safety training before I started my job	☐	☐	☐	☐	☐
11.	I believe I know when the filter in my mask/respirator needs to be replaced	☐	☐	☐	☐	☐
12.	I keep my chin area clean shaven if I know I will be using a respirator	☐	☐	☐	☐	☐
13.	I have received safety training during my employment with this company	☐	☐	☐	☐	☐

Safety Knowledge

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
14.	I have received formal training (trade school or training program) on how to construct fiberglass boats/products	☐	☐	☐	☐	☐
15.	I have been properly fitted for a respirator	☐	☐	☐	☐	☐
16.	I have received training on how to use a respirator	☐	☐	☐	☐	☐
17.	I believe *employees* know who to ask if they are not sure about the safe way to complete a task	☐	☐	☐	☐	☐
18.	I believe *employees* feel free to request or seek out additional safety training if they think it is needed	☐	☐	☐	☐	☐
19.	I believe *employees* know the safe way to complete their work	☐	☐	☐	☐	☐
20.	*Employees* believe wearing a mask or respirator is part of the safety equipment required for their job	☐	☐	☐	☐	☐
21.	I believe *employees* know the correct way to use a respirator/mask	☐	☐	☐	☐	☐
22.	I believe *employees* read the MSDS (Material Safety Data Sheets) when they have to work with chemicals	☐	☐	☐	☐	☐

Safety Knowledge

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
23.	I believe *employees* find the MSDS sheets easy to read	☐	☐	☐	☐	☐
24.	I believe *employees* understand the information provided in the MSDS sheets	☐	☐	☐	☐	☐
25.	I believe *employees* have been properly fitted for a respirator	☐	☐	☐	☐	☐
26.	I believe *employees* have received training on how to use a respirator	☐	☐	☐	☐	☐

Safety Motivation

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	There is no incentive (reason) for me to follow the safety policies at my work	☐	☐	☐	☐	☐
2.	I am not rewarded for being safe	☐	☐	☐	☐	☐
3.	This company is not rewarded for being safe	☐	☐	☐	☐	☐
4.	I praise the employees when I see that they are following proper safety procedures	☐	☐	☐	☐	☐
5.	I reprimand employees when they don't follow safety rules	☐	☐	☐	☐	☐
6.	I take employee health and safety very seriously	☐	☐	☐	☐	☐

Safety Motivation

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
7.	I am open to talking about safety issues with employees	☐	☐	☐	☐	☐
8.	I reassure employees that bringing up concerns about health and safety will not negatively affect their job	☐	☐	☐	☐	☐
9.	Wearing the mask while working is very uncomfortable	☐	☐	☐	☐	☐
10.	The cost of better ventilation for the plant exceeds the company's profits	☐	☐	☐	☐	☐
11.	Wearing safety glasses does not slow down my work	☐	☐	☐	☐	☐
12.	Wearing a mask/respirator slows down my work	☐	☐	☐	☐	☐
13.	Wearing safety glasses does not slow down the work of *employees*	☐	☐	☐	☐	☐
14.	Wearing a mask/respirator slows down the work of *employees*	☐	☐	☐	☐	☐
15.	I often feel under pressure to meet deadlines	☐	☐	☐	☐	☐
16.	I value health and safety concerns more than production concerns	☐	☐	☐	☐	☐
17.	*Employees* have been informed about the health effects of styrene	☐	☐	☐	☐	☐

Safety Motivation

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
18.	I worry when employees take risks on the job	☐	☐	☐	☐	☐
19.	The employees at this workplace should not do a job they think is a risk to their health	☐	☐	☐	☐	☐
20.	I have been informed about the health effects of styrene	☐	☐	☐	☐	☐

		No	Sometimes	Yes
21.	I provide free safety glasses to employees	☐	☐	☐
22.	I provide free work gloves to employees	☐	☐	☐
23.	I provide free face masks to employees	☐	☐	☐
24.	I provide free charcoal filters for employee breathing mask	☐	☐	☐
25.	This company has monthly safety meetings	☐	☐	☐

Feelings and Beliefs about Working in the Fiberglass Boat-Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	I believe the use of styrene is regulated properly at my workplace	☐	☐	☐	☐	☐
2.	I do not believe that working with styrene is hazardous to my health	☐	☐	☐	☐	☐

Feelings and Beliefs about Working in the Fiberglass Boat-Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
3.	I feel safe when working with styrene	☐	☐	☐	☐	☐
4.	I do not believe that styrene is harmful because of my own experience working here	☐	☐	☐	☐	☐
5.	I have not had negative health experiences while working with styrene	☐	☐	☐	☐	☐
6.	I believe styrene is hazardous to my health because science says that is the case	☐	☐	☐	☐	☐
7.	I believe Occupational Health and Safety personnel need to do more to ensure my working environment is safe	☐	☐	☐	☐	☐
8.	I believe Occupational Health and Safety personnel are unaware of the problems the safety equipment causes to my ability to complete my work	☐	☐	☐	☐	☐
9.	I believe that Occupational Health and Safety personnel should visit my workplace more often	☐	☐	☐	☐	☐
10.	I believe my working environment could be a safer place to work	☐	☐	☐	☐	☐
11.	I believe I do everything I can to ensure my health and safety at work	☐	☐	☐	☐	☐

Feelings and Beliefs about Working in the Fiberglass Boat-Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
12.	I believe I do everything I can to ensure the health and safety of *employees* at work	☐	☐	☐	☐	☐
13.	I believe *employees* at this plant do everything they can to ensure their health and safety at work	☐	☐	☐	☐	☐
14.	I believe *employees* at this plant are concerned about their health and safety at work	☐	☐	☐	☐	☐
15.	I am concerned about my own health and safety at work	☐	☐	☐	☐	☐
16.	I believe health care professionals in my community are aware of the health effects of styrene	☐	☐	☐	☐	☐
17.	I believe the health care professionals in my community can recognize the symptoms of having been over-exposed to styrene	☐	☐	☐	☐	☐
18.	I believe the WHMIS training was useful	☐	☐	☐	☐	☐
19.	I am satisfied with my job	☐	☐	☐	☐	☐
20.	I feel I have control over my own safety at work	☐	☐	☐	☐	☐

Perceived Risk with Working in the Fiberglass Boat Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	I work in a risky environment	☐	☐	☐	☐	☐
2.	The health risks of working with styrene are low	☐	☐	☐	☐	☐
3.	I sometimes worry that working with styrene will make me sick	☐	☐	☐	☐	☐
4.	If I do not feel sick, then the styrene does not pose a threat to my health	☐	☐	☐	☐	☐
5.	If I cannot smell the styrene, I am not at risk for over-exposure	☐	☐	☐	☐	☐
6.	I worry that I may get sick in the future because I work with styrene	☐	☐	☐	☐	☐
7.	I know people who have gotten sick while working with styrene	☐	☐	☐	☐	☐
8.	This is a healthy place to work	☐	☐	☐	☐	☐
9.	I feel that the *employees* at this workplace are at risk when it comes to their health	☐	☐	☐	☐	☐
10.	Working with styrene poses a threat to my health	☐	☐	☐	☐	☐
11.	The *employees* at this plant think working with styrene is dangerous to their health	☐	☐	☐	☐	☐

model. It has been suggested that 'background or distal factors' (e.g., knowledge, SES, emotion, social support, etc.) may indirectly mediate behaviour by moderating the effects of the proximal determinants of behaviour (e.g., Albarracin, Johnson, & Zanna, 2005).

Finally, the model has also been criticized as to the number of proximal determinants of behaviour. Some have suggested that the model is currently insufficient to fully understand behaviour and requires additional constructs to enhance the model's predictive ability (e.g., Conner & Abraham, 2001). For example, Conner and Armitage (1998) suggested that the TPB ignores the emotional determinants of behaviour. Conner and Abraham (2001) suggest that when individuals perceive a threat this may provoke feelings of worry or anxiety about the potential outcomes of performing or not performing behaviour. Consequently, they added an affect-cognition component to the TPB in an attempt to assess health protection and exercise behaviour. Path analysis results indicated that anticipated affective reaction (e.g., worry and regret) significantly affected the extent to which individuals intended to perform the behaviours. That is, the more individuals anticipated anxiety or regret from not having preformed the behaviour the more they intended to perform the behaviour. This finding suggests that affective reactions may have a significant effect on behaviour.

Summary of stages of change and social cognitive models of workplace safety behaviour and implications for the current study. It appears that when attempting to understand factors affecting attitude and behaviour change as they relate to workplace safety, stage-change models and social-cognitive models provide quite different

Perceived Risk with Working in the Fiberglass Boat Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
12.	I believe I have a good understanding of the risks associated with working with styrene	☐	☐	☐	☐	☐
13.	I believe *employees* have a good understanding of the risks associated with working with styrene	☐	☐	☐	☐	☐
14.	If I think I will get hurt or ill when doing a job then I will not take the risk	☐	☐	☐	☐	☐
15.	I believe I know the risks of working with styrene and I am skilled enough to take account of them to avoid injury or illness	☐	☐	☐	☐	☐
16.	I believe I know all the risk associated with working with styrene	☐	☐	☐	☐	☐
17.	If *employees* think they will get hurt or ill when doing a job then they will not take the risk	☐	☐	☐	☐	☐
18.	I believe *employees* know the risks of working with styrene and they are skilled enough to take account of them to avoid injury or illness	☐	☐	☐	☐	☐
19.	I believe *employees* know all the risk associated with working with styrene	☐	☐	☐	☐	☐

Social Influence

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	Employees at this plant want me, as their manager, to use safety equipment	☐	☐	☐	☐	☐
2.	My family encourages me to use safety equipment at work	☐	☐	☐	☐	☐
3.	I strongly insist employees at this plant use safety equipment	☐	☐	☐	☐	☐
4.	I often remind employees to use their safety equipment	☐	☐	☐	☐	☐
5.	My family is concerned about how styrene will affect my health	☐	☐	☐	☐	☐
6.	Employees do not see the value of using safety equipment	☐	☐	☐	☐	☐
7.	I see the value of using safety equipment	☐	☐	☐	☐	☐
8.	As a manager/owner I am concerned about the health of my employees	☐	☐	☐	☐	☐
9.	I find it difficult to behave safely at work when the employees are not behaving safely	☐	☐	☐	☐	☐
10.	My employees and I discuss health and safety issues as it relates to our workplace often	☐	☐	☐	☐	☐
11.	I care about what the employees at this plant think about my safety behavior at work	☐	☐	☐	☐	☐

Social Influence

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
12.	I care about what my family thinks about my safety behavior at work	☐	☐	☐	☐	☐
13.	My doctor encourages me to wear safety equipment at work	☐	☐	☐	☐	☐
14.	My doctor has talked to me about the health effects of styrene	☐	☐	☐	☐	☐
15.	My doctor constantly reminds me to wear safety equipment at work	☐	☐	☐	☐	☐
16.	Safety issues are kept under the table at my workplace	☐	☐	☐	☐	☐
17.	People seldom raise safety issues at my workplace	☐	☐	☐	☐	☐
18.	My image at work would be hurt if I brought up safety concerns	☐	☐	☐	☐	☐
19.	My employees would think badly of me if I brought up safety concerns at work	☐	☐	☐	☐	☐
20.	I would not think badly of a coworker or employee for bringing up safety concerns at work	☐	☐	☐	☐	☐

The Health Effects of Working with Styrene

Excessive exposure to styrene...		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	Is related to reduced color vision	☐	☐	☐	☐	☐
2.	Is not related to hearing loss	☐	☐	☐	☐	☐
3.	Is related to changes in mood	☐	☐	☐	☐	☐
4.	Is not related to depression	☐	☐	☐	☐	☐
5.	Is related to aggression	☐	☐	☐	☐	☐
6.	Is related to hair loss	☐	☐	☐	☐	☐
7.	Is not related to lung problems	☐	☐	☐	☐	☐
8.	Does not cause skin irritation	☐	☐	☐	☐	☐
9.	Causes eye irritation	☐	☐	☐	☐	☐

Please place an X next to the response that best gives your answer to the following question:

10. Do you think working with styrene has affected your mood?

Yes ☐

Maybe ☐

No ☐

The Health Effects of Working with Styrene

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
11.	Since I began working with styrene I find myself to be more irritable or moody	☐	☐	☐	☐	☐
12.	Working with styrene has affected my relationships with employees at this plant	☐	☐	☐	☐	☐
13.	Working with styrene has affected my relationships with family	☐	☐	☐	☐	☐
14.	Excessive exposure to styrene has affected my ability to make good decisions	☐	☐	☐	☐	☐
15.	Family members have commented about changes in my mood since I started working with styrene	☐	☐	☐	☐	☐
16.	I have noticed changes in my mood since I began working with styrene	☐	☐	☐	☐	☐
17.	Coworkers have commented about changes in my mood since I started working with styrene	☐	☐	☐	☐	☐
18.	I have noticed changes in employees' mood that I believe is related to styrene exposure	☐	☐	☐	☐	☐
19.	I have noticed changes in employees' personality that I believe is related to styrene exposure	☐	☐	☐	☐	☐

The Health Effects of Working with Styrene

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
20.	I believe my health has gotten worse since I began working with styrene	☐	☐	☐	☐	☐
21.	I have experienced a work related illness that I believe is due to styrene exposure	☐	☐	☐	☐	☐
22.	I have seen people get sick while working with styrene	☐	☐	☐	☐	☐
23.	I have experienced a work related injury while working here	☐	☐	☐	☐	☐
24.	I believe I can recognize the symptoms related to styrene exposure	☐	☐	☐	☐	☐

Company/ Plant Status

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	The amount of work at this plant has decreased	☐	☐	☐	☐	☐
2.	This plant is often busy	☐	☐	☐	☐	☐
3.	This plant is seasonal	☐	☐	☐	☐	☐
4.	This plant operates all year round	☐	☐	☐	☐	☐

Perceived Job Security

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	My job security is good	☐	☐	☐	☐	☐
2.	I feel it is likely that I might lose my job in the years to come	☐	☐	☐	☐	☐
3.	I fear not having a job	☐	☐	☐	☐	☐
4.	I fear losing this job	☐	☐	☐	☐	☐
5.	I feel employees should feel secure in their jobs	☐	☐	☐	☐	☐
6.	The number of hours I work at this company changes quite often	☐	☐	☐	☐	☐
7.	I feel that the future of this company is uncertain	☐	☐	☐	☐	☐
8.	I enjoy managing/owning this company	☐	☐	☐	☐	☐

Perceived Alternative Employment Opportunities

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	There are very few jobs available for me in my community	☐	☐	☐	☐	☐
2.	I take pride in my work	☐	☐	☐	☐	☐
3.	I would continue to work at this job even if there were other job opportunities	☐	☐	☐	☐	☐

Perceived Alternative Employment Opportunities

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
4.	I feel like I have no other choice but to work at this job	☐	☐	☐	☐	☐
5.	I work here because I like building fiberglass boats/products	☐	☐	☐	☐	☐
6.	I will take almost any job to make money	☐	☐	☐	☐	☐
7.	I like operating my own business	☐	☐	☐	☐	☐

***Please answer the following questions. **Notice that your response options have changed.**

Safety Behaviors at Work

How often do you….		Never	Almost Never	Sometimes	Almost Always	Always
1.	Use a respirator/mask when working with styrene?	☐	☐	☐	☐	☐
2.	Wear safety glasses when grinding?	☐	☐	☐	☐	☐
3.	Wear safety glasses when spraying?	☐	☐	☐	☐	☐
4.	Wear protective gloves while you work with styrene?	☐	☐	☐	☐	☐
5.	Have your work clothes cleaned/washed everyday?	☐	☐	☐	☐	☐

Safety Behaviors at Work

How often do you....		Never	Almost Never	Sometimes	Almost Always	Always
6.	Ignore safety rules and regulations at work when working with styrene?	☐	☐	☐	☐	☐
7.	Take shortcuts in safety guidelines related to the use or handling of styrene in order to get the job done faster?	☐	☐	☐	☐	☐
8.	Clean your respirator after every use?	☐	☐	☐	☐	☐

Safety Behaviors at Work

In your opinion, how often do		Never	Almost Never	Sometimes	Almost Always	Always
9.	Employees use a respirator or mask when working with styrene?	☐	☐	☐	☐	☐
10.	Employees ignore safety rules and regulations at work when working with styrene?	☐	☐	☐	☐	☐
11.	Employees take shortcuts in safety guidelines related to the use or handling of styrene in order to get the job done faster?	☐	☐	☐	☐	☐
12.	Employees who wear a respirator clean their respirator after every use?	☐	☐	☐	☐	☐
13.	Employees have their work clothes cleaned/washed everyday?	☐	☐	☐	☐	☐

Safety Behaviors at Work

In your opinion, how often do	Never	Almost Never	Sometimes	Almost Always	Always
14. Employees wear safety glasses when grinding?	☐	☐	☐	☐	☐
15. Employees wear safety glasses when spraying?	☐	☐	☐	☐	☐
16. Employees wear protective gloves while working with styrene?	☐	☐	☐	☐	☐

Health Care Usage and Satisfaction with Health Care

1. Do you have a regular medical doctor? Yes _____ No _____

If "No", why do you not have a regular medical doctor? Check all that apply to you.

_____ No medical doctors available in the area

_____ Medical doctors in the area are not taking new patients

_____ I have not tried to contact one

_____ I had a medical doctor who left the area or retired

_____ I do not believe the medical doctors are competent

_____ Other – Please specify _____

2. Have you seen a doctor in the last 12 months? Yes _____ No _____

3. Have you seen a doctor in the last 12 months for an injury or illness that you thought might be work related? Yes _____ No _____ Unsure _____

4. Where did the most recent contact with a health care provider take place?

_____ Doctor's office

_____ Hospital Emergency room

_____ Hospital outpatient clinic

_____ Walk-in clinic

_____ Appointment clinic

_____ Community health centre

_____ At work

_____ At home

_____ Over the telephone

_____ Other – Please Specify _____

perspectives. Stage-change models provide a framework for introducing effective health promotion and education programs (e.g., Barrett et al., 2005; DeJoy, 1996; Urlings et al., 1990). That is, if one can identify where people are with respect to their beliefs about safety at work, one can tailor an educational program to address the needs of workers at particular stages. However, stage-change models do not provide insight regarding the development of attitudes and beliefs or the extent to which social or environmental circumstances affect attitudes and behaviours.

Social-cognitive theories of behaviour intention and behaviour change provide a framework for understanding the factors affecting existing attitudes and behaviours. While the HBM has been used to address issues of health and safety at work (e.g., Arcury et al., 2002), the emphasis on health risk may prevent users from identifying other perceived risks such as economic and social risks (e.g., Wilkinson, 2001). Further, the model is focused on individual cognitive processes and does not thoroughly explore the social environment as a factor affecting behaviour change. Melamed et al. (1996) demonstrated via the PMT that self-efficacy is an important factor with respect to performing safety behaviours. However, like the HBM, this model does not provide any explanation of the factors influencing the development of attitudes and perceptions of risk.

As Lingard and Yesilyurt's (2003) study demonstrates, attitudes are an important component for understanding safety behavioural outcomes and the TPB may provide a suitable framework for understanding the factors affecting safety attitudes and behaviours. As previously mentioned, the TPB is different from other social cognitive

5. During the last 12 months was there ever a time when you felt that you needed health care but you didn't receive it? Yes _____ No_____

If "Yes", why didn't you get health care? Please check all that apply to you.

_____ No medical doctors available in the area
_____ Medical attention not available when required
_____ Personal/family responsibilities
_____ Felt doctor's advice /treatment would be inadequate
_____ Cost
_____ Doctor didn't think it was necessary I needed treatment
_____ Didn't get around to it or didn't bother
_____ Unable to leave the house because of a health problem
_____ Rural communities are difficult to service
_____ Transportation problems
_____ Wait time too long
_____ Language problems
_____ Dislikes/afraid of doctors
_____ Decided not to seek care
_____ I was too Busy
_____ Didn't know where to go
_____ Distance
_____ Other – Please Specify

6. Thinking of the most recent time, what was the type of care that you needed?

_____ Treatment of a physical health problem
_____ Treatment of an emotional or mental health problem
_____ Treatment of a workplace injury or illness
_____ Other – Please Specify _____
_____ A regular check-up
_____ Treatment of an injury

7. Thinking of the most recent time, where did you try to get the medical care you were seeking?

_____ Doctor's office
_____ Hospital emergency room
_____ Appointment clinic
_____ Other – Please Specify _____
_____ Walk-in clinic
_____ Hospital outpatient clinic
_____ Community health centre

8. Overall, how would you rate the **availability** of health care services in your community?

_____ Excellent _____ Good _____ Fair _____ Poor

9. Overall, how would you rate the **quality** of health care services in your community?

_____ Excellent _____ Good _____ Fair _____ Poor

10. Overall, how would you rate the **availability** of health care in your community as it relates to workplace injury or illness?

_____ Excellent _____ Good _____ Fair _____ Poor

11. Overall, how would you rate the **quality** of health care in your community as it relates to workplace injury or illness?

_____ Excellent _____ Good _____ Fair _____ Poor

Additional Comments:

_____
_____
_____
_____
_____

Please do not forget to fill out the last page…

Demographics

1. How long (in total) have you been working in the boat building and repair industry? (Please specify if it is **years or months**) _____

2. How long have you been managing or have owned this company? (Please specify if it is **years or months**) _____

3. What is your position or job title at your work? _____

4. Is part of your job to work with styrene? ☐ Yes ☐ No ☐ Sometimes

5. On average, how many hours a day do you work with styrene? _____ Hours

6. On average, how many hours a day are you **exposed** to styrene even if you are **not** working with it? _____ Hours

7. How many months of the year do you work at a fiberglass boat-building plant? _____ months

8. Age: _____ 9. Sex: _____

10. Marital Status:

_____ Single
_____ Common Law
_____ Married
_____ Divorced/Separated
_____ Widowed
_____ Other

11. Do you have a child or children? _____ Yes _____ No

12. Please indicate the highest level of education that you have completed.

_____ Elementary School
_____ High School
_____ Community College/Trade School
_____ Other (Please specify:_____)
_____ University (Undergraduate)
_____ University (Graduate Master's Degree)
_____ University (Graduate PhD)

13. Please indicate your approximate income from your job.

_____ Less than $15,000
_____ $15, 000 to $29,999
_____ $30,000 to $49, 999
_____ $50,000 to $79,999
_____ $80, 000 or more

14. Are there other members in your household contributing to the household income?

Yes ☐ No ☐ Sometimes ☐

15. To your knowledge, how many people live in your community? _____

16. Have you completed the WHMIS program? _____ Yes _____ No

Thank you for participating in this survey!

Appendix D.3

Occupational Health and Safety Inspector Survey

Assessing Knowledge, Beliefs, and Perceptions of Risk about the Fiberglass Boat-Building Industry in Newfoundland and Labrador

Please complete the following statements with reference to the Fiberglass Boat-Building Industry.

Please place an X in the box that best represents your level of agreement with each of the following statements.

Safety Knowledge

With respect to Employees....		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	Employees have received formal training (trade school or training program) on how to construct fiberglass boats/products	☐	☐	☐	☐	☐
2.	Employees have been properly fitted for a respirator	☐	☐	☐	☐	☐
3.	I believe employees know who to ask if they are not sure about the safe way to complete a task	☐	☐	☐	☐	☐
4.	I believe employees feel free to request or seek out additional safety training if they think it is needed	☐	☐	☐	☐	☐
5.	I believe employees know the safe way to complete their work	☐	☐	☐	☐	☐

Safety Knowledge

With respect to Employees….		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
6.	I believe employees know that wearing a mask or respirator is part of the safety equipment required for their work	☐	☐	☐	☐	☐
7.	I believe employees know the correct way to use a respirator/mask	☐	☐	☐	☐	☐
8.	I believe employees read the MSDS (Material Safety Data Sheets) when they have to work with chemicals	☐	☐	☐	☐	☐
9.	I believe employees find the MSDS sheets easy to read	☐	☐	☐	☐	☐
10.	I believe employees understand the information provided in the MSDS sheets	☐	☐	☐	☐	☐

Safety Knowledge

With respect to Managers…		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
11.	Managers have received formal training (trade school or training program) on how to construct fiberglass boats/products	☐	☐	☐	☐	☐
12.	Managers have been properly fitted for a respirator	☐	☐	☐	☐	☐

Safety Knowledge

With respect to Managers...		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
13.	I believe managers know who to ask if they are not sure about the safe way to complete a task	☐	☐	☐	☐	☐
14.	I believe managers feel free to request or seek out additional safety training if they think it is needed	☐	☐	☐	☐	☐
15.	I believe managers know the safe way to complete their work	☐	☐	☐	☐	☐
16.	I believe managers know that wearing a mask or respirator is part of the safety equipment required for their job	☐	☐	☐	☐	☐
17.	I believe managers know the correct way to use a respirator/mask	☐	☐	☐	☐	☐
18.	I believe managers read the MSDS (Material Safety Data Sheets) when they have to work with chemicals	☐	☐	☐	☐	☐
19.	I believe managers find the MSDS sheets easy to read	☐	☐	☐	☐	☐
20.	I believe managers understand the information provided in the MSDS sheets	☐	☐	☐	☐	☐

Safety Motivation

With respect to Managers…	Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1. There is no incentive (reason) for managers to follow the safety policies at work	☐	☐	☐	☐	☐
2. Managers are not rewarded for being safe	☐	☐	☐	☐	☐
3. These fiberglass boat-building companies are not rewarded for being safe	☐	☐	☐	☐	☐
4. Managers praise employees when they see that employees are following proper safety procedures	☐	☐	☐	☐	☐
5. Managers reprimand employees when they don't follow safety rules	☐	☐	☐	☐	☐
6. Managers take employee health and safety very seriously	☐	☐	☐	☐	☐
7. Managers are open to talking about safety issues with employees	☐	☐	☐	☐	☐
8. Managers reassure employees that bringing up concerns about health and safety will not negatively affect their job	☐	☐	☐	☐	☐
9. Managers feel that wearing a mask while working is very uncomfortable	☐	☐	☐	☐	☐

Safety Motivation

With respect to Managers…	Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
10. Managers believe that the cost of proper ventilation for these plants exceeds the company's profits	☐	☐	☐	☐	☐
11. Managers believe that wearing safety glasses does not slow down employee work	☐	☐	☐	☐	☐
12. Managers believer that wearing a mask/respirator slows down the work of employees	☐	☐	☐	☐	☐
13. Managers often feel under pressure to meet deadlines	☐	☐	☐	☐	☐
14. Managers value health and safety concerns more than production concerns	☐	☐	☐	☐	☐

Safety Motivation

With Respect to Employees…	Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
15. There is no incentive (reason) for employees to follow the safety policies at work	☐	☐	☐	☐	☐
16. Employees are not rewarded for being safe	☐	☐	☐	☐	☐
17. Employees are praised by managers when they see that employees are following proper safety procedures	☐	☐	☐	☐	☐
18. Employees are reprimanded by managers when they don't follow safety rules	☐	☐	☐	☐	☐

Safety Motivation

With Respect to Employees...		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
19.	Employees take health and safety very seriously	☐	☐	☐	☐	☐
20.	Employees feel that managers are open to talking about safety issues	☐	☐	☐	☐	☐
21.	Employees are reassured by managers that bringing up concerns about health and safety will not negatively affect their job	☐	☐	☐	☐	☐
22.	Employees feel that wearing a mask /respirator while working is very uncomfortable	☐	☐	☐	☐	☐
23.	Employees value health and safety concerns more than production concerns	☐	☐	☐	☐	☐
24.	Employees feel that managers take health and safety concerns very seriously	☐	☐	☐	☐	☐
25.	Employees often feel under pressure to meet manager deadlines	☐	☐	☐	☐	☐
26.	Employees feel that wearing safety glasses does not slow down their work	☐	☐	☐	☐	☐

		No	Sometimes	Yes
27.	Employees are provided free safety glasses	☐	☐	☐
28.	Employees are provided free work gloves	☐	☐	☐
29.	Employees are provided with free face masks	☐	☐	☐
30.	Employees are provided with free charcoal filters for their breathing mask	☐	☐	☐
31.	Most of these companies have monthly safety meetings	☐	☐	☐

Feelings and Beliefs about Working in the Fiberglass Boat-Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	I believe the use of styrene is regulated properly at most fiberglass boat-building plants	☐	☐	☐	☐	☐
2.	I do not believe that working with styrene is hazardous to employee health	☐	☐	☐	☐	☐
3.	Employees working in this industry feel safe when working with styrene	☐	☐	☐	☐	☐
4.	I believe the health care professionals servicing communities with fiberglass boat-building plants can recognize the symptoms of having been over-exposed to styrene	☐	☐	☐	☐	☐

theories in that it proposes the subjective norms construct which, while still a cognitive component, provides a social account of behaviour. However, the model falls short when addressing broader external issues and situational circumstances beyond the limited normative influence (e.g., Joffé, 1996) such as precarious employment and competition for work. Further, this model does not provide insight into how attitudes develop (e.g., Howarth, 2006). For instance when competition for work increases in response to economic decline, attitudes about the workplace may change in response. Furthermore, attitudes may be influenced by the degree or accuracy of knowledge regarding health and safety procedures.

According to Conner and Abraham (2001), affective reactions to a threat may affect whether or not one is willing to perform a particular behaviour. Given these findings, an assessment of behaviour within a risky work environment requires an assessment of affective reactions to such risk.

Applying the TPB to Understanding Safety Behaviours in the Fibreglass Boat-Building Industry

Given that the TPB continues to be widely used in dealing with risk-taking and health-related behaviours, and informing public health policy, and that it has the capacity to be extended or elaborated, the TPB is used in this study as a framework for understanding the factors affecting *existing* perceptions of risk and safety behaviours within the context of the NL fibreglass boat-building industry. Specifically, this study

Feelings and Beliefs about Working in the Fiberglass Boat-Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
5.	*Employees* believe the WHMIS training is useful	☐	☐	☐	☐	☐
6.	*Managers* believe the WHMIS training is useful	☐	☐	☐	☐	☐

Perceived Risk with Working in the Fiberglass Boat Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	The fiberglass boat-building industry is a risky work environment	☐	☐	☐	☐	☐
2.	The health risks of working in this industry are low	☐	☐	☐	☐	☐
3.	I sometimes worry that visiting these worksites will make me sick	☐	☐	☐	☐	☐
4.	If I do not feel sick, then the styrene does not pose a threat to my health	☐	☐	☐	☐	☐
5.	If I cannot smell the styrene, I am not at risk for over-exposure	☐	☐	☐	☐	☐
6.	I worry that I may get sick in the future because I visit places that work with styrene	☐	☐	☐	☐	☐
7.	I know many people who have worked in this industry and did not get sick	☐	☐	☐	☐	☐

Perceived Risk with Working in the Fiberglass Boat Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
8.	The fiberglass boat building industry is a health place to work	☐	☐	☐	☐	☐
9.	I feel that the employees at this workplace are at risk when it comes to their health	☐	☐	☐	☐	☐

Employee Perceived Risk with Working in the Fiberglass Boat Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
10.	Employees believe that the fiberglass boat-building industry is a risky work environment	☐	☐	☐	☐	☐
11.	Employees believe that the health risks of working with styrene are low	☐	☐	☐	☐	☐
12.	Employees worry that working in this environment will make them sick	☐	☐	☐	☐	☐
13.	If employees do not feel sick, then the y believe that styrene does not pose a threat to their health	☐	☐	☐	☐	☐
14.	If employees cannot smell the styrene, they believe they are not at risk for over-exposure	☐	☐	☐	☐	☐
15.	Employees worry that they may get sick in the future because they work with styrene	☐	☐	☐	☐	☐

Employee Perceived Risk with Working in the Fiberglass Boat Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
16.	Employees believe that the fiberglass boat-building industry is a healthy place to work	☐	☐	☐	☐	☐
17.	Employees believe that working with styrene puts their health at risk	☐	☐	☐	☐	☐

Manager Perceived Risk with Working in the Fiberglass Boat Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
18.	Managers believe that the fiberglass boat-building industry is a risky work environment	☐	☐	☐	☐	☐
19.	Managers believe that the health risks of working with styrene are low	☐	☐	☐	☐	☐
20.	Managers worry that working with styrene will make them sick	☐	☐	☐	☐	☐
21.	If managers do not feel sick, then they believe that styrene does not pose a threat to their health	☐	☐	☐	☐	☐
22.	If managers cannot smell the styrene, they believe they are not at risk for over-exposure	☐	☐	☐	☐	☐
23.	Managers worry that they may get sick in the future because they work with styrene	☐	☐	☐	☐	☐
24.	Managers believe that the fiberglass boat-building industry is a healthy place to work	☐	☐	☐	☐	☐

Manager Perceived Risk with Working in the Fiberglass Boat Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
25.	Managers believe that working with styrene puts their health at risk	☐	☐	☐	☐	☐

Social Influence

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	In general, employees think working with styrene is dangerous to their health	☐	☐	☐	☐	☐
2.	Family members encourage the use of safety equipment at work	☐	☐	☐	☐	☐
3.	As an Occupational Health and Safety Inspector, I strongly insist employees use safety equipment at work	☐	☐	☐	☐	☐
4.	I remind *employees* to use their safety equipment at work	☐	☐	☐	☐	☐
5.	I remind *managers* to use their safety equipment at work	☐	☐	☐	☐	☐
6.	Employees do not see the value of using safety equipment at work	☐	☐	☐	☐	☐
7.	Managers do not see the value of using safety equipment at work	☐	☐	☐	☐	☐
8.	I see the value of using safety equipment at the workplace	☐	☐	☐	☐	☐

Social Influence

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
9.	Managers are concerned about the health of employees	☐	☐	☐	☐	☐
10.	I think employees find it difficult to behave safely at work when other employees are not behaving safely	☐	☐	☐	☐	☐
11.	Employees and managers in the fiberglass boat-building industry often discuss health and safety issues	☐	☐	☐	☐	☐
12.	Health care personnel/doctors encourage employees to wear safety equipment at work	☐	☐	☐	☐	☐
13.	Health care personnel/doctors constantly remind employees to wear safety equipment at work	☐	☐	☐	☐	☐
14.	Health care personnel/doctors have talked to employees about the health effects of styrene	☐	☐	☐	☐	☐

The Health Effects of Working with Styrene

Excessive exposure to styrene…		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	Is related to reduced color vision	☐	☐	☐	☐	☐
2.	Is not related to hearing loss	☐	☐	☐	☐	☐

The Health Effects of Working with Styrene

Excessive exposure to styrene…		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
3.	Is related to changes in mood	☐	☐	☐	☐	☐
4.	Is not related to depression	☐	☐	☐	☐	☐
5.	Is related to aggression	☐	☐	☐	☐	☐
6.	Is related to hair loss	☐	☐	☐	☐	☐
7.	Is not related to lung problems	☐	☐	☐	☐	☐
8.	Does not cause skin irritation	☐	☐	☐	☐	☐
9.	Causes eye irritation	☐	☐	☐	☐	☐
11.	Can affect a worker's ability to make good decisions	☐	☐	☐	☐	☐
12.	Has resulted in mood changes in workers	☐	☐	☐	☐	☐
13.	Has resulted in personality changes in workers	☐	☐	☐	☐	☐

***Please answer the following questions. **Notice that your response options have changed.**

Safety Behaviors at Work

In your opinion, how often do	Never	Almost Never	Sometimes	Almost Always	Always
1. Employees use a respirator or mask when working with styrene?	☐	☐	☐	☐	☐
2. Employees ignore safety rules and regulations while working with styrene?	☐	☐	☐	☐	☐
3. Employees take shortcuts in safety guidelines related to the use of or handling styrene in order to get the job done faster?	☐	☐	☐	☐	☐
4. Employees who work with styrene clean their respirator after every use?	☐	☐	☐	☐	☐
5. Employees have their work clothes cleaned/washed everyday?	☐	☐	☐	☐	☐
6. Employees wear safety glasses when grinding?	☐	☐	☐	☐	☐
7. Employees wear safety glasses when spraying?	☐	☐	☐	☐	☐
8. Employees wear protective gloves while they work with styrene?	☐	☐	☐	☐	☐

Please do not forget to fill out the last page....

Demographics

1. How long (in total) have you been working for Government Services: Department of Occupational Health and Safety? (Please specify if it is **years or months**) _____

2. What is your position or job title at your work? _____

3. Age: _____

4. Sex: _____

5. Marital Status:

_____ Single
_____ Common Law
_____ Married
_____ Divorced/Separated
_____ Widowed
_____ Other

6. Do you have a child or children? _____ Yes _____ No

7. Please indicate the highest level of education that you have completed.

_____ Elementary School
_____ High School
_____ Community College/Trade School
_____ Other (Please specify:_____)
_____ University (Undergraduate)
_____ University (Graduate Master's Degree)
_____ University (Graduate PhD)
_____ University (MD)

8. Please indicate your approximate income from your job.

_____ Less than $15,000
_____ $15, 000 to $29,999
_____ $30,000 to $49, 999
_____ $50,000 to $79,999
_____ $80, 000 or more

9. Have you ever visited a Fiberglass Boat-Building Plant? _____ Yes _____ No

10. Have you ever inspected a Fiberglass Boat-Building Plant? _____ Yes _____ No

Additional Comments: _____

_____

_____

_____

_____

_____

_____

Thank you for participating in this survey!

Appendix D.4

Health Care Provider Survey

Please place an X in the box that best represents your level of agreement with each of the following statements. PLEASE NOTE: THERE ARE QUESTIONS ON THE BACK OF EACH PAGE.

Please answer the following statements with reference to the Fiberglass Boat Building Industry

Feelings and Beliefs about Working in the Fiberglass Boat-Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	I believe the use of styrene is regulated properly at this plant	☐	☐	☐	☐	☐
2.	I do not believe that working with styrene is hazardous to employee health	☐	☐	☐	☐	☐
3.	I do not believe that styrene is harmful	☐	☐	☐	☐	☐
4.	I have not encountered fiberglass boat-building plant employees with negative health experiences while working with styrene	☐	☐	☐	☐	☐
5.	I believe styrene is hazardous to people's health because science says that is the case	☐	☐	☐	☐	☐
6.	I believe Occupational Health and Safety personnel need to do more to ensure the fiberglass boat-building work environment is safe	☐	☐	☐	☐	☐

Feelings and Beliefs about Working in the Fiberglass Boat-Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
7.	I believe that Occupational Health and Safety personnel should visit fiberglass boat building plants more often	☐	☐	☐	☐	☐
8.	I believe the fiberglass boat-building work environment could be a safer place to work	☐	☐	☐	☐	☐
9.	I believe *employees* at this plant do everything they can to ensure their health and safety at work	☐	☐	☐	☐	☐
10.	I believe *employees* at this plant are concerned about their health and safety at work	☐	☐	☐	☐	☐
11.	I believe health care professionals servicing communities with fiberglass boat-building plants are aware of the health effects of styrene	☐	☐	☐	☐	☐
12.	I believe the health care professionals servicing communities with fiberglass boat-building plants can recognize the symptoms of having been over-exposed to styrene	☐	☐	☐	☐	☐

addresses the issue of the role of the social/environmental context which has not been fully developed by such social-cognitive models.

More specifically, while the TPB provides a model for determining the extent to which attitudes, subjective norms, and perceived behavioural control affect behavioural intentions, the theory currently does not address how salient attitudes that shape behaviour might have originated and developed, or how to conceptualize the social environment beyond the subjective norms component. As previously mentioned, the subjective norms component of the TPB has been found to be a weak predictor of behavioural intentions. In this study, this component is elaborated upon and reconceptualised by clearly defining the subjective norms. It may be the case that there are a number of important others or reference groups with different expectations of behaviour that may influence an individual when considering whether or not to engage in a behaviour. Furthermore, this study further develops the *social* aspect of the model by introducing social influences from a broader social context that have the ability to affect individual cognition and, consequently, behaviour.

Additionally, while the attitude component of the TPB is thought to encompass perceived risk, this construct requires greater consideration. For example, workplace safety research suggests that employee attitudes affect employee perceptions of risk (e.g., Mearns, Rundmo, Flin, Gordon, & Fleming, 2004; Sjoberg, 2000). Such research suggests that attitudes and risk perception are two distinct constructs. The review of the risk perception literature in subsequent sections provides evidence to the significance of assessing risk perception when attempting to understand employee safety behaviours.

Perceived Risk with Working in the Fiberglass Boat Building Industry

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	The health risks of working with styrene are low	☐	☐	☐	☐	☐
2.	If employees do not feel sick, then the styrene does not pose a threat to their health	☐	☐	☐	☐	☐
3.	If you cannot smell the styrene, then you are not at risk for over-exposure	☐	☐	☐	☐	☐
4.	Employees should worry about getting sick in the future because they work with styrene	☐	☐	☐	☐	☐
5.	I know people who have gotten sick while working with styrene	☐	☐	☐	☐	☐
6.	This fiberglass boat-building plant is a healthy place to work	☐	☐	☐	☐	☐
7.	I feel that my clients who work with styrene are at risk when it comes to their health	☐	☐	☐	☐	☐

Social Influence

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	My clients who work in the fiberglass boat-building industry think working with styrene is dangerous to their health	☐	☐	☐	☐	☐

Social Influence

		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
2.	I encourage clients working in the fiberglass boat-building industry use safety equipment at work	☐	☐	☐	☐	☐
3.	I constantly remind my clients who work in the fiberglass boat-building industry to use their safety equipment	☐	☐	☐	☐	☐
4.	My clients who work with styrene do not see the value of using safety equipment at work	☐	☐	☐	☐	☐
5.	I see the value of using safety equipment	☐	☐	☐	☐	☐
6.	As a healthcare provider I am concerned about the health of my clients who work with styrene	☐	☐	☐	☐	☐
7.	My clients and I discuss the health effects of working with styrene	☐	☐	☐	☐	☐

Safety Motivation

		No	Sometimes	Yes
1.	Employers provide free safety glasses to employees	☐	☐	☐
2.	Employers provide free work gloves to employees	☐	☐	☐

Safety Motivation

		No	Sometimes	Yes
3.	Employers provide free face masks to employees	☐	☐	☐
4.	Employers provide free charcoal filters to employees for the breathing mask	☐	☐	☐

The Health Effects of Working with Styrene

Excessive exposure to styrene…		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
1.	Is related to reduced color vision	☐	☐	☐	☐	☐
2.	Is not related to hearing loss	☐	☐	☐	☐	☐
3.	Is related to changes in mood	☐	☐	☐	☐	☐
4.	Is not related to depression	☐	☐	☐	☐	☐
5.	Is related to aggression	☐	☐	☐	☐	☐
6.	Is related to hair loss	☐	☐	☐	☐	☐
7.	Is not related to lung problems	☐	☐	☐	☐	☐
8.	Does not cause skin irritation	☐	☐	☐	☐	☐

The Health Effects of Working with Styrene

Excessive exposure to styrene…		Strongly Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Strongly Agree
9.	Causes eye irritation	☐	☐	☐	☐	☐
11.	Can affect one's ability to make good decisions	☐	☐	☐	☐	☐
12.	Has resulted in mood changes in workers	☐	☐	☐	☐	☐
13.	Has resulted in personality changes in workers	☐	☐	☐	☐	☐

***Please answer the following questions. **Notice that your response options have changed.**

Safety Behaviors at Work

In your opinion, how often do you		Never	Almost Never	Sometimes	Almost Always	Always
1.	Employees use a respirator or mask when working with styrene?	☐	☐	☐	☐	☐
2.	Employees ignore safety rules and regulations when working with styrene?	☐	☐	☐	☐	☐
3.	Employees take shortcuts in safety guidelines related to the use of or handling styrene in order to get the job done faster?	☐	☐	☐	☐	☐
4.	Employees who work with styrene clean their respirator after every use?	☐	☐	☐	☐	☐
5.	Employees have their work clothes cleaned/washed everyday?	☐	☐	☐	☐	☐
6.	Employees wear safety glasses when grinding?	☐	☐	☐	☐	☐
7.	Employees wear safety glasses when spraying?	☐	☐	☐	☐	☐
8.	Employees wear protective gloves while they work with styrene?	☐	☐	☐	☐	☐

Health Care Utilization and Satisfaction

1. Do you believe there is a proportion of people in your region/health authority that have unmet health care needs?

   Yes _____ No _____ Unsure _____

If "Yes", please estimate the proportion of the population in your region/health authority that you believe have unmet health care needs: _____%

2. Why do you think people in your region/health authority may not have received health care when they needed it? (Please check all that apply)

_____ No medical doctors available in the area
_____ Medical attention not available when required
_____ Personal/family responsibilities
_____ Language problems
_____ Unable to leave the house because of a health problem
_____ Decided not to seek care
_____ Didn't get around to it or didn't bother
_____ Didn't know where to go
_____ Felt doctor's advice /treatment would be inadequate
_____ The patient was too busy
_____ Rural communities are difficult to service
_____ Distance
_____ Transportation problems
_____ Wait time too long
_____ Dislikes/afraid of doctors
_____ Cost
____ Other – Please Specify _____

3. Overall, how would you rate the **availability** of health care services in **your health region/ authority**?

   _____ Excellent_____ Good _____ Fair _____ Poor

4. Overall, how would you rate the **quality** of health care services in **your health region/ authority**?

_____ Excellent_____ Good _____ Fair _____ Poor

5. Overall, how would you rate the **availability** of health care in your **health region/ authority** as it relates to **workplace** injury or illness?

_____ Excellent_____ Good _____ Fair _____ Poor

6. Overall, how would you rate the **quality** of health care in **your health region/ authority** as it relates to **workplace** injury or illness?

_____ Excellent_____ Good _____ Fair _____ Poor

Demographics

1. How long (in total) have you been working in this community?
(Please specify if it is **years or months**) _____

2. What is your position or job title at your work? _____

3. Age: _____

4. Sex: _____

5. Marital Status:

_____ Single
_____ Common Law
_____ Married
_____ Divorced/Separated
_____ Widowed
_____ Other

6. Do you have a child or children? _____ Yes _____ No

7. Please indicate the highest level of education that you have completed.

_____ Elementary School
_____ High School
_____ Community College/ Trade School
_____ Other
(Please specify:_____)
_____ University (Undergraduate)
_____ University (Master's Degree)
_____ University (Graduate PhD)
_____ University (MD)

8. Please indicate your approximate income from your job.

_____ Less than $15,000
_____ $15, 000 to $29,999
_____ $30,000 to $49, 999
_____ $50,000 to $79,999
_____ $80, 000 or more

9. If you are a physician, is your practice based on:

Fee for service ☐

Salary ☐

Additional Comments:

_____

_____
_____
_____
_____
_____
_____
_____
_____
_____

Thank you for participating in this survey!

Appendix E

Consent Forms for Study 2

Employee Consent Form

Dear Employee,

As a person who works in this industry, I believe your expertise, thoughts, and opinions are vital to understanding the issues related to the fiberglass boat-building and repair industry in rural Newfoundland and Labrador. Boat-building and repair continues to be an active part of rural Newfoundland both culturally and economically. Therefore, I am inviting you to participate in this survey.

I am a graduate student in psychology at Memorial University of Newfoundland working on a PhD project. The purpose of this project is to assess your beliefs, knowledge, behaviors, and perceptions of risk about the fiberglass boat-building industry in Newfoundland and Labrador with respect to exposure to styrene. I would like to invite you to participate in this research by filling out a survey. This will require about 15 – 20 minutes of your time.

You should know that participation in this survey is completely **voluntary** and will have no effect on your current employment status. However, it is possible that your survey responses may contribute to changes in the industry. All information provided by you will be **strictly confidential**. No information that can identify you will be released or published, therefore, please **do not** place your name or any information that could identify you (e.g., address, phone number, etc.) on the survey.

Completion of the survey will be considered your consent to participate in this study.

If you want to take part in this study, please fill out the attached survey. You are free to leave out any questions you do not want to answer or to quit the survey at anytime. However, completion of the entire survey is greatly appreciated. When you are finished please detach this letter from the survey and place the survey in the envelope provided. Please make sure to seal the envelope. The survey will be picked up by the researcher at your workplace; however, if you would like to make alternative arrangements to return your survey please contact me (Stacey Wareham) at the number below. Please keep this cover letter for your information.

This research has been approved by the Interdisciplinary Committee on Ethics in Human Research (ICEHR). If you have any ethical concerns about this research that are not dealt

with by me or my supervisor you may contact ICEHR at icehr@mun.ca or by telephone at (709) 737-8368.

It is possible that the survey questions will cause some curiosity about styrene exposure. Please feel free to contact us with any questions you may have and, if needed, we will put you in touch with the best qualified person to answer your question(s). You may contact me (Stacey) at (709) 687-6640 or my supervisor, Dr. Christine Arlett, at (709) 737-8496.

If you have any questions while filling out this survey please call me collect at 709-687-6640 and I will be happy to help.

Thank you very much for your time and cooperation.
Sincerely,

Stacey Wareham
PhD Student at Memorial University of Newfoundland
Dr. C. Arlett, Supervisor

Please tear off this page and keep it for your information!

Conner and Abraham (2001) incorporated risk perception as an additional determinant of behavioural intentions when applying the TPB to health protective behaviours and, more specifically, exercise behaviour. Findings from this study suggest that risk perception was not a significant predictor of behavioural intentions. However, Conner and Abraham did not assess the extent to which risk perception may affect the original TPB determinants of behavioural intentions (i.e., attitudes, subjective norms, perceived behavioural control). Conner and Abraham suggest that perhaps risk perception is a distal determinant of behavioural intentions. Furthermore, it may also be the case that the predicted behaviours (e.g., global measure of health protection and exercise) may not elicit the same belief with respect to risk as when one is continuously exposed to risk, such as in the workplace. Additionally, Conner and Abraham's findings suggest that the predictive utility of the TPB may be enhanced with the addition of an affective component.

The following section proposes how the TPB may be augmented with the addition of an individual level component, namely, risk perception. Note that due to the scope of workplace safety research, particularly with respect to employee behaviour, the literature review has primarily been limited to research related to chemical exposures in the workplace, although additional workplaces and hazards have been included when particularly relevant.

Risk Perception and the Workplace

Experts and lay people differ in several ways with respect to chemical risk perception and chemical risk exposure (e.g., Kraus et al., 1992; MacGregor, Slovic &

Manager Consent Form

Dear Manager/Owner,

As a person who works in this industry, I believe your expertise, thoughts, and opinions are vital to understanding the issues related to the fiberglass boat-building and repair industry in rural Newfoundland and Labrador. Boat-building and repair continues to be an active part of rural Newfoundland both culturally and economically. Therefore, I am inviting you to participate in this survey.

I am a graduate student in psychology at Memorial University of Newfoundland working on a PhD project. The purpose of this project is to assess your beliefs, knowledge, behaviors, and perceptions of risk about the fiberglass boat-building industry in Newfoundland and Labrador with respect to exposure to styrene. I would like to invite you to participate in this research by filling out a survey. This will require about 15 – 20 minutes of your time.

You should know that participation in this survey is completely **voluntary** and will have no effect on your current employment status. However, it is possible that your survey responses may contribute to changes in the industry. All information provided by you will be **strictly confidential**. No information that can identify you will be released or published, therefore, please **do not** place your name or any information that could identify you (e.g., address, phone number, etc.) on the survey.

Completion of the survey will be considered your consent to participate in this study.

If you want to take part in this study, please fill out the attached survey. You are free to leave out any questions you do not want to answer or to quit the survey at anytime. However, completion of the entire survey is greatly appreciated. When you are finished please detach this letter from the survey and place the survey in the envelope provided. Please make sure to seal the envelope. The survey will be picked up by the researcher at your workplace; however, if you would like to make alternative arrangements to return your survey please contact me (Stacey Wareham) at the number below. Please keep this cover letter for your information.

This research has been approved by the Interdisciplinary Committee on Ethics in Human Research (ICEHR). If you have any ethical concerns about this research that are not dealt with by me or my supervisor you may contact ICEHR at icehr@mun.ca or by telephone at (709) 737-8368.

It is possible that the survey questions will cause some curiosity about styrene exposure. Please feel free to contact us with any questions you may have and, if needed, we will put you in touch with the best qualified person to answer your question(s). You may contact me (Stacey) at (709) 687-6640 or my supervisor, Dr. Christine Arlett, at (709) 737-8496.

If you have any questions while filling out this survey please call me collect at 709-687-6640 and I will be happy to help.

Thank you very much for your time and cooperation.
Sincerely,

Stacey Wareham
PhD Student at Memorial University of Newfoundland
Dr. C. Arlett, Supervisor

Please tear off this page and keep it for your information!

Occupational Health and Safety Inspector Consent Form

Dear Government Services Occupational Health and Safety Personnel,

I believe your expertise, thoughts, and opinions are vital to understanding the issues related to health and safety in the fiberglass boat-building and repair industry in rural Newfoundland and Labrador. Boat-building and repair continues to be an active part of rural Newfoundland both culturally and economically. Therefore, I am inviting you to participate in this survey.

I am a graduate student in psychology at Memorial University of Newfoundland working on a PhD project. The purpose of this project is to assess your beliefs, knowledge, and perceptions of risk about the fiberglass boat-building industry in Newfoundland and Labrador with respect to exposure to styrene. You will also be asked to give your opinions about what Managers and Employees believe with respect to beliefs, knowledge, and perceptions of risk regarding the fiberglass boat building industry. I would like to invite you to participate in this research by filling out a survey. This will require about 15 – 20 minutes of your time.

You should know that participation in this survey is completely **voluntary** and will have no effect on your current employment status. However, it is possible that your survey responses may contribute to changes in the industry. All information provided by you will be **strictly confidential**. No information that can identify you will be released or published, therefore, please **do not** place your name or any information that could identify you (e.g., address, phone number, etc.) on the survey.

Completion of the survey will be considered your consent to participate in this study.

If you want to take part in this study, please fill out the attached survey. You are free to leave out any questions you do not want to answer or to quit the survey at anytime. However, completion of the entire survey is greatly appreciated. You can complete the survey by either typing in your answers or printing the survey and completing it by hand. When you are finished please detach this letter from the survey. You can return the survey either **1)** by email (though this may not be an option if you are concerned about anonymity); **2)** Print the survey (it is a Microsoft Word document) and send it to the address below making sure you do not put your name or return address on the envelope; **3)** Fax the survey to the number below, again making sure you do not put your name or address on the fax cover sheet. If you would like to make alternative arrangements to return your survey please contact me (Stacey Wareham) at the number below.

This research has been approved by the Interdisciplinary Committee on Ethics in Human Research (ICEHR). If you have any ethical concerns about this research that are not dealt

with by me or my supervisor you may contact ICEHR at icehr@mun.ca or by telephone at (709) 737-8368.

If you have any questions regarding this survey, you may contact me **(Stacey) at (709) 687-6640** or my supervisor, **Dr. Christine Arlett, at (709) 737-8496**.

Thank you very much for your time and cooperation.

Sincerely,

Stacey Wareham
C/O Psychology Department
Memorial University of Newfoundland
St. John's, NL
A1B 3X9
Fax: (709) 737-2430
Email: swareham@play.psych.mun.ca

Please tear off this page and keep it for your information!

Health Care Providers Consent Form

Dear Health Care Provider,

I believe your thoughts, expertise, and opinions are vital to understanding the issues related to occupational health and safety in the fiberglass boat-building and repair industry in rural Newfoundland and Labrador. Boat-building and repair continues to be an active part of rural Newfoundland both culturally and economically. Therefore, I am inviting you to participate in this survey.

I am a graduate student in psychology at Memorial University of Newfoundland working on a PhD project. The purpose of this project is to assess your beliefs, knowledge, and perceptions of risk about the fiberglass boat-building industry in Newfoundland and Labrador with respect to exposure to styrene. You will also be asked to give your opinions about what Managers and Employees believe with respect to beliefs, knowledge, and perceptions of risk regarding the fiberglass boat building industry. I would like to invite you to participate in this research by filling out a survey. This will require about 15 – 20 minutes of your time.

You should know that participation in this survey is completely **voluntary.** All information provided by you will be **strictly confidential**. No information that can identify you will be released or published, therefore, please **do not** place your name or any information that could identify you (e.g., address, phone number, etc.) on the survey. It is possible that your survey responses may contribute to changes in the industry.

Completion of the survey will be considered your consent to participate in this study.

If you want to take part in this study, please fill out the attached survey. You are free to leave out any questions you do not want to answer or to quit the survey at anytime. However, completion of the entire survey is greatly appreciated. When you are finished please detach this letter from the survey and place the survey in the postage paid envelope provided for mailing back to me. Please make sure to seal the envelope. If you would like to make alternative arrangements to return your survey please contact me (Stacey Wareham) at the number below. Please keep this cover letter for your information.

This research has been approved by the Interdisciplinary Committee on Ethics in Human Research (ICEHR). If you have any ethical concerns about this research that are not dealt with by me or my supervisor you may contact ICEHR at icehr@mun.ca or by telephone at (709) 737-8368.

If you have any questions regarding this survey, you may contact me (Stacey) at (709) 687-6640 or my supervisor, Dr. Christine Arlett, at (709) 737-8496.

If you have any questions while filling out this survey please call me at 709-687-6640 and I will be happy to help.

Thank you very much for your time and cooperation.
Sincerely,

Stacey Wareham
PhD Student at Memorial University of Newfoundland
Dr. C. Arlett, Supervisor

Please tear off this page and keep it for your information!

Malmfors, 1999; Slovic et al., 1995) and different assumptions, values, and perceptions underlie these differences (Slovic et al., 1995). For example, it has been observed that the general public and chemical experts vary significantly in their perceptions of risk of various chemicals (e.g., food additives, pesticides, etc.). Compared to toxicologists, the general public tend to have higher perceptions of risk and less favourable attitudes towards chemicals (Slovic et al., 1995; Slovic et al., 1997; Kraus et al., 1992). Further, men tend to judge risks as smaller and less problematic than women (Slovic, 1999), and this appears to be true for both the general public and experts (Slovic, Malmfors, Mertz, Neil, & Purchase, 1997). Flynn, Slovic, and Mertz (1994) found that in comparison to white females, non-white males, and non-white females, white males rated risks consistently lower. However, when white males were assessed more closely, not all white males perceived risks as low. Rather, 30% of white males rated the risks significantly lower than the remainder of the white male group. This subgroup differed from the group as a whole in that they were better educated, had higher socioeconomic status, and were more politically conservative. Thus, it would appear that in addition to gender, socioeconomic status and education level influence risk perception.

While much of the research on chemical risk perception has concentrated on risk perceptions in the general public, research has rarely focused on risk perceptions involving specific work environments requiring the use of hazardous chemicals, particularly those industries that are considered crucial to the economic and cultural well-being of communities and individuals (e.g., Kovacs, Fischhoff, & Small, 2001; Quandt, Arcury, Austin, & Cabrera, 2001; Sjoberg & Drottz-Sjobert, 1991). For instance, Sjobert

and Drottz-Sjoberg (1991) discussed the paucity of research on risk perception in special groups such as nuclear power plant employees. They believed that this specific group was an important focal point for risk perception research since they are in a situation where their *own* actions have consequences for the actual risk they may be exposed to.

Using rating scales, Sjoberg and Drottz-Sjoberg (1991) assessed knowledge, risk perception, and attitudes among nuclear power plant employees. Ten professional groups at two Swedish power plants were included in the study. Results indicated that those who were less knowledgeable about job-related radiation risk were more likely to perceive higher levels of risk. This finding points to the relevance of knowledge of chemical risk exposure and safety procedures. Furthermore, a significant difference was found between the ten different professional groups at the plants regarding perceived job risks and general accident risk (e.g., lung cancer from smoking, drowning, traffic accident, etc.). Those who perceived their job as being high risk gave low ratings for general accident risks. It appeared that if the perceived job risk is very high, other risks are judged as lower by comparison.

Qualitative research methods have also been used to assess chemical risk perception in specific groups. In contrast to the aforementioned quantitative research, qualitative studies have attempted to determine *why* there are differences between groups in chemical risk perception. In addition, qualitative approaches to understanding chemical risk perception of employees have focused mainly on perceptions of risk at work and not risk perceptions in general. Findings of several studies suggest that while workers are

aware of the concerns associated with their work, they underestimate or deny the risk associated with the chemicals in question (e.g., Kovacs et al., 2001; Vaughan, 1993).

One such qualitative study involved dry cleaners and their customers. Kovacs et al. (2001) found that while dry cleaners (who are exposed to Perchloroethylene (PCE), a probable carcinogen) acknowledged the concerns surrounding the use of PCE, they denied such concerns and provided anecdotal evidence as justification. Some of the justifications they provided included no observed ill effects in other dry cleaners or their customers, distrust in the science that has concluded that PCE is carcinogenic, and their own years of experience in the industry without any health problems. In fact, many dry cleaners believed that stronger enforcement of regulations and new technology would be detrimental to small businesses.

Building on an existing program of research (e.g., Quandt, Arcury, Austin, Saavendra, 1998), Quandt, Arcury, Austin, and Cabrera (2001) used participatory action research with Latino farmworkers to develop an intervention program aimed at preventing occupational exposure to pesticides. Interviews and focus groups were conducted with farmworkers, farmers, health care personnel (e.g., outreach workers, nurses, and physician assistants), and Cooperative Extension personnel (e.g., agents from different countries and with different backgrounds). Farmworkers were questioned about personal experiences with pesticides, safety training, beliefs about health effects of exposure and exposure prevention, and preferred methods of receiving information about pesticides and other health topics.

While the farmworkers were concerned about pesticides, their beliefs about both the nature of exposure and the risk factors were not always accurate. They were worried about inhaling pesticides and therefore wore bandanas over their mouths. However, they believed that if the pesticide was not detectable by the senses, there was no reason for concern and that the chemical could not be absorbed through the skin. Furthermore, they believed that washing their hands with cold water or taking a shower right after work (suggestions for minimizing exposure to the chemical) were hazardous to their health. These beliefs were consistent with the humoral medicine system common in Mexico, but not with recommendations provided by WPS (Worker Protection Standard) (Quandt et al., 2001). Farmworkers also believed that the effects of pesticides were immediate and were not life threatening (Quandt et al., 2001). In addition, they lacked significant knowledge about their exposure to residues, received very little training and were not provided with personal protective equipment (PPE) by their employer. However, Cooperative Extension agents and farmers believed that training in pesticide safety was not needed and that farmworkers were not exposed to the chemical since they were not involved in the mixing and application process. In contrast, health care personnel thought that pesticide related health problems were underreported and under-treated, suggesting that farmworkers might resist going to health clinics for fear of losing wages or jobs and/or were not aware of symptoms associated with pesticide exposure. Health care personnel also believed that many of the farms were not complying with regulations such as providing hand washing stations, showers, and clothes washing facilities to

farmworkers, and that farmworkers were not given adequate training regarding pesticides and risk of exposure.

Quandt et al.'s (2001) work suggests that there are varying degrees of knowledge about pesticides and different levels of risk perception among these groups of workers, and these findings are consistent with a similar study of Latino farmworkers conducted by Elmore and Arcury (2001). Furthermore, these findings implicate social, cultural, and economic factors as influential mediators of risk perception. Similar findings were found among Hungarian and UK industrial radiographers where social and economic circumstances appeared to affect risk perception (Orton, Sjoberg, Jung, Urge-Vorstaz, & Tamassyne-Biro, 2001). In this study, it was observed that even though Hungarians experienced the same exposure risk as UK radiographers, their low pay and depressed economic state translated into lower reported perceptions of radiation risk compared to their counterparts.

Based on research such as that cited above, studies aimed at assessing perceptions of risk of a specific target group (e.g., boat-building plant employees) regarding a specific risk (e.g., occupational exposure to styrene) may be improved by taking a dual method approach to risk perception, that is, a qualitative – quantitative approach. Such an approach was adopted by Weyman, Clarke and Cox (2003) when exploring coal miners' views on risk-taking behaviour. In this study, Weyman et al. conducted focus groups (N = 64) with coal miners in an attempt to gain insight into salient influences that affect risk decision-making and risk-taking behaviours. Thematic analysis of the focus groups provided detailed information regarding task-related factors relating to the organization

and social relationships in the work environment and the impact of these factors on individual and team decision-making. Information from the qualitative analysis was used to develop a questionnaire. The questionnaire consisted of 83 items representing the identified themes. Weyman et al. restricted the number of items to ensure a manageable instrument although they recognized the risk of possibly generating weak constructs with this constraint. After several modifications, the survey was distributed to 932 operational mine workers; 787 workers completed the survey, representing a response rate of 84%. The survey data were analyzed using a Principal Component Analysis (PCA) and a varimax rotation. Three factors were obtained, accounting for 35% of the total variance in the data. Within each factor, internal consistency and test-retest reliability analyses were performed, indicating that each factor had a coefficient alpha of approximately .80. Weyman et al. labelled the three constructs derived from the PCA as (1) time pressure, (2) management commitment, and (3) confidence in ability to deal with risk (locus of control).

A salient observation by Weyman et al. was the extent to which miners felt confident in dealing with risk, which the authors considered 'unreasonably optimistic'. Such beliefs relating to perceived skill and expertise have been related to notions of personal control and have generally been conceptualized by researchers as indicating a cognitive bias (DeJoy, 1989; Weinstein, 1984; Weinstein & Nicholich, 1993). Weyman et al. contend that high levels of reported confidence in dealing with risk among coal miners affect risk taking behaviours by attenuating perceptions of risk and therefore increasing the propensity for risk-taking behaviour.

Weyman et al.'s dual method approach to understanding the underlying factors affecting risk taking behaviour is certainly a step in the right direction. However, their study falls short of conducting an analysis to determine if the three identified factors actually predict risk-taking behaviour as safety behaviours were not measured. Furthermore, social and cultural factors beyond the organizational context with the potential to influence workplace safety behaviours were not examined.

Cognitive approaches to assessing risk perception. There are a variety of approaches to risk perception each with its own strengths and weaknesses. Much social psychological research on risk perception has taken a cognitive approach with a focus on information processing and potential cognitive errors such as optimistic bias (e.g., Dejoy, 1989), overconfidence and desire for certainty (Slovic, Fischhoff, & Lichtenstein, 2000).

The most widely employed methods used to assess cognitive factors of risk perception are rating scales and factor-analytic procedures to determine the different cognitive factors that shape responses (Lupton, 1999). These methods are commonly referred to as the psychometric approach within the risk perception literature (e.g., Wahlberg, 2001). With respect to risk perception, this approach is based on decision theory and attempts to identify the risk attributes underlying risk preferences (i.e., the extent to which people are risk averse and their attitudes toward taking risk; Eiser, 2001). The rating scale and factor analytic method was first presented by Fischhoff, Slovic, Lichtenstein, Read and Coombs (1978) at which time nine risk dimensions were determined (e.g., voluntary versus involuntary, catastrophic, delayed versus immediate,

known to science). Subsequently, Slovic (1987) used factor analysis to summarize the data, identifying two main factors: high versus low dread and known versus unknown.

Stemming from Zajonc's (1980) argument that affective reactions or feelings guide information processing and judgements, contemporary risk researchers have advocated for the importance of an affective component in risk judgements (Peter & Slovic, 2000; Slovic, 1999; Slovic & Peters, 2006; Slovic, Finucane, Peters, & MacGregor, 2007). That is, an affective component would involve basing judgements and behavioural decisions on evaluative assessments of like or dislike, attraction or aversion, that are experienced more immediately and intuitively rather than on the rational calculations implied by decision models (Peter & Slovic, 2000; Slovic, 1999). The use of such feelings in guiding judgements and decisions has been described as the affect heuristic (Slovic & Peter, 2006; Slovic, Finucane, Peters, & MacGregor, 2007). While the affect heuristic can provide efficient and adaptive behavioural responses, over-reliance on heuristics can lead us down the wrong decision-making path (Slovic, et al., 2007). Recently, affect or 'warm cognition' and social context have been recognized as necessary components for broadening the information processing approach to decision making and social judgement (e.g., Schwarz, 2000).

Slovic and his colleagues have conducted a great deal of research using the psychometric approach, mostly trying to understand the cognitive and affective processes underlying risk preferences and evaluation of potential hazards, and demonstrating the multi-dimensionality of risk perception. This approach has proven to be well suited for identifying similarities and differences among groups with regard to risk perceptions and

attitudes toward risk (Kraus, Malmfors, & Slovic, 1992; MacGregor, Slovic, & Malmfors, 1999; Mertz, Slovic, & Purchase, 1998; Slovic, 1987; Rippl, 2002).

An extension to the psychometric approach as a means of determining differences in risk perception between groups has been proposed by Sjoberg (1993) and colleagues. This alternative approach has been called the Basic Risk Perception Model (BRPM) or, in more recent studies, the Extended Psychometric Model (Sjoberg, 2000). It includes factors such as attitude toward a specific risk, risk sensitivity, and specific fear (Sjoberg, 2000) and sometimes trust and moral value (Wahlberg, 2001). Recently, another dimension, tampering with nature, has been added to the Extended Psychometric Model (Sjoberg, 2000).

Typical of the psychometric approach, the BRMP uses questionnaires and factor and regression analyses to assess attributes of risk. However, Sjoberg (2002) argued that the seemingly large portion of variance accounted for using the psychometric method is somewhat misleading. Specifically, the concern is that average ratings are analyzed across hazards, providing little information concerning individual variation in risk perception or about intra-individual perception processes. In response to this criticism, the statistical analyses used in the BRMP approach require that the individual is the unit of analysis rather than mean responses of participants (Wahlberg, 2001).

Cognitive approaches to assessing risk perception: Implications for the current study. While the cognitive approach provides a great deal of information with respect to how individuals characterize risk, it lacks the capacity to take into account the social

nature of risk (Douglas, 1985; Eiser, 2001; Joffé, 2003; Rippl, 2002). One prominent criticism is that it does not provide explanations as to why people experience risk in the identified dimensions (Walberg, 2001) such as Slovic's (1987) notions of high versus low dread and known versus unknown risk.

The cognitive approach to risk perception has been criticized for over-emphasizing individual cognition and assuming that people are rational thinkers who try to avoid risk (Douglas, 1985). This approach fails to address social influence (Douglas, 1985; Eiser, 2001) and does not take into account social and cultural factors that can affect risk perception (Rippl, 2002). Hence, in addition to assessing perceptions of risk via cognitive processes, it has become important to address the role of social influence. That being said, the rating scale method is a practical and proven approach to assessing risk perceptions within and between large groups.

Social approaches to assessing risk perception. Whereas the cognitive approach focuses on the cognitive factors that determine individuals' risk perceptions, there are several 'social' approaches to exploring perceptions of risks. Cultural Theory (CT) proposed by Douglas and Wildavsky (1982) takes a sociological/anthropological approach to risk, focusing on social and cultural influences on risk perception. Douglas and Wildavsky suggest that risk perceptions about environmental or social issues are socially and culturally framed; values and worldviews of certain social and cultural contexts mould an individual's perceptions and evaluations of risk (Rippl, 2002). World views are the general social, cultural, and political attitudes that have an impact on

people's judgments about complex issues (Dake, 1991). Individuals are a part of a larger social system which tends to shape their attitudes, values, and views (Rippl, 2002). In contrast to the cognitive approach, CT asserts that the "important predictors of what people fear or do not fear are not individual cognitive processes such as perceptions of threats to health or feelings of uncontrollability, but socially shared worldviews – so-called cultural biases that determine the individual's perceptions" (Rippl, 2002, p. 148). Individual risk perception is rooted in the individual's culture. Douglas and Wildavsky suggest four prototypical patterns: fatalism, hierarchy, individualism, and egalitarianism. These four cultural types were developed using two central dimensions of sociality: control and social commitment.

The CT of risk perception has been praised for adopting a broader social/cultural approach to risk which includes risk judgments that are influenced by political and moral views (Lupton, 1999). However, the CT has been criticized for its lack of ability to predict perceived risk (Sjoberg, 2002). It has been suggested that better measures of cultural biases are needed (Peters & Slovic, 1996; Rippl, 2002). For example, Marris et al. (1998) used the Cultural Biases Questionnaire developed by Dake (1991) to compare the utility of CT with the more cognitive approaches in predicting perceptions of risk. The rating scale methods typical of the cognitive approach predicted a greater portion of variance in risk perception than did the Cultural Biases Questionnaire. Although Marris et al. (1998) state that CT "does not really claim to explain such abstract ratings of risk" (p. 645), this appears to fly in the face of the numerous articles using CT to explain risk perception (Sjoberg, 2002).

Rippl (2002) modified Dake's Cultural Biases Questionnaire in order to provide a measurement that would be more consistent with the assumptions of CT. While she concedes that the improved measure did not increase the predictive power of CT with respect to risk perception, it did provide a better method for testing the model. While this model appears suitable for categorizing people in terms of whether they perceive risk, it appears that it may not be appropriate for predicting perceived risk.

Eiser (2001) has recently proposed an approach to risk perception that he claims is more social psychological in focus than past approaches. Eiser contends that risk perceptions and attitudes can be seen as components of a complex dynamic system both at the cognitive level (networks of learned associations) and at the social level (communication and influence between groups of individuals). The consideration of social influence is required if we are to take a more social psychological approach to risk perception (Eiser 2001).

Eiser's approach conceives of risk perceptions or judgements about safety as strongly influenced by personal experience. Personal experience is evaluative and, therefore, provides direction for attitudes and behaviour. The second component involves the acquisition of knowledge or information from others. This includes the uncertainty of who should be approached for information and whether the information providers have the appropriate information, whether that information is reliable, and whether the information providers can be trusted to give unbiased information. Eiser argues that we are not simply dealing with perceptions of risk but with social attitudes – evaluative thoughts and feelings. Recall that risk researchers have recently advocated for the

importance of an affective component in risk judgements (Slovic & Peters, 2006; Slovic, 1999) and behaviour (e.g., Conner & Abraham, 2001).

Eiser (2001) posits that we must take into account the *frames of reference* in which risk perceptions are made. Frames of reference are defined by thoughts, feelings, experience, and social influence and are subject to change with the acquisition of new knowledge and influences. Trust in sources of information and attitudes toward agencies responsible for monitoring hazards is important for understanding frames of reference. Furthermore, Eiser suggests the *stability* of risk perceptions is also related to thoughts, feelings, and memories held by the individual and the perceptions and preferences within the individual's social networks, i.e., social influence. Past theories of risk perception have mainly focused on individual level processes, neglecting the social level of analysis (Eiser, 2001). However, a complex issue such as risk perception and the workplace requires the inclusion of a number of levels of analysis. Eiser (2001) further proposes that it is not just a matter of understanding various analytic levels but also how they interact and represent a system as a whole. Future research on perceptions of risk should be cognizant of this and, consequently, unite the social context with individual cognitive processes.

Kasperson et al. (1988) have taken a sociological approach to risk and have attempted to combine risk perception and social processes to examine the social amplification and attenuation of risk. This theoretical framework has been considered one of the more serious attempts at integrating social processes and social context (e.g., social influence) into risk perception research (Eiser, 2001; Masuda & Garvin, 2006). The core

focus of this approach is that psychological, social, institutional and cultural processes interact with specific aspects of a particular hazard to amplify or attenuate perceptions of risk associated with the hazard. According to Wahlberg (2001) "social amplification is a social analogy to communication theory, positing that people and organizations can act like amplifier stations to risk messages, that will ripple through society and cause different effects; economical, judicial, social etc" (p. 241). The channels of communication may be formal, such as the media or community meetings, or informal, such as information through word-of-mouth social interactions (Masuda & Garvin, 2006). Further, Kasperson (1992) suggests that in addition to social context, culture accounts for the various ways in which risks are communicated and contributes to the differences in perceived risk from place to place.

In a recent study, Masuda and Garvin (2006) explored the role of culture and social context in the social production of risk. Interviews were conducted with local residents (e.g., farmers, land owners, subdivision residents) of a community that was the focus of an eco-industrial development proposal and non-resident stakeholders (e.g., politicians, industry representatives, administrators, etc). Interviews were analyzed around four social constructs resulting in eleven emergent themes: (1) life (danger, health, and safety), (2) home (rural idyll, heritage, geography, and employment), (3) prosperity (stigma and economy), and (4) community (marginalization and philanthropy). Six of the themes were believed to be reflective of high perceptions of risk (danger, health, rural idyll, heritage, stigma, and marginalization) and the five remaining themes were reflective of low perceptions of risk (safety, geography, employment, economy, and

philanthropy). These findings suggest that perceptions of risk are not isolated in the minds of individuals; rather, perceptions of risk are manifested within the social context of individuals (e.g., community well-being, sense of belonging in the community). Beliefs about risks were communicated through public meetings, newspapers, and information interactions and either attenuated or amplified community members' perceptions of risks. Feelings of place attachment in the form of family, tradition, and rural idyll lifestyle appeared to contribute to the amplification of risk among residents. However, non-resident participants were more likely to attenuate the risk, emphasizing economic growth and development within the community. This study suggests that place attachments may affect perceptions of risk. That is, the extent to which a person feels a sense of belonging to a place appears to affect the extent to which they will amplify or attenuate risk associated with that place.

Social psychology has often been criticized for its heavy fixation on individual cognitive processes (e.g., Fraser, 1994; Howarth, 2006; Purkhardt, 1993) and relative neglect of the social, cultural, and historical origins of psychological concepts (e.g., Gergen, 1973; Parker, 1987). Moscovici's (1972) Social Representation Theory (SRT) was a reaction to this heavy handed cognitive approach to understanding psychological concepts. The SRT employs qualitative methods to assess social knowledge, social practices, and past experiences and how these factors affect our beliefs and present experiences (see Howarth 2006). Social representations - ways of understanding our world (Joffé, 2003) - are formed through communication and interactions with others in our environment (Moscovici, 1998).

Recently, the SRT has been used to explain meanings of risk and how these explanations of risk emerge with an emphasis on social factors beyond individual cognitive processing (Joffé, 2003). Those advocating the SRT of risk have criticized the primarily cognitive approaches of risk as highlighting cognitive issues such as biases and heuristics as deficits to understanding or interpreting risk (Joffé, 2003). Such criticisms include the more current re-evaluations of the psychometric paradigm that have included affect as an important component for assessing risk (e.g., Finucane, Alhakami, Slovic, & Johnson, 2000). In contrast, the SRT of risk proposes that theories of risk and subsequently risk research must include the social and cultural factors that contribute to explanations of risk perceptions and to understand the internal cognitive process in relation to the social world of individuals (Joffé, 2003). A similar argument has been proposed by Howarth (2006) who stresses the importance of identifying social and cultural factors to enhance our understanding of the underlying bases of individual attitudes.

While a complete review of the SRT is beyond the scope of this thesis, this brief discussion has shown that the emphasis in the SRT on the social and cultural environment as influences on individual perceptions of risk is an essential and complementary component to understanding risk through cognitive processes.

Social approaches to assessing risk perception: Implications for the current study. The social approaches to risk perception have made significant contributions to the risk perception literature. More specifically, each theory has highlighted the

importance of broadening the existing cognitive theories of risk perception to include a more social approach to understanding.

It is the contention of this thesis that the combination of social and cognitive factors is critical for understanding risk perception and safety behaviours within the context of the current study. Douglas and Wildavsky (1982), Eiser (2001), Kasperson et al. (1988), and Joffé (2003) have all argued that understanding the social context from which an individual forms his/her attitudes toward hazards and perceptions of risk may be of particular importance when assessing risk perceptions. Attitudes, personal experience, social circumstances, culture, and social influence may have significant influences on risk perceptions and may thereby shape behaviour. Moreover, findings from Masuda and Garvin (2006) may be of particular interest to the current study because, as previously mentioned, many of the NL fibreglass boat-building plants operate in rural communities. Many of these communities have a long history with extensive social connections. The concept of place attachment may therefore be of particular interest with respect to whether employees amplify or attenuate risk at their workplace.

Social Environments and Employee Safety Behaviours: The Workplace

The following is a discussion of factors that could mediate employee safety behaviours from a broader social context. Taking direction from the social approaches to risk perception, social contexts such as the workplace will be assessed in relation to employee safety behaviours. According to extant research, factors related to social influence in the workplace have been found to affect safety attitudes, perceptions of risk,

and employee safety behaviours and it is the contention of this thesis that such factors warrant a place in the TPB model.

Safety culture, climate, and attitudes: How are they different and how do they relate to safety behaviours? There is an extensive literature concerning the influence of safety culture and safety climate on safety behaviours (e.g., Cheyne, Oliver, Tomas, & Cox, 2002; Cox & Flin, 1998; Glendon & Stanton, 2000; Guldenmund, 2000; Neal & Griffen, 2003; Neal, Griffen, & Hart, 2000) and a thorough review and critique of this literature is well beyond the scope of this paper. Nonetheless, a distinction must be made between safety culture and safety climate (two concepts which have been used interchangeably within the literature, see Guldenmund, 2000 for a review) to understand the current study.

The terms safety culture and safety climate are derivatives of the more general concepts of organizational culture and organizational climate (Cox & Flin, 1998). While researchers have not reached agreement on a definition of safety culture (e.g., Cox & Flin, 1998, Guldenmund, 2000), several conceptualizations of safety culture adopt a social psychological perspective. For example, Pidgeon (1991) suggests that safety culture may be defined as the beliefs, norms, attitudes, roles, and social and technical practices that reduce employee exposure to hazardous conditions. Similarly, Lee (1996) contends that safety culture is the result of individual and group attitudes, values, perceptions, knowledge, skills, and behaviours that contribute to an organization's commitment to health and safety. Ostrom et al. (1993) add that these attitudes and beliefs

are manifested in the actions, policies and procedures which affect an organization's safety performance. Social cognition and normative behaviour appear to be fundamental elements of these definitions and they are considered to demonstrate stability over time (Cox & Cox, 1991). Assessing safety culture requires the use of in depth, qualitative methods to explore values and beliefs (Guldenmund, 2000).

Compared to safety culture, safety climate has been more narrowly focused on employee perceptions about the value of safety within an organization as it relates to policies, procedures, and practices (e.g., Barling, Loughlin, & Kelloway, 2002; Griffin & Neal, 2000; Zohar, 2003) and the extent to which these perceptions are shared by individuals within the organization (Neal & Griffin, 2003). Safety climate is largely assessed using survey or quantitative measures.

Within the literature, the number and type of factors used to investigate safety climate has varied. For example, Cox and Cheyne (2000) examined safety climate in the offshore oil and gas industry using a survey method where nine factors emerged: management commitment, priority of safety, communication, safety rules, supportive environment, involvement, personal priorities and need for safety, personal appreciation of risk, and work environment. Factors identified in other studies include organizational responsibility, safety supervision, and company precautions (e.g., Varonen & Mattila, 2000), and risk perception (Rundmo, 1992a, 1992b). In a recent review of the safety climate literature, Zohar (2003) identified management commitment to the health and safety of employees as the primary target of safety climate perceptions. It has been suggested that perceptions of safety climate in the workplace can affect safety related

attitudes, the interaction between employees, and the behaviours they perform at work (Neal & Griffen, 2003).

Just as it is important to distinguish between safety culture and safety climate, it is also important to address the difference between perceptions of safety climate and a third term, safety attitude, to avoid confusion. While safety climate has been defined as the *shared* perception by employees regarding the extent to which an organization values health and safety, attitudes are *individual* beliefs and feelings about safety related objects or activities (Neal & Griffen, 2003). That is, safety climate may be considered the more 'social' of the two concepts reflecting the social influence within the work environment. The distinction between safety attitudes and safety climate has been repeatedly demonstrated (e.g., Cox & Cox, 1991; Mearns, Flin, Gordon, & Fleming, 1998; Williamson, Feyer, Cairns, & Biancotti, 1997). For example, Cox and Cox (1991) assessed safety attitudes and safety climate within a European company involved in the production and distribution of industrial gases. Of the five factors that emerged, two were found to assess safety climate (perceived safeness of the work environment and the effectiveness of the organizations' safety procedures) and three assessed safety related attitudes (personal scepticism, individual responsibility, and personal immunity). Similarly, Rundmo (2000) assessed safety climate, employee attitudes, risk perception and safety behaviour among Norsk Hydro industrial employees from Europe, the USA, and Canada, using a self-administered questionnaire. Safety attitudes and perceived safety climate emerged as different factors and each accounted for a significant amount of the variance in employee risk taking behaviours. Neal and Griffin (2003) contend that

these findings have demonstrated greater variability in employee attitudes compared to perceptions of safety climate, suggesting two distinct constructs. Attitudes are individual feelings and beliefs influenced by individual differences. Contextual factors, therefore, result in less agreement between individuals as compared to perceptions of safety climate which are shared feelings and beliefs.

Aspects of social influence: Safety climate. Recall above, that while the TPB has a component to represent the impact of social influence on behavioural intentions/outcomes, this component, the subjective norms, is very limited in scope and has considerable room for development. Safety climate may be able to account for a degree of social influence within the workplace not accounted for by the current subjective norms component. Assessing the safety climate of a workplace introduces the importance of the organization's perceived health and safety related norms, a social or contextual factor that, as previously mentioned, research suggests has an impact on safety related behaviours and/or outcomes. Given that safety climate has been found to influence attitudes toward safety (e.g., Neal & Griffin, 2003) and attitudes toward safety and safety climate have been associated with employee risk perceptions and safety related behaviours (Donald & Canter, 1994; Neal, Griffin & Hart, 2000; Rundmo, 1997), it is pertinent for the current study to address both safety attitudes and perceptions of safety climate held by employees in the fibreglass boat-building industry.

Where to place safety climate within the TPB is debatable. Ostensibly, it appears that safety climate captures group norms in the workplace. However, in a recent study,

Fogarty and Shaw (2003) found that within the TPB model, management attitudes and actions about safety topics and safety situations had a direct effect on all aspects of the TPB model, attitudes, subjective norms, PBC, and behaviour intentions. This finding suggests that safety climate, in particular, management influence, may warrant a new position within the TPB in that it may be a separate component of social influence.

Group influence inside and outside the workplace? In the previous section, an aspect of social influence was discussed in terms of shared perceptions and beliefs, i.e., safety climate. This section focuses on group influences in the workplace, where social influence is discussed in terms of observed or modelled behaviours in the workplace as employees interact with each other.

Considerable social influence can be wielded by groups, especially those groups of which we are a member (e.g., groups in the workplace). Conformity to group norms (i.e., expected behaviour by group members) is most likely when the group is attractive to the individual, when the individual values the group or is a valued member of the group (Kelley & Shapiro, 1954), or when the individual wants to be liked by group members (Cialdini & Trost, 1998), or to avoid derision or rejection (Asch, 1956).

Groups can be a source of both informational and normative influence (see Eagley & Chaiken 1998 for a review). Informational and normative influences are distinguished by the extent to which people communicate with one another regarding substantiation about the nature of reality (informational influence) or the expectations about appropriate behaviour (normative influence; Eagley & Chaiken, 1993). Group membership can

influence our attitudes and behaviours in any given situation. Terry, Hogg, and Duck (1999) argue that attitude change and the impact of persuasive communications cannot be fully understood without reference to group memberships in that attitudes are social products influenced by social norms. Furthermore, Terry et al. (1999) suggest that norms of a valued social group can influence an individual's willingness to engage in specific behaviours and hold particular attitudes.

The impact of social influence exercised by groups is evident in a study by De Vris and Lechner (2000) where differences were assessed between workers who demonstrated a high degree of self-protective behaviours (e.g., the use of protective gloves, glasses, clothes, masks, and not touching faucets with polluted hands) and those who showed a low degree of self-protective behaviour. The sample consisted of workers who were exposed to a number of chemicals such as nickel sulphite, asbestos, and chromium trioxide on a daily basis. Self-report questionnaires were used to compare worker attitudes toward self-protective behaviours, social influence (e.g., social support from colleagues, boss, and spouses and modeling of colleagues' use of safety equipment), self-efficacy, intention to use safety equipment in the future, and self-protective behaviour. Frequent users of personal safety equipment were found to be more positive about both the consequences of personal safety equipment use and the use of personal safety equipment (e.g., describing it as good, useful, and not unpleasant). Furthermore, the frequent users reported more social support from their bosses, colleagues, and spouses; were more likely to describe their colleagues as frequently using personal safety equipment; and more likely to state that using their personal safety equipment would

result in more appreciation from colleagues and greater job satisfaction. Compared to frequent users, non-frequent users were more likely to report that using their personal safety equipment would impede work progress resulting in more work, less job satisfaction, and ridicule from colleagues, and that using their personal safety equipment would be difficult when colleagues failed to use the equipment or questioned the need to do so.

De Vris and Lechner used a multiple regression analysis to show that type of company (e.g., laboratory versus mechanical), colleague use of safety equipment, and intention accounted for 56% of the variance in employee use of personal safety equipment. Laboratory workers appeared to share norms of workplace safety and were therefore more likely to report using safety equipment than mechanical workers. Interestingly, the more often colleagues used safety equipment, the more likely participants were to respond that they also used their safety equipment. Furthermore, there was a positive association between intention to use safety equipment and reported current use of safety equipment. Fifty-three percent of the variance in employee intention to use personal safety equipment was predicted by the social support employees obtained from their bosses, colleagues and spouses; the self-efficacy or trust in their own ability to use their personal safety equipment; the safety behaviour of their colleagues; and whether they thought that using their personal safety equipment was a pleasant thing to do.

Based on these findings, De Vris and Lechner (2000) contend that one of the primary targets of intervention and prevention workplace programs should be the social environment within the workplace. Further, De Vris and Lechner argue that workers need

to become more aware that their colleagues use safety equipment, suggesting that social norms favouring the desired behaviour or behaviours should be clearly communicated and given great emphasis in the worker's environment.

The findings also suggest that social influence outside the workplace is also relevant. In addition to bosses and colleagues providing social support to employees, support from spouses seemed to play an important role as well. That is, the social environment outside the workplace can have an influence on the attitudes and behaviours of employees.

The influence of social groups both inside and outside the work environment on workplace safety was recently echoed in a study of the role of social influence on young workers' risk-taking behaviours. Westaby and Lowe (2005) assessed three environments of social influence on young workers' risk-taking behaviours: supervisory influence, coworker risk taking behaviour, and parental risk taking. The extent to which young workers are motivated to engage in work activities that put them at risk was significantly predicted by all three sources of social influence. More specifically, those workers who had supervisors who were adamant about not taking risk were more likely to report reduced risk orientation. Young workers who believed their coworkers took risk were more likely to report an increased risk orientation; coworker risk taking was a stronger predictor of risk-taking orientation than supervisory influence. Finally, the impact of social influence appeared to extend beyond the immediate work environment. Findings implicate a positive association between perceived parental risk taking and young workers' global attitudes toward risk. Westaby and Lowe suggest developmental

experiences and parental modeling in particular influence a young worker's willingness to take risk. Further analysis indicated that the global attitude toward risk was associated with risk orientation in the workplace.

Taken together, these studies suggest that social influence affecting employee behaviours extends beyond the immediate work environment. Groups to which employees belong outside of the workplace, such as the family, and the norms espoused by such groups affect behaviour in the workplace.

Social Environments and Employee Safety Behaviours: Social and Cultural Circumstances

As the aforementioned studies (e.g., De Vris & Lechner, 2000; Westaby & Lowe, 2005) demonstrate, the effects of social influence on safety behaviour extend beyond the borders of the workplace. At this point, I will address the potential role of the community as a contributing factor with respect to safety behaviour in the workplace. In particular, the extent to which people feel a sense of attachment to their community, a need to remain in their community, the social and economic circumstances of a community, and the implications of such circumstances to workers will be discussed.

Community attachment and behaviour. Within the community psychology literature is the fundamental construct 'Psychological Sense of Community' (PSOC). Conceived by Sarson (1978), this construct represents the extent to which individuals feel a sense of attachment and belonging to a community, a feeling of being accepted by

members of the community, and of having their needs met (e.g., Brodsky, O'Campo, & Aronson, 1999; McMillan & Chavis, 1986; Pooley, Cohen, & Pike, 2005). A PSOC does not represent individuals' perceptions of the economic wellbeing of their communities, rather it is the extent to which they identify with and feel a sense of connection with their community and their perceived relationships within it (e.g., Brodsky, O'Campo, & Aronson, 1999). This is a very important distinction as a community may be thriving economically but individuals may feel a sense of disconnection and isolation contributing to a low or negative PSOC. Research also suggests there may be incidences where a positive or high level of PSOC may actually be detrimental, such as in communities that are low in resources and commitment for residents. For example, single mothers in low income, physically dangerous communities reported that being disconnected and not well integrated in their community (negative PSOC) was a protective influence for themselves and their families, suggesting the consequences of attaching or identifying with this environment were too costly (Brodsky, 1996).

One of the most widely used measures of PSOC is the Sense of Community Index (SCI; Chavis, Hogge, McMillan, & Wandersman, 1986) which is based on the four dimensions of sense of community proposed by McMillan and Chavis (1986): membership (e.g., feelings of belonging and emotional/social connectedness), influence (e.g., community cohesiveness and control), integration and fulfillment of needs (e.g., common goals, values, and beliefs among community members), and shared emotional connection (e.g., bonds that have developed over time). Although the extent to which these dimensions capture the PSOC has been debated in the literature (see Chipuer &

Pretty, 1999a, 1999b), Obst and White (2004) argue that these four factors adequately represent PSOC. They report the use of Confirmatory Factor Analysis (CFA) to refine the items within each factor, resulting in a model that addressed PSOC in various community memberships (e.g., university community, neighbourhood, and interest groups; Obst & White, 2004).

A similar concept related to PSOC, and sometimes used interchangeably within the literature (Hidalgo & Hernandez, 2001), is 'place attachment'. The numerous definitions of place attachment have contributed to the confusion between it and other concepts such as PSOC, place identity, place dependence, community attachment and sense of place (Hidalgo & Hernandez, 2001). From a psychological perspective, place attachment has been broadly defined as "emotions, cognitions and experiences that cause a person or group of persons to feel attached to a certain place" (Billig, 2006, p. 250). The "place" to which a person is attached may vary in that it may be one's neighbourhood community, one's city or town, ones' physical property (e.g., house or land), etc. (e.g., Hidalgo & Hernandez, 2001). Nonetheless, many studies, regardless of theoretical perspective, have conceptualized place attachment as having both physical and social components (Hidalgo & Hernandez, 2001), while others have added that place attachment also involves the temporal and psychological aspects of place (Burnholt, 2006; Burnholt & Naylor, 2005).

In a recent study, Billig (2006) assessed factors related to risk perceptions of Jewish settlers and their tendency to remain living in a risky, hostile environment. Of particular interest to Billig was the degree to which place attachment influenced peoples'

willingness to stay in an environment under conditions of terrorist attacks. Survey data assessed the extent to which place attachment to settlement (i.e., land), home attachment, and ideology of holding onto land affected perceptions of risk. During preliminary analysis, home attachment and place attachment were so highly correlated that Billig used only home attachment in subsequent regression analyses. Multiple regression analyses revealed that gender, religion, and length of time living in the region were significantly related to perceptions of risk, together contributing to 13% of the variance. Specifically, men perceived the region as less risky than women, religious people considered the region to be less risky than non-religious people, and people who had lived there for shorter periods of time found the region to be less risky. Ideology of holding on to land significantly contributed to variance in risk perception; however, it was a modest 2%. The greatest predictor of risk perception in the model was home attachment, accounting for 24% of the variance; the stronger the home attachment the lower the perception of risk reported by participants. A further multiple regression analysis was used to assess the residents' tendency to stay in the region. The analysis revealed that religion accounted for 10% of the variance in participants' tendency to stay in the region; religious individuals were less likely to leave than secular individuals. Ideology of holding onto land accounted for only 3% of the variance in the model while risk perception and home attachment accounted for 7% and 11%, respectively. The stronger the ideology of holding on to land, the lower the perceived risk, and the higher the home attachment, the more likely people were to stay in the region. Similar findings

regarding the influence of place attachment on perceptions of risk and behaviour reported by Masuda and Gavin (2006) were discussed in a previous section.

These findings suggest that the feelings people have toward their place of residence can affect perceptions of risk and their behaviours (i.e., remaining in a risky environment). While Billig (2006) addressed perceptions of risk in a rather extreme, hostile environment, similar notions can be applied to the current study. As was previously mentioned, much of the risk perception literature assumes that the perceived risks proposed by the researcher are the same as those considered by participants (e.g., Wilkinson, 2001). Researchers have tended to focus on the physical health risks within the workplace safety literature and this may have obscured the influence of other perceived risks (Wilkinson, 2001).

As I previously put forward, while some may perceive risk as it relates to individual health, others may view risk in terms of social or economic risk (e.g., job loss, having to relocate to find work, etc.). The initial question raised was why, if workers are aware of the physical health risk associated with working in the fibreglass boat building industry, would they ignore safety regulations and fail to perform self-protective behaviours to protect their health? What if the perceived risks were not related to physical health? Are people worried about losing other 'things' that contribute to their perceptions of risks? As mentioned in the forward of this paper, many of the communities with operating fibreglass boat-building plants have become single industry towns and employment opportunities have become increasingly scarce in rural communities. Furthermore, many of the NL rural communities have a long history with extensive social

connections which may contribute to feelings of attachment to the community. Consequently, perhaps the greater perceived risk among workers is losing ones' job and the potential fallout of losing one's job, including individual economic crisis, and, depending on the economic climate of the community, having to leave the community to find work.

Job insecurity and safety behaviour. A large body of research has been devoted to the relationship between employment status and health (e.g., Breslin & Mustard, 2003; Dooley, 2003; Dooley, Fielding, & Levi,1996; Lavis, Mustard, Payne & Farrant, 2001; Mustard, Vermeulen, & Lavis, 2003), but existing research has not paid sufficient attention to the relationships between precarious work (unstable work, with a lack of employee protection) in the context of social and economic vulnerability (Tompa, Scott-Marshall, Dolinschi, Trevithick, & Bhattacharyya, 2007) on employee safety related behaviours. Recently, job insecurity and employment uncertainty have been examined as factors influencing safety attitudes, perceptions, and behaviours. Some have defined job insecurity as potential job loss or the perceived threat to job continuity (see Sverke, Hellgren, & Naswall, 2002), while others have defined it as an individual's perception of the stability and continuance of their job as they know it (Probst, 2002). Mantler, Matejicek, Matheson, and Anisman (2005) suggest that employment uncertainty is a more inclusive concept as it "extends beyond threats to current employment to include threats to the possibility of future employment for people seeking jobs" (p.200).

For the purposes of this study I will adopt Probst's (2002) definition of job insecurity (i.e., perceived instability and continuance of one's job) for the remainder of this discussion. My reason for using this definition is twofold. First, much of the research on the influence of job insecurity on employee safety outcomes has been largely conducted by Probst and her colleagues and using this definition will therefore facilitate the discussion. Secondly, within the context of this study, I will only be assessing workers who are currently employed.

Probst and Brubaker (2001) assessed the extent to which job insecurity affected safety outcomes of employees at two food processing companies. Probst and Brubaker used cross-sectional and longitudinal survey data concerning employees' perceptions of job insecurity, job satisfaction, safety knowledge, safety motivation, safety compliance, and workplace injuries and workplace accidents. Analysis of the survey data revealed that safety motivation and safety compliance were related to workplace injuries and accidents. Specifically, higher safety motivation and reported safety compliance were related to fewer workplace injuries and accidents. Interestingly, those employees who reported higher perceptions of job insecurity also reported lower safety motivation and less compliance with safety standards suggesting an effect of perceived job insecurity on safety outcomes. Probst and Brubaker contend that there may be a trade-off between production demands and safety demands. For example, those employees who feel that their jobs are threatened may feel motivated to ignore safety procedures or take short cuts to meet the bottom line. According to Probst and Brubaker (2001), "when employees perceive that the demands of safety and production are incompatible, safety motivation

may be replaced by the demands of production motivation when the employee feels his or her job is insecure, particularly if the employee is not actively rewarded for being safe" (p. 156).

Similar findings of the negative effects of job insecurity on safety outcomes have been reported (e.g., Probst, 2002; Quandt et al., 2001; Saha, Kulkarni, Chaudhuri, & Saiyed, 2005). However, in a longitudinal study of glass manufacturing employees, Parker, Axtell, and Turner (2001) found that job insecurity was related to more safety compliance among workers. These conflicting findings led Probst (2004) to investigate the notion that perhaps there was another variable that affected the extent to which job insecurity influenced employee safety behaviours and suggested that this third variable might be safety climate.

Using survey methodology, Probst (2004) assessed manufacturing employees' perceptions of job insecurity, organizational safety climate, safety compliance, safety knowledge, and workplace accidents and injuries. Analysis revealed a significant interaction between safety climate and job insecurity where safety climate attenuated the negative effects of job insecurity on employee safety outcomes. When employees perceived a low safety climate within the organization, job insecurity was associated with low levels of safety knowledge, less self-reported safety compliance, and greater likelihood of workplace injuries and accidents. Conversely, when employees perceived a strong safety climate the effect of job insecurity on safety outcomes weakened. Probst contends that these findings demonstrate the importance of a strong organizational

climate on employee safety outcomes in that it can offset the adverse effects of perceived job insecurity.

Social Environments and Employee Safety Behaviours: Summary

As suggested by risk perception research (Douglas & Wildavsky, 1982; Fischhoff, 1994), the extent to which people will accept or tolerate risk may depend on perceived or real alternatives to the given situation and the values and beliefs of individuals and groups. Research has shown that safety climate, i.e., the shared perceptions and beliefs regarding managements' commitment to safety, is particularly important for exploring employee safety behaviours. As demonstrated by the above said research, feelings or bonds associated with an individual's community and perceptions of job insecurity can influence perceptions of risk and safety behaviours. Consequently, within the context of the present study, social influence must be rigorously explored to determine the influence of safety climate (as a subjective norm component), community attachment, PSOC, and perceived job insecurity on employee perceptions of risk and willingness to engage in self-protective behaviours in the workplace.

Study Objectives

The objective of the current study was to assess social, cognitive, and cultural factors affecting safety behaviours with respect to styrene exposure among groups who have personal contact with or have a vested interest in the fibreglass boat-building industry in NL. Such groups include the boat-building plant workers and employers,

health care personnel providing health care services to workers in these communities, and OHS personnel.

Based on the objectives of the current study and the literature reviewed above, several major questions guide this research. (1) What factors are associated with employee attitudes, subjective norms, PBC, risk perception, and affective reactions to risk? (2) Do the proposed background (distal) factors provide information that enhances our understanding of employee safety behaviours and the proposed determinants of behaviour? And, (3) what are the factors influencing employee safety behaviours in the NL fibreglass boat building industry?

Answers to these questions will contribute to the theoretical understanding of the cognitive and social aspects of safety behaviours in the workplace and contribute to the development of health related social cognitive models. Figure 1.2 presents an augmented version of the TPB as the framework for this study. The relationship among the proposed factors remains to be seen. For the purpose of this study, self-reported safety behaviours were assessed. That is, *intention* to perform safety behaviour was omitted from the model in an attempt to determine the factors directly affecting safety behaviours.

Research Design

To assess safety behaviours and related issues and concerns among those associated with the fibreglass boat-building industry, qualitative and quantitative research methods were utilized. There is tremendous value in combining the two approaches. One

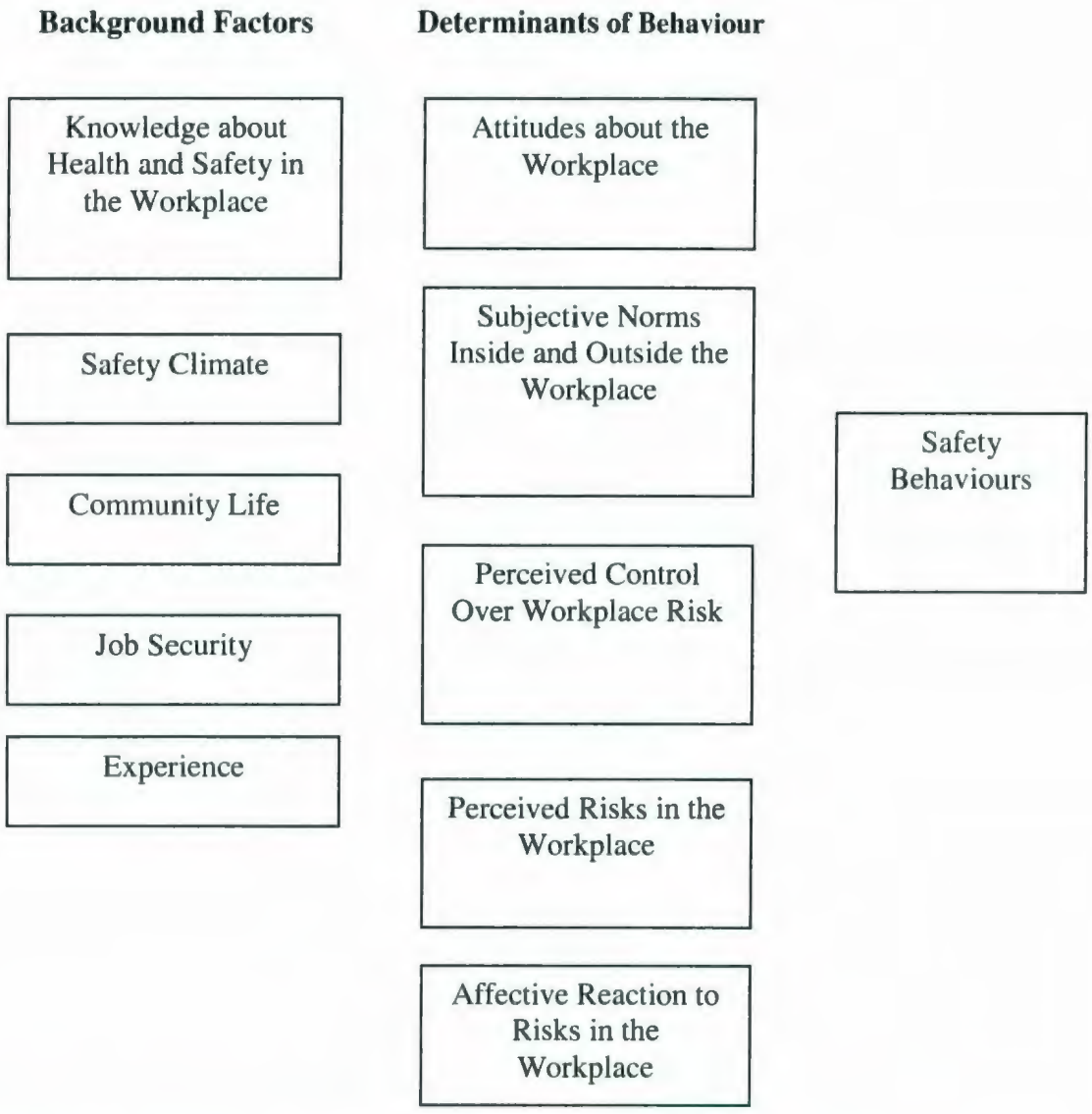

Figure 1.2 - An augmented version of the TPB as the framework for this study.

important outcome of qualitative research is the construction of psychometric instruments based on the experience of participants, thereby ensuring that the survey instrument is relevant to the populations of interest (Fishbein et al., 2001; Fowler, 1993; Rea & Parker, 1992). Consequently, this project used a mixed-method approach. Study 1 consists of the qualitative portion of this project, while Study 2 consists of the survey development and

dissemination. The information from Study 1 was used to understand the perspectives of the individuals living in the communities concerning the importance and consequences of this industry in their communities (e.g., Lincoln & Denzin, 1994). This information was then used to inform survey development and provide insight into survey findings. Study 2 involved the development of surveys for each group of interest, data collection, and analyses of survey data.

Chapter 2

Study 1 Method

Study 1 Method

Approach and Design

The objective of the qualitative approach is to understand the experiences and perspectives of the acting individual (Lincoln & Denzin, 1994). Initially, the research plan was to conduct interviews with key informants (e.g., a manager of a boat building plant, a member of the provincial OHS department, a health care provider) and focus groups with employees. However, due to difficulties in recruiting participants for focus group meetings (e.g., lack of employee interest), and time constraints within which the study had to be completed, the focus group idea was abandoned. It was decided to adopt a more community-based approach whereby members of communities with operating fibreglass boat-building plants would be interviewed in order to obtain their views regarding the industry, the importance and consequences of the industry to both individuals in their community and the community itself. Key informant interviews were conducted with representatives of groups with a vested interest in the fibreglass boat-building industry.

Ethical Considerations for Study 1

Participants were fully informed that their participation in this study was completely voluntary and that they could leave the interview session at anytime. They were informed that they could refrain from answering any question(s) posed during the interview session, that their participation would be completely confidential, and that any comments made and featured in future documents would be anonymous. Where relevant,

participants were in particular assured that their employer would not be privy to the information obtained in the interview sessions. Each participant was asked to sign a document demonstrating their consent to participate in the interview session (see Appendix A for consent form). Participants were given contact information for the primary investigator and for the Interdisciplinary Committee on Ethics in Human Research (ICEHR) in the event they had questions or comments about the study (see Appendix B for ICEHR ethics approval documents).

Key Informant Interviews

Key informant interviews were conducted with three individuals, 1) a Government Services Occupational Health and Safety (OHS) representative, 2) a health care professional, and 3) a former owner/manager of a fibreglass boat-building plant. These three individuals were selected based on their significant interest in the fibreglass boat-building industry and unique perspectives on the risks associated with boat building based on their individual expertise and relationship with the industry. They also had access to important sources of information concerning risk perception and safety behaviours within the context of the fibreglass boat-building industry (Mays & Pope, 1995). It should be noted that the member of the NL OHS division was interviewed on two separate occasions. The second interview was necessary to obtain further details concerning policies and procedures that are required to be implemented or adhered to by managers and employees according to OHS legislation.

Community Selection: Community Location and Characteristics

At the time of Study 1 data collection, there were 17 operating fibreglass boat-building plants on the island portion of the province. Initially, a list of fibreglass boat-building plants was developed based on information from websites and the phone book. Each plant was then contacted to determine if it was in operation and if it manufactured fibreglass boats (as opposed to aluminium or steel products). Upon this initial contact with the plant, the name of the owner/manager and the mailing address and fax number of the plant was ascertained for future contact.

The identified fibreglass boat-building plants were found to be scattered around the island in the Northern Peninsula, Central, Southern, and Avalon regions. As geographic location, and, in particular, the distance of each of the plants from other communities or urban centers, was hypothesized to be associated with different perceptions of risk or degrees of self-protective behaviours, plants were chosen from different communities and regions in the province.

Three communities with operating fibreglass boat-building plants were selected to participate in Study 1. The names of communities or the region of each community cannot be given in an attempt to maintain participant anonymity. Therefore, the communities will simply be referred to as Community A, B, and C. Two communities were randomly chosen (i.e., Community A and Community C) while the third community (i.e., Community B) was chosen as a contrast to the other two as this community is, compared to Communities A and C, located near a major urban center. Communities were assessed on several different characteristics that were of particular interest for this

study: (1) self-reliance ratio (i.e., the extent to which a community is dependent on government transfer payments); (2) population size; (3) employment rate; (4) population decline, and (5) distance from the nearest urban centre (a city with a population of 20,000 plus residents; see Table 2.1). The data were extracted from the NL Community Accounts database (2001), a collection of social, economic, demographic, health, and education indicators pertaining to 400 communities in NL. It should be noted that it is unclear from the available data how many of the employed individuals within each community actually work in their community as opposed to a neighbouring location.

Table 2.1

Community A, Community B, Community C on Selected Community Variables (Newfoundland and Labrador Community Accounts, 2001)

Community Indicator	Community A	Community B	Community C
Distance (Kms) from nearest Urban Centre	439	49	88
Population	700	1,890	795
Population Decline[a]	16%	6%	14%
Self-Reliance Ratio[b]	58%	79%	59%
Employment Rate	27%	61%	27%

[a]This is the population decline since the last update of Community Accounts in 1996.
[b]Self-Reliance Ratio is a measure of community dependency on government transfers such as Canada Pension, Old Age Security, Employment Insurance, Social Assistance, etc. The higher the Self-Reliance Ratio the less community dependency on government transfers. This indicator is based on updated Community accounts data for 2004.

As shown in Table 2.1, Communities A and C have a similar self-reliance ratio, employment rate, population, and population decline. However, these two communities differ significantly when it comes to their distance to a major urban center (439 kms and 88 kms respectively). Residents of Community C may be in a better position to seek

employment at the nearest urban center compared to residents in Community A. Nonetheless, it appears that both Communities A and C are struggling economically and are experiencing out migration.

On the other hand, Community B, compared with Communities A and C, has a larger population, less population decline, less reliance on government transfer payments, a higher employment rate, and is only 49 kms from the nearest urban centre. Based on these data, Community B is doing quite well economically (i.e., high self-reliance and employment rate) compared to Communities A and C. It may be the case that living in a community that is located near a major urban centre provides individuals with the option of staying in their community but being able to work outside their community.

Community Participant Recruitment

Participants for Study 1 were community members who had a vested interest in or had knowledge about the fibreglass boat-building industry in their community. Investigators (the primary investigator and research assistant) approached key people in the community (e.g., managers of fibreglass boat building plants, mayors, and members of community councils) via telephone to arrange a time for an interview and also solicited additional participants from them by word of mouth. All interviews were conducted within the participants' respective communities.

A non-probabilistic sampling method was employed for this study as the goal of the recruitment process was not to gain a random or representative sample but to identify specific groups of individuals who held the knowledge and experiences relevant to the

social circumstances being studied (e.g., Katz & Elliot, 2003; May & Pope, 1995). Accordingly, participant recruitment occurred in two stages. First, a purposive sampling method was employed to contact and recruit key people in each community, namely, community council members and the managers of the boat-building plants. Second, snowball sampling was used to obtain additional participants from these initial contacts by asking them who else they thought would be interested in or have knowledge about the topic at hand. This iterative recruitment process resulted in a total of 17 community members (14 males and 3 females) from the three communities. Nine participants were from Community A, five participants from Community B, and three from Community C. All interviews were conducted with individuals with the exception of two small group interactions (two groups of two participants). Participants included three boat-building plant managers, three boat-building plant employees, four fishermen, three members of community councils, a fish plant worker, a wife of a former boat-building plant employee and restaurant operator, and two individuals who worked at a local marina (see Table 2.2).

Participant Interviews

Interview questions were derived from literature related to the objectives of the current study (see Appendix C for a sample interview guide). Interviews were semi-structured with questions falling under several categories: (1) community history and background; (2) knowledge about health effects of styrene; (3) attitudes toward working in the fibreglass boat-building industry; (4) perception of social influence regarding

Table 2.2

Participant Location, Occupation, and Age Group

Community	Participant No.	Occupation	Age Group (yrs)
A	1	Boat Building Employee	20 – 30
	2	Boat Building Employee	30 – 40
	3	Boat Building Manager	40 – 50
	4	Retired Fisherman	60 – 70
	5	Retired Fisherman	70 – 80
	6	Retired Fisherman	70 – 80
	7	Fisherman	30 – 40
	8	Teacher	40 – 50
	9	Former Fish Plant Worker	40 – 50
B	10	Boat Building Manager	40 – 50
	11	Boat Building Employee	40 – 50
	12	Marina Associate	40 – 50
	13	Marina Associate	40 – 50
	14	Town Clerk	30 – 40
C	15	Boat Building Manager	30 – 40
	16	Wife of Former Boat Building Employee	40 – 50
	17	Town Representative	50 – 60
Key Informants	18	Government Services Occupational Health and Safety Representative	30 – 40
	19	Health System Administrator	40 – 50
	20	Former Boat Building Plant Manager/Owner	40 – 50

health and safety; (5) perceptions of risk; (6) safety behaviours at work, and (7) level of experience or exposure to styrene. Since not all questions were suitable for all participants, questions were omitted when inappropriate. For example, some of the questions were specific to working in the plant (e.g., "Do employees (coworkers) use their safety equipment often at work?") and therefore could not be reliably answered by those not working in the plant. When necessary, probing questions were used to clarify information or to follow up on information provided by the participant. Furthermore, additional questions were added when a participant raised an issue that had not been previously thought of by the investigators. Follow up on participants' statements that may not have been in direct reference to the questions within the interview guide was necessary in order to ensure the capture of as many of the social, cultural, and economic factors as possible (e.g., Lincoln & Denzin, 1994). It has been suggested that allowing participants to discuss issues they believe to be important improves the validity of qualitative data in that participants contribute to the content of the topics discussed (e.g., Mays & Pope, 1995).

Procedure

Communities were visited between August 2005 and October 2005. Each interview was conducted by the primary investigator together with a research assistant. Participants were informed before the beginning of each session of their rights as participants and were given the opportunity to ask questions and refuse participation. Interviews were conducted at a location convenient to the participant, generally the

participant's place of work or home. The length of the interviews varied, ranging from thirty minutes to two hours. Interviews were digitally recorded for accuracy and later transcribed. Both the investigator and the research assistant took notes during the interview sessions.

Data Analysis

The content of each interview was assessed using qualitative Ethnograph software. Thematic analyses were conducted using deductive and inductive approaches (e.g., Neuman, 2006). That is, the initial analysis was deductive in nature where transcripts were assessed to provide participant accounts that were associated with predetermined theoretical concepts (e.g., perceptions of organizational commitment to safety, perceptions of risk, knowledge of the health effects of styrene, attitudes about working in the boat-building industry, etc.). However, it became clear that there were further issues raised by the participants which had relevance to this study. Applying an inductive approach to the data revealed ideas and explanations which were subsequently informed by further literature reviews (e.g., community attachment, community status, job insecurity, PSOC, social influence beyond the workplace).

Interrater reliability. The unit of analysis for each interview was based on the participant responses to each question; more specifically, a sentence within a paragraph was coded when appropriate. After the primary investigator completed the coding for all 17 interviews, a sample of five interviews were randomly selected to determine inter-

rater reliability for codings of thematic content between the primary investigator and the research assistant. The research assistant was instructed to use the themes developed based on the primary investigator's coding analysis and/or to develop new themes when it was felt necessary to do so. Sampled participant statements were randomly selected for inclusion in the reliability analysis. The data were coded as 1, the two examiners agreed, and 0, the examiners disagreed.

A non-parametric binomial analysis was calculated on the data to determine the percentage of agreement between the two examiners. The author acknowledges that percentage agreement is considered a very liberal measure of interrater reliability as it fails to account for agreement that would occur by chance (e.g., Lombard, Snyder-Duch, & Bracken, 2002). However, by using a non-parametric binomial statistic, one can assess the level of interrater agreement against chance levels by selecting a test proportion of .50 (chance levels; Brace, Kemp & Snelgar, 2003).

Using this approach, interrater coding reliability was calculated to be 81% agreement, $p < .001$, based on the analysis of 96 participant statements. This demonstrates an acceptable level of agreement between the raters (e.g., Lombard et al., 2002).

Chapter 3

Study 1 Results

Study 1 Results

A total of 17 community members (14 males and 3 females) from three communities participated in interviews. Nine participants were from Community A, five participants from Community B, and three from Community C. Participants included three boat-building plant managers, three boat-building plant employees, four fishermen, three members of community councils, a fish plant worker, a wife of a former boat-building plant employee and restaurant operator, and two individuals that worked with a local marina (see Table 2.2 in Chapter 2, p. 69).

Community Life, Challenges, and Perceived Future

Community life. Each interview typically began with questions pertaining to participants' experiences of life and work in their communities. Based on their responses, it was quite clear that respondents from all three communities felt a sense of both fondness for, and connection with their communities. Some offered comments about cohesive and friendly resident interaction:

> *"The people, are very kind, and very cooperative. So, I like living here." (Fisherman 2 – Community A)*

> *"Uh, community. It's a uh, it is a close-knit community, and like a lot of small communities around the province... Overall, I find that people there are pretty good, really, overall, and they're relatively sensible people ..." (Marina Associate 2 - Community B)*

> *"Oh, I love it. I grew up here, and went to school here in uh, back in the '50s, '60's. I worked for 32 years with the provincial government, and retired and came back, so -- I guess that says it all...fairly, fairly close-*

knit...friendly. Yeah, for the most part." (Town Council Representative - Community C)

Respondents talked about resident support, particularly during times of crisis or challenge. According to a Teacher from Community A, for example:

"Well, for me, ... I enjoyed working here, and living here, ...People are generally good, I mean, it's a very small community and everybody knows everybody else, and sometimes it can have its disadvantages of course, but the thing about it is, is that if anybody gets into any kind of trouble or mishaps here, usually what happens is that with a small community there's always so much people to come around and help you to get through any kind of, you know, any kind of problem that you might have..." (Teacher - Community A - Community A)

Participants characterized their communities in terms of an overall unconstrained lifestyle. According to a boat building plant employee from Community A, for instance:

"Well, you can pretty much do your own thing after work, you know? Don't cost a big lot to have fun." (Employee 1 –Community A)

Others spoke fondly of their community's "country lifestyle":

"Oh, it's a wonderful place to live here. You got the country scene and, you know, you got spaces between your homes, and you got a nice few tourists passing through ... good fresh air livin' here." (Marina Associate 1- Community B)

The communities were defined as safe environments with very low crime rates, for instance:

It's a nice community... the people are nice... I find it's a great little community to live in, I have to say. It's a nice environment...Low crime rate and all that sort of stuff, so it's nice like that...Very, very close-knit, everybody knows each, everybody around here..." (Manager 3 - Community C)

Respondents spoke specifically about their community's setting as a safe and secure environment for family life, for example:

> *"...Well, I grew up here, this is my home town. So, I enjoy it here, it's quiet, peaceful, and it's a good place to raise your kids." (Former fish plant worker - Community A)*

> *"...It's a different lifestyle [than living in the city], I mean you gotta tie on kids, or keep them in, whereas here, basically they're free to go and come as they please and quite a different atmosphere" (Teacher - Community A)*

Overall, the interviews revealed little in the way of variation among the communities in terms of participant perceptions of positive resident interaction and support, stress-free lifestyles, and a sense of overall community connectedness.

Perceived economic challenges and future of the communities. The communities did seem to vary in terms of perceived economic wellness and sense of future. Respondents from Communities A and C in particular detailed salient challenges in terms of limited employment prospects, especially since the mainstay of their livelihood (i.e., the fishery) had collapsed. Several from these communities spoke specifically about financial hardship and out-migration. While participants cited the boat building industry as an important economic generator, many questioned whether the infusion of economic resources it provided was sufficient to sustain their communities.

According to a Fisherman from Community A, for instance, the future remained precarious despite the boat building plant operating in the community, as the only way to ensure the future of the town would be the reopening of the fishing industry:

> *"Oh, [the fibreglass boat building plant is] the only work that's there now, really... the main thing [was the fish] plant ... the boat building industry can't keep this place going, it's only a few people. If the [fish] plant don't, [reopen] she's out...No one's going to be here but retired people... And*

they're not going to be able to keep the town running, pay for the services and that...I don't see no future. If the [fish] plant don't come back there's no future...It [boat building plant] won't keep this place going, 10 or 15 men, or 20 or 30 men is not going to keep the community going. The rest gotta go away and get their work, get their stamps... And if they're young, they're not going to go away and get their stamps and come back they're gonna go, they got no other choice ..." (Fisherman 1 – Community A)

Others from Community A spoke similarly about the significant decline in resident numbers due to poor employment prospects, described the boat-building operation as having limited hiring potential, and spoke of the reliance on governmentally funded employment projects:

"No, it's [the community is] in a state of decline...it was 11- or 12-hundred people there at one time, and now there's probably somewhere around 600. Families going all the time, the odd family trickle effect... But the problem about that is [having only the fibreglass boat building plant in the community], if you've got 20 or 25 people down there and that's the only thing here, how can the community be sustained on 20 or 25 people working, services are just not going to be here for anybody...Very, very difficult now, the only work students happen to get around now is if it's something that's government sponsored or whatever else, right. So it very, uncertain, ... you don't know what the future holds, right now, the uncertainty that overhangs the community, in terms of the fish plant or an operation or some kind of viable industry that's going to keep the economy going...Rural Newfoundland is dying by degrees. Dying by degrees, all the time." (Teacher - Community A)

"Well, it was [growing] in the '50s from the '50s to the '80s, I'd say, I could see where it was growing - or even the '90s -- but since that, the fish plant have closed down, and it looks like it's going down the other way. I mean, people are moving away, they gotta move away to make a living... So, if the fish plant don't open or some employment for people, well, within a few more years, the, most of the people will be left here and gone to the mainland lookin' for work." (Fisherman 2 - Community A)

Respondents from Community C had very similar perspectives in terms of high out-migration, and a very uncertain future due to limited employment prospects. According to

one participant, for example, while the community had some small business activity, it did not seem sufficient to sustain the community:

> *"No. Definitely not [growing]... this community's probably one of the more fortunate ones, because there's a lot of little businesses in this community for some reason, there's five or six good businesses here. But, even though it's [population] declining every year... probably 400 people here, maybe -- that's the three communities." (Manager 3 - Community C)*

Others from Community C offered similar comments regarding the decline in resident numbers and the questionable future of the town:

> *"I would say no. [the town is not growing]. A lot of the older people are dying off. Not many people are -- more people are leaving than coming home." (Wife of Former FBB Employee - Community C)*

> *"Unfortunately, no [the town is not growing]. Not in my opinion, anyways... it's growing to the point where, people are retiring and returning back home like I did, that stuff...no, [there's] no employment."(Town Council Representative - Community C)*

Despite the poor prognoses offered by most participants from Communities A and C regarding the security of their towns, there was an interesting "upside" proposed by a boat building manager. This particular respondent suggested that the economic crisis within the community due to the fishery closure had a beneficial side effect for his business as it meant he could select the "best" workers from a pool of individuals in dire need of employment. According to this respondent:

> *"...with the fish plant closing there are a lot more people looking for work so I can pick the best ones out." (Manager 1 - Community A)*

Compared to residents from Communities A and C, those from Community B often highlighted growth in the community by indicating the number of new businesses in the area:

> *"Oh it is [growing], leaps and bounds. Everyday you look there's a new subdivision goin' in. And, uh, as you come up the road, the main highway there, every now and then you see 3 or 4 houses here and another one there, and like that. It's really gettin' built up...we just got a new [restaurant] up there now, and there's another one there gonna be the [restaurant]. And, you know, there's a funeral home up there, ambulance services, and there's -- senior citizens homes -- for care for older people and that." (Marina Associate 1- Community B)*

> *"There's a lot of people moving in here, and there's a lot of younger people staying. We had a problem, over a number of years, that -- well, like everywhere -- that most people were leavin', and not, either comin' back and not stayin' at all. But now it seems -- well, even since I started workin' here, the number of building applications and the number of people buildin' here has gone up...and I would think part of it is due to -- right now, they just finished part of [the secondary highway] that comes as far as [two close towns]... Actually, economically, it's pretty good... like, if you drive back the main road here, like this strip here is pretty much the, the centre, and there's the funeral home, gas station, steel company, fruit and vegetable market, the bank is there, there's a [restaurant], and a [restaurant] goin' there -- you know, it's, it's -- this strip is really startin' to uh, to build up, compared to what it was probably, 10 years ago." (Town Clerk – Community B)*

However, one participant asserted that the community was maintaining economic stability rather than growing:

> *"Well, it's not actually growing at all. It's basically maintaining its own, it's population has been pretty stable – I've done some research on this looking at Stats Canada census -- but it's, I say, it's holding its own. Which, in some respects, is a good thing, because most communities tend to die...And the things you look for in small communities, is the existence of a bank -- they still have a bank. A bank in a small community, I would say, is much like a, the old coal mines, would take a canary down there -- it's a bit like a canary in a mine, in terms of the livelihood and health of a*

community. So, it's surviving -- but they were intent on trying to grow and develop." (Marina Associate 2 – Community B)

Two participants indicated that rural community life is more economical and more private than urban life. From the perspective of these residents, this was one of the reasons that Community B was growing:

"Most people wants to get outta town, don't they? So, we're a better place to go. Around the bay. Cheaper...It's cheaper, easier. Way out. Why go into a place, pay a fortune, to live there [city]? Don't make sense do it?" (Employee 3 – Community B)

"Plus, I mean, [the closest major town] has grown, it's getting a lot bigger, and some people wanna get to the less densely populated areas, have a bigger piece of land, more privacy -- now that's, actually what I hear, that a lot, a lot of people are moving here now for the privacy, they're, they're building a lot." (Town Clerk – Community B)

<u>Summary</u>. There was an overwhelming consensus among all participants (excluding key informant interviews) that living in their community was very important to them, that their community was a nice place to live and to raise their children, and that the people in the community were supportive of one another.

Participants in Communities A and C frequently commented on the poor economic status of their communities. The fishing industry had been a vital component to the economic success of these communities. However, with the fishing industry in crisis many of the fish plants have been closed for some time. Consequently, many participants reported feeling uneasy about their community's future, fearing further economic crisis and out migration.

According to Manager 1 from Community A, there was an unexpected positive side effect of the community economic crisis for his business. This manager suggested that the lack of employment opportunities within the community, together with people's reluctance to leave the community to look for work, allowed the manager to select the very best workers out of the pool of unemployed men and women looking for work.

Compared to Communities A and C, Community B was described as prospering, or at least maintaining economic stability. Community B residents pointed to the number of new businesses in the area as an indicator of community growth. Several participants indicated that the perception of a relaxed lifestyle associated with rural community life had people relocating from urban areas and contributing to the growth of Community B. Residents of Community B expressed no sense of fear about the future.

Perceived Importance of the Fibreglass Boat-Building Plant to Community Well-Being

Participants were asked about the importance of the boat-building industry to their personal economic status and the economic well-being of their community. People from Community A stated that the boat-building plant was extremely important for maintaining employment in the community:

> *"Oh, it [the boat-building plant] means, it means a lot to the community here, you know, the dockyard over there. Like I said, the major thing was the plant." (Fisherman 1 – Community A)*

> *"More and more everyday, cause everything is going to the wayside except for this place [the boat-building plant]...Fish plant is gone, it's only tourism and boat building, pretty much, now, left in [this town]...Creating work, and trying to put the town on the map...if there wasn't this place, like I said, there wouldn't be nothing in [this town]...so I*

mean, the town would be pretty much dependent on welfare, and that's it. Or leave and go look for work elsewhere." (Employee 1 - Community A)

"I'd say it's really important to the community, and to the people, the town...there's nothing else here, I mean, yeah...Really important, cause, uh, only thing that's here...it's the only thing that's holding the town together, as far as I'm concerned... it is important, definitely important...I'd have to move out of, I'd have to leave the province, look for work...[Community residents are] Proud [to have the boat-building here], I'd say, a lot of them...Good for the community." (Employee 2 – Community A)

"Well, as I said, it's provided some employment, some badly needed employment for some of the men that's here, that hasn't been, you know... And seem to have a fairly good reputation so, it's been good that way, it's, I suppose, helped promote the community that way." (Teacher – Community A)

"That is, that is really important. Because that's the only bit of employment that's left here. So, I mean, without that, would be almost a ghost town right now." (Fisherman 2 – Community A)

Similar comments regarding the significance of the boat-building plant to community well-being were made by residents of Community C:

"Well...I guess [the boat-building plant] is pretty important, it gives a few people jobs...Actually, with the fishing industry and everything right now [in trouble], it is hard to say whether [it is really important], but you know, just for now, giving them people jobs for right now." (Wife of Former Boat-Building Plant Worker – Community C)

*"Yeah, to this community, I think it's [the boat building plant] very important. Cause anytime that you can, you develop an industry where you create 3 or 4 or 5 to 6 jobs, is extremely important...Creating jobs, you know, and obviously the greater the business, if they expand, and the more taxes to the town, and that sort of thing, right.
" (Town Council Representative – Community C)*

"Oh, very important...I mean, it's 6 guys workin' here, so I mean, that's 6 jobs for guys, where if they wasn't there they'd have to go away. So, and it's the same thing with all the other little companies that are around here, I mean, the businesses that are here are the life of this community. If they

weren't there, then there'd be absolutely very little here, this place would be like a retirement town. And that's what it's beginning to turn into, right....As long as there's places like this [company] and they're staying open, there's jobs, then it's something for young people to stay around for, right, so." (Manager 3 – Community C)

While residents of Community A and C indicated that the fibreglass boat-building industry was essential for both the economic well-being of their communities and keeping individuals in the community, there was more ambivalence in Community B:

"...it [the boat building plant leaving] probably would not have a big impact. ...The local people would probably still live here, for the most part" (Marina Associate 2 – Community B)

"...I don't know if it's [the boat-building plant] essential...If they can get the marina moving and expanded, I'd say, the fibreglass plant with regards to the boat piece, will become more important...it may become more important, over time. Now, there are quite a few jobs down there -- but I don't know if it's a do or die situation if it[leaves]...but I can see it becoming more important, if the marina grows and expands and more boats come in and more people are there, their services would be more heavily needed." (Town Clerk – Community B)

Nonetheless, several participants from Community B did suggest that the boat–building plant contributed to the community by providing employment opportunities and tax base for the community:

"Well, it contributes a couple of ways. One, it pays taxes... It contributes in the sense that it employs people, and these people, some of them live in the community, so they buy a property there, and they buy their groceries there, and they pay their own taxes there as well....In many small communities their primary, um, for their operating monies and that, they depend pretty well on residential and uh, small business, um, taxes -- that's it, that's the only revenue they have, right. So, anytime you get a small business in there like that, it's a positive thing for them, really" (Marina Associate 2 - Community B)

"...we donate to everything that go on in the community, whether it's the breakfast program, or, whatever, [omitted] festival, whatever that goes on, uh, we always contribute. And I know that, uh, property tax is fairly high here, so, the town is benefiting from our property tax...all the employees that we did hire on - it's probably prejudiced but -- I wanted to hire people from the area. So all the employees that we hired, the 9 employees were from this area." (Manager 2 – Community B)

"[The company contributes] with the jobs that's there. You're gonna pick up a thousand guys if you want...there's no work out here. There's just no work...we've had people here that, I don't know if they ever worked before. We had one young fellow here that never ever worked, 24 years old." (Employee 3 – Community B)

Summary. Residents from Communities A and C stated that the fibreglass boat-building plants were vital to the economic well-being of both their respective communities and the individuals residing in them. Furthermore, residents from these communities believed that the plant was essential for keeping people in the community to prevent out-migration. According to participants in Communities A and C, the boat-building plant was a significant source of employment for both communities.

The impact of the fibreglass boat-building plant was less evident in Community B where the industry appeared to be only one contributor to a growing community. For the most part, Community B participants stated that the plant contributed to the community's business sector and to town revenues, but did not link the success of the community to the success of this particular business.

Attitudes Concerning Workplace Health and Safety

Residents and key Informant. Residents of Community A were aware of OHS issues and had a relatively positive attitude towards occupational health and safety in the workplace:

> *"I don't operate in such an industry, but my psyche would tell me that if my workers are safe and happy and, you know, and they're going to be more production out of them, or so on, if they're happy and safe in the environment that they're working in, if I was providing a safe environment for them, so, I would think that it would be in my best interests to promote it...Oh, I would say that anybody, you know, before they go to work any such place, that they need to know what they're -- anywhere -- they need to know, you should know what you're getting yourself into [working with chemicals]." (Teacher Community A)*

> *"And regarding to the fishery, or the boat building plant, or whatever, to me, safety always comes first... I've been a member of the Coast Guard Auxiliary, for 27, or just about 27 years. But I've promoted safety, all my life." (Fisherman 2 – Community A)*

Despite this level of awareness of OHS issues, concern about neglect of safety was also reported:

> *"See, a lot of our problem is we've been all brought up and safety was never a thing. Till we came here lately, the last few years they've [Government Services OHS Officers] pushed it in on us" (Employee 2 – Community A)*

> *"... Newfoundlanders are known, worldwide, for their ability to put things together, to make something out of nothing. And, so that ability to be diverse and makes us take on a lot of things we mightn't be capable of doing. But when we do do it, we think that we're doing it the great way and this is the only way of doing it, so we're not really good when it comes to safety...you see them doing a lot of different things, cause we're great when it comes to that. When it comes to being safe...not so good." (OHS Representative)*

Managers. Overall, managers expressed concern with respect to the health and safety of employees. One manager admitted that occupational health and safety had not always been a priority:

> *"Safety is now an attitude that the company has...I didn't always think this way about the Occupational Health and Safety, I had my back up about it, but I came around, came all the way around the circle when Occupational Health and Safety [inspectors] started coming around...and now it is an important issue, and that workers do know that they have to do certain things to keep themselves safe from the chemical, but they don't always do it, though...But in order to stay in business there's certain things that they have to do" (Manager 1 – Community A)*

Managers 1 and 3 reported that they had instituted regular safety meetings and were enhancing their compliance with OHS practices:

> *"Now we have meetings once every three months— we talk about the effects of styrene, or the effects of the fibreglass...we do our own testing of the air here and we keep records of all the results and OHS checks this when they come in...workers know when they shouldn't work in an area"(Manager 1 - Community A)*

> *"We just did safety training. We just finished our, our safety course. And, um, we just appointed a head guy for the safety office. So, we're just getting, really, set up on that sort of thing, but, yes, we're starting to get more involved into the safety aspect of things." (Manager 3 – Community C)*

The Former Owner contended that while employees complained about using PPE (personal protective equipment), he would continue to encourage the use of PPE for the sake of the employees and the company:

> *"They [employees] always complained [about using PPE], yeah, it's common for them to complain, but I mean, you try to make them wear it as much as you can because you don't want them getting sick, not only for their sake, but I mean, you know, you're liable too, it's your plant, right,*

you're responsible for their safety, and you didn't want it to happen" (Former Owner).

When asked about managers' attitudes toward health and safety, the Former Owner stated that the bottom line was revenue:

> *"They [managers] think dollars... What's this going to cost me to get the plant safe? ... That was somewhat my father's idea, although I didn't feel that way. I felt that we should get more safety in there, and get the guys involved more, that will help us." (Former Owner)*

This point was echoed by the OHS representative. It was this participant's contention that productivity often takes precedence over health and safety. Changing existing attitudes and getting workers to internalize the importance of OHS has been a difficult and slow process:

> *"The main priority [for Managers] is get the job done. I think if you asked the employers, the employees, the main priority is get the job done. Some may say, "Get the job done -- oh, yeah, and be safe". Uh, some may not even say safety at all...So, the attitude is not that positive. We're having some change, but the changes are very — slow... I mean, the attitude has changed a little, but not a lot. Then they're of the attitude, 'I'm gonna do it because you want me to do it, not because I want do it my own self'." (OHS Representative)*

The Former Owner appeared to have a positive attitude towards health and safety suggesting that, when starting a new business, the infrastructure of a plant and the costs of doing so would have to be considered at the forefront to ensure a safe working environment:

> *"Well, health and safety goes hand in hand with production too. You can't separate the two. Because in order to figure out what your production is going to be, and what your bottom line is going to be, the health and safety has to tie into it as well as laying out the plant so you can do your*

work...Health and safety is whatever, but you still got to figure on the cost. So you got to design your plant so that you got: health and safety, proper ventilation, proper tools, better ways to apply the glass, if there's any new technology for curing the glass, to cut down on the styrene or whatever is out there." (Former Owner)

Employees. Employees 1 and 2 from Community A provided a number of examples of the safety procedures they followed at work and appeared to have positive attitudes toward safety:

"Well, I wear a respirator, safety glasses, that sort of thing... and try to keep the place clean" (Employee 1 – Community A)

"We all got to wear our hats, boots, and...if you're sawing, gettin' your safety pants...Well, we gotta do tests [air quality], every couple hours while we're working, eh, see what the condition is, when you got to leave the area... Yeah, like leave the area if it's got up to -- you got a certain amount to work in and once it gets to that level, you're supposed to leave it, eh." (Employee 2 – Community A)

Employee 2 from Community A recognized that the workplace could be a safer environment by way of better ventilation in the plant:

"Well, what you really need is a good air conditioning put in, something that would take everything out, the dust and all...better ventilation, type of thing... What we mostly do is, the masks, and well, we use some ventilation, eh, a lot of it...there's not really enough [ventilation]...so, lot of [employees] don't do it [work with styrene]...There could be some improvements in the health part, especially with the fibreglass." (Employee 2 – Community A)

Employee 3 from Community B did not provide any information to the investigators on this matter as the participant exited the interview to return to work before the investigator

approached the question (this participant preferred to be interviewed together with Manager 2).

Attitudes related to Government Services OHS Department. Managers were asked to comment on their association with Government Services Occupational Health and Safety Inspectors. Manager 2 in Community B only stated that *'inspectors come all the time, they come and test that all the time and everything's fine in here'*. Based on this brief comment it was difficult to determine the attitude held by Manager 2 with respect to OHS Inspectors. However, the attitudes of Manager 1 of Community A and Manager 3 of Community C about OHS inspectors were more apparent. For example, Manager 1 commented that when he thought of OHS inspectors he would immediately associate them with financial cost and threats to the future of the company:

> *"..all I could think of was, they [OHS inspectors] want me to buy this, they want me to buy that, spend money here, and spend money there...try to shut me down...." (Manager 1 – Community A)*

> *"...then I finally realized [the seriousness], when they sat me down and said, 'listen, we really will shut you down, if you don't, you know, pull it together,' or whatever" (Manager 1 – Community A)*

Manager 1 went on to say that a positive working relationship has evolved, over time, with OHS Inspectors:

> *"...we have a very good working relationship, now, with the Occupational Health and Safety inspectors—if there's something off—that they need to be doing, they know that we'll, make the change. They let me know and tell me we'll have to make the change for the next time they come, we will, you know, go ahead and do that, and they'll check it the next time" (Manager 1 – Community C)*

Manager 1 also went on to say that his interactions with OHS inspectors have improved his attitude toward OHS:

> *"Safety is now an attitude that the company has...I didn't always think this way about the Occupational Health and Safety, I had my back up about it, but I came around, came all the way around the circle when Occupational Health and Safety [inspectors] started coming around...and now it is an important issue, and that workers do know that they have to do certain things to keep themselves safe from the chemical, but they don't always do it, though...But in order to stay in business there's certain things that they have to do" (Manager 1 – Community A).*

Manager 1's statement was especially telling with respect to why the Manager felt the need to comply with safety standards – *'...to stay in business.'* This statement implies that the health and safety of employees is not the only reason, and possibly not the primary reason, for abiding by safety regulations and recommendations of OHS inspectors.

Manager 3 in Community C appeared to have very strong, negative feelings and beliefs about OHS inspectors. Manager 3 suggested that some of the recommendations made by OHS inspectors were not reasonable or beneficial to the company:

> *"...I don't wanna see them. No, sometimes they'll create more problems, and they'll end up costing you money for a lot of issues that aren't issues. That's what we've heard anyway, and that's what we've seen in the past. Sometimes they'll pick on stuff that's, you know, it's just--petty." (Manager 3 - Community C)*

In addition, Manager 3 contended that a lack of knowledge with respect to the boat building process was one reason for problematic recommendations offered by OHS inspectors:

> *"Like, just making modifications to your shop sometimes, different things that gotta be done and, it just, it don't make sense what they're doin, right.*

So sometimes there's lack of knowledge on their part, what they're doin'. So, that sometimes becomes a problem." (Manager 3 – Community C)

Manager 3 provided the following example regarding the use of safety glasses to illustrate his point:

"...here: safety glasses. You get in and you start grinding a boat, with safety glasses on, OK? You can't! It's impossible to do it, cause they're gonna be covered [in dust] in no time. You can't see what you're doin'. Another thing is -- have you ever seen people spraying cars before, you may have seen that, right -- have you ever seen anybody with a pair of safety glasses on doing that before? You never see anyone spraying a car with a pair of glasses on, for the simple reason cause there's overspray, you can't see what you're doin'. So they [OHS inspectors] were comin' in trying to enforce safety glasses but you can't, it's impossible, it's like sprayin' the car, if you got glasses on, they're gonna be covered. So you can't see what you're doin', so how are you supposed to do it? So it's, sometimes there's issues like that, that come up, like, you know, if you never worked there, how do you know what you're talkin' about -- and sure, I know that you're trying to promote safety but, it's impossible to do it." (Manager 3 – Community A)

This statement leads to an obvious question: If spraying paint results in overspray that accumulates on safety glasses, where does the spray go when an employee is not wearing safety glasses while spraying? This question was not posed to the manager.

The Former Owner suggested that it was important for managers to adopt the ideas and recommendations of OHS Inspectors but that there are limitations to what the industry can do with regard to meeting safety standards:

"They [Managers] have to [embrace the ideas of OHS] ...At times they would come and check air quality [in my plant]. You know, give us a few recommendations, we'd do what we could. But if they pushed it to the limit they'd put you out of business. That's the problem, some of their techniques are very, very costly." (Former Owner/Manager)

Summary. Several Community A residents acknowledged the importance of OHS issues and revealed a relatively positive attitude towards workplace health and safety. However, Employee 2 alleged that the lack of discourse in the community about workplace health and safety means that experienced workers must take on the responsibility for educating others about OHS policies and practices. The perceived lack of concern among community members regarding workplace health and safety was reiterated by the OHS Representative.

Managers expressed an overall concern over the health and safety of employees. Unexpectedly, Manager 1 admitted that workplace health and safety was not a priority for his business but he realized the need for change. All managers provided descriptions of changes they had made or were in the process of making to enhance OHS standards and practices in their workplaces. The Former Owner believed that employee complaints can make it difficult to enforce the use of PPE.

The OHS Representative suggested that productivity has a tendency to take priority over health and safety and that changing that attitude and getting workers to internalize the significance of OHS has been a slow and frustrating process. This point was supported by the Former Owner who stated that attitudes toward safety were tied to the resources of the company; when a company is in crisis, health and safety concerns are not a priority.

The Former Owner recognized that though he was conscious of health and safety while he owned and managed the company, in hindsight he would have made many changes with respect to health and safety. Based on his experience, health and safety

precautions need to be built into the infrastructure of a new plant and the costs of doing so should be considered before beginning a business.

Employees 1 and 2 expressed their attitudes, largely positive, toward health and safety by providing examples of the safety procedures they followed at work. It appeared that employees may be aware of times when their workplace is not up to standards indicative of a safe working environment. Employee 2 believed that his work environment could be safer if the plant had a better ventilation system.

There were a wide variety of attitudes toward Government Services OHS inspectors. Manager 1 from Community A stated that his attitude towards OHS inspectors and OHS regulations has changed and that the company has embraced a new way of thinking surrounding OHS. However, the manager also commented that complying with OHS Inspector recommendations was necessary for his business to remain in operation. Such a comment implies that the health and safety of employees is only one of several reasons to comply with safety regulations and the recommendations of OHS inspectors.

The negative attitude toward OHS Inspectors held by Manager 2 in Community C was particularly apparent. Manager 3 indicated that he was not always in agreement with OHS inspectors' requests. From this manager's perspective, the requests of OHS inspectors for modifications or improvements are not always realistic suggesting they do not understand the logistics of the boat-building process.

The Former Owner maintained that it is important for managers to comply with OHS regulations but also stated that due to the economic hardships faced by many of the

companies there are limits to what the industry can do. This is a very important point given that the interviews with managers indicated that while they were concerned about the health and safety of employees (albeit the degree to which each manager perceived a health risk to employees varied), the FBB (fibreglass boat-building) industry in NL is precarious and, therefore, it is difficult to make some of the changes recommended by OHS Inspectors.

Factors Affecting Safety Behaviours and Compliance With Safety Standards

The following quote from the OHS Representative sets the stage for comments regarding the importance of promoting and enforcing PPE use and the factors affecting PPE use among workers:

> *"It [ventilation systems] varies a lot from facility to facility -- there's some, I'm sure, that you'll find that it's non-existent. There's some, rely upon a little small bathroom fan -- to take care of their ventilation. And so it's [ventilation] from non-existent to there's some systems that are very good. But for the most part, I'd, you're probably looking at 2 or 3 [good ventilation systems]. Cause they're relying a lot on natural ventilation-- if you're utilizing natural ventilation, your personal protective equipment, well it increases the importance of it. That's your sole protection then. But, that's where they start to lax on, the personal protective equipment, therefore, that's when you're getting exposed to the styrene." (OHS Representative)*

Social Factors Affecting Safety Behaviours

Family influence. Participants were asked if they thought family members encouraged employees working at FBB plants to take safety precautions. Participants were inconsistent in their answers. For example, Employee 1 in Community A said "oh,

yeah', while Employee 2 in Community A stated that family members did not because they were unaware of the safety hazards:

> *"Uuh, no, I wouldn't say they [family] do...if they [family] really knew what was going on [at work], probably they would..... A lot of them [family] don't understand. ...No, they don't know what's going on [at work], really." (Employee 2 – Community A)*

The wife of a former employee at the fibreglass boat-building plant in Community C indicated that she had had worries about the health of her husband when he worked at the plant:

> *"Well, I worry, but I guess he's, where he's a grown man, I guess it's up to him, how he felt when workin' there, right. I mean, he did wear a mask and stuff like that but like, at times, that you didn't have it on, right." (Wife of Former FBB Plant Worker – Community C)*

This participant also believed that family influence on health and safety really depended on the worker's options with respect to employment opportunities suggesting that family members may not bring up safety concerns if such concerns have a detrimental effect on family resources:

> *"That [family influence on safety practices] all depends, too. That all depends on how much the person needs the job, and how his family -- I mean, you gotta think about that type of stuff too. Oh, that's the worst thought of it, is if they need the job and their family needs that person to work in a place like that in order to get food and that on the table. That's the worst of it. And that is the situation in a lot of cases." (Wife of Former FBB Plant Worker – Community C)*

The OHS Representative contended that one of the recent achievements of the NL OHS department has involved enhancing OHS in the fishing sector. This participant

suggested that family influence played a major role in the attitude change of employees within this sector and was having an impact on PPE use:

> *"One of the things we have been successful in, especially in the fishing sector: you wanna make a change? -- talk to the fisherperson's wife. Certainly [a family approach would help] because when they [workers] go home, every time it's, 'Were you doing this? Were you wearing a respirator? Cause I'll tell ya...'. And it's just the same complacency that passed on from generation to generation, from fisherperson to fisherperson. The wives are still talking and saying what it's like not having a husband coming home anymore, and the hardships that they had to endure, from talking to the women. So the women are now a lot more passionate about this stuff, and realistic about it all, and knows what it's gonna be like...But it's a very big challenge." (OHS Representative)*

Co-worker influence. Participants were asked whether or not co-workers encouraged or supported safety behaviour at work. Employee 1 from Community A stated that '*everybody takes care of themselves*' and they do not remind each other to use safety equipment. In contrast, Employee 2 from Community A maintained that there is a strong co-worker influence over the use of safety equipment and learning about safety procedures in the workplace:

> *"Yeah, we do [encourage each other]. If I'm goin' along, see someone that's doin' something he shouldn't be doin', I'm supposed to [let them know], eh, and we do." (Employee 2 – Community A)*

Manager 2 from Community B also suggested that employees encourage each other to practice safe behaviours in the workplace:

> *"I think they do [encourage each other to be safe], yeah...And I know, I know that my husband is very health-conscious, cause he'll tell the boys, 'now, get your mask on, you're not going to the spray booth without your mask on'." (Manager 2 – Community B)*

With that being said, the Former Owner of a FBB believed that co-workers only encouraged each other to behave safely in the workplace if the workers themselves were concerned about OHS issues:

> *"If you can get a couple of guys that are [concerned about OHS]...they will encourage the others, right. If they [workers] can see that you can do it, the right way, they'll probably try to do it, right." (Former Owner)*

Employee 2 from Community A spoke to the importance of informational influence, i.e., seasoned employees passing on their knowledge of safety procedures to new employees as a means of promoting safety behaviour in the workplace:

> *"You needs that [to encourage co-workers to use safety equipment], because some people comes on the job new -- see, if you're workin' on the job, and you're not used to safety, you got to learn it...See, a lot of our problem is we have been brought up and safety was never a thing. Till we came here lately, the last few years they've [Government Services OHS Officers] pushed it in on us...new workers comin' in, you got to keep after them. You go along, there's a fellow who's got his hat off, someone's got their boots off, probably a pair of sneakers on 'cause it's warm or something, eh. But you can't do that, not supposed to do it." (Employee 2 – Community A)*

The OHS Representative contended that coworkers do influence each other with respect to safety practices on the job. However, the influence could have a positive or negative impact depending on the workers' commitment to OHS:

> *"Without a doubt. They influence each other from everything. I mean, if you're working with me, and you says, 'Well, listen, you come and follow me around for a day', then I'm gonna be a big influence on you. And I decides, look, I'm not committed to this [safety] at all, I'll go, I'll show up on the job site. You say, "I guess, well, he's the safety person, so he must know the difference, so I'm gonna follow whatever he does." And especially if that's your first exposure to it, then you'll learn -- you may learn some bad habits, you may learn some good -- so that's when you're most impressionable. So, if we're in the fibreglassing sector, where you*

have a lot of older people and now you got some people, young ones coming up there, they're following that along, he says, "Well, obviously he never got that grey hair from nothing, he must know what he's doing to some degree," even though it might be the most hazardous thing there on site. He's just been lucky." (OHS Representative)

The OHS representative also believed that building on the strengths of workers such as younger workers' knowledge about workers' rights and older workers' experiences, could have a positive influence on safety practices in the workplace:

"Well, the younger workers are a different generation, like a lot of them are more educated, we have certain tools, we have the internet, you can find out anything and everything, which wasn't there before -- I'm not that old, but there was no internet when I grew up. So, the younger ones are coming, they're a lot more familiar, they know their rights a lot more, and they're not as timid, like they'll speak up. But the older ones -- so if you can get the two of them together, share that education, that outspokenness, and say, "Listen", and the older one's there sharing his experience, because he can also tell you a lot of bad things that went wrong, and they've learned the hard way...it's learning from each other. Now that, sometimes, can be a big thing, because it's a big generation gap -- both are intimidated by each other." (OHS Representative)

Younger versus older workers. The distinction was made between younger and older workers as it relates to the use of safety equipment. One manager suggested that most employees use PPE but younger employees are less likely to do so:

"...employees, wear, their mask, usually, though the younger employees are less likely to do so and have to be reminded to use their masks because, well, I don't know if it is because they are young and they don't think that things can affect them...(Manager 1- Community A).

When asked if there were differences between younger and older workers, the increased concern for younger workers was addressed by Manager 2 who told of a recent

incident where a young employee had to be let go for failing to comply with safety practices:

> *"One of the guys that we hired on the summer, was a little bit of a rebel, and I used to have to be on his case all the time. You know, he, he didn't want to wear his goggles, he wore glasses and he hated the goggles on over the glasses while grinding. And I, you know, I used to say, 'you lose your eyes, you've got nothing left,' right. But they don't -- when you're young, you know, you do a lot of things that you wouldn't do after you're 40..." (Manager 2 – Community B).*

.

Interestingly, Manager 2 related younger workers' increased risk taking at work to taking risk with alcohol suggesting that young people take risk with alcohol (e.g., over-indulging and drinking and driving) because they do not believe that they will experience a negative outcome.

The Former Owner of a FBB plant expressed the view that in his experience people knew that there was a health risk but it was particularly difficult to get young workers to appreciate the risk and behave accordingly:

> *"Most people, who I have talked to, do acknowledge the risk. But there is -- some people just don't think it could happen to them. And that's the problem. A lot of the people I had working for me were younger, a little more carefree, a lot of them smoked, were smokers -- I smoked a bit at the time... -- but those guys are still smoking. So along with that, and the combination, you know, they're really playing with dynamite -- they're young, "we're young, strong", conquer the world, type of thing -- but it's gonna catch up to them later in life. And I can even feel it, when I walk now -- come the Spring when it gets a little better, I'll be out walking again -- but I'll find the lungs, I still find it in the lungs when I put a lot of strain on them. It's a different feeling, that stuff being in your system, right." (Former Owner/Manager)*

The OHS representative described both lack of experience among young workers and complacency among experienced workers:

> *"Because the younger people don't have the experience, and, well, they can't relate to stories, so they don't have a lot of that common sense associated with things -- common sense is only based upon your experience, and taking the experience of others, so they're not exposed to that. Therefore they do things and they can't really perceive the risk. And the older ones, if they went their full career without being associated with it, complacency sets in, and so therefore he says, 'Listen, I did this for 30 years -- I've done the same thing for 30 years and nothing happened, so I can get another 20 years out of this, before I retire'. So it's just complacency. So you can see the two extremes: the young ones, being that because they never had the exposure, and the old ones taking their own experience throughout the full thing." (OHS Representative)*

An aforementioned statement made by Employee 2 implied that safety practices and an awareness of safety issues in the workplace have not been the norm. Employee 2 suggested that the community environment has not assisted in establishing positive beliefs or awareness of OHS issues; rather, OHS needs to be learned by employees. This observation was echoed by the OHS representative:

> *"... we [OHS in the province] really never evolved a lot in safety until the last 10 or 15 years. And people weren't communicating good, we [OHS inspectors] weren't going out there, we weren't requiring stuff - 'This is the right way to do it, this is your knowledge, this is what you should do' - So all those workers that were working previous to that, they're saying, 'No, no, no, look, I did that there on the job, I was climbing around for years and years and years, and nothing happened to me. I've been exposed with the product -- look, don't be so foolish, you guys [OHS inspectors] are too sensitive now, you guys are--'. So, it's that attitude were dealing with." (OHS Representative)*

In addition to attitudes toward health and safety in general, the Former Owner believed that employees did not "value" the PPE given to them and, from his perspective, would take measures to ensure that they did not have to wear the PPE. Such actions provoked the co-owner to refrain from providing free PPE:

"And if I turned my back, if they didn't use it, what could I do? But, not only would they not use it, in some cases the employees would just throw it down; they didn't value it, 'If it's broke, I can't wear it'. And then, that's when the old man's [co-owner] idea kicked in, 'Well, they're only going to cost me money, if they don't give a damn about it'. And that's his argument, he didn't want to give them equipment for free – 'I'm only going to give them one more and that's it,' you know" (Former Owner/Manager)

<u>*Summary.*</u> There appeared to be inconsistency among participants concerning the extent to which family members were concerned about the health and safety of those working in the FBB plant. Employee 1 from Community A believed that family members were concerned while Employee 2 from Community A believed this was not the case suggesting that family members are not really aware of the health and safety issues at the FBB. Yet the wife of the former boat building plant worker in Community C believed that family influence on employee behaviour was dependent upon the employment options of the employee suggesting that the weight of having to provide for a family, or as a family member having to be provided for, affects the extent to which family members will influence safety practices.

From the perspective of the OHS Representative, family members have been influential in reshaping the attitudes of employees particularly in the fish harvesting sector. The OHS representative stated that involving family members in OHS awareness and promotion has contributed to enhancing OHS in the fishing sector and could have an impact on PPE use among workers.

With respect to co-workers, there again appears to be inconsistency among participants regarding peer influence in the workplace as it relates to safety practices. Employee 1 from Community A stated that workers largely looked after themselves

while Employee 2 from Community A suggested that there is a strong co-worker influence associated with safety practices in the workplace. The belief that employees do encourage each other to be safe at work was echoed by Manager 2 from Community B. However, the Former Owner believed that co-workers were likely to encourage each other to be safe *only* if employees were concerned about, and aware of, OHS practices and guidelines.

Employee 2 from Community A suggested that seasoned employees need to teach new employees the importance of health and safety procedures as many new employees are not aware of these workplace issues. This participant believed that lack of knowledge and awareness surrounding OHS issues is due to in part to the lack of safety culture in the community.

The age of the employee emerged among participants as a possible factor associated with failure to use or under use safety equipment. The OHS Representative suggested coworkers do influence each other and this influence could have a positive or negative impact depending on the workers' commitment to OHS. The OHS representative suggested that a lack of experience among young workers and complacency among older workers both affect PPE use and risk perception.

Based on his experience, the Former Owner reported that people knew there were health risks but trying to get workers to understand the risk and behave in a way to protect themselves from hazards was extremely difficult, especially in the case of younger workers. Several participants suggested that it was more difficult to convince younger workers of the significance of PPE use. Participants also compared risk taking

among young workers to the risk associated with smoking and excessive alcohol consumption. That is, the young workers are considered to be less able to understand the future consequences, such as health impacts, of their present behaviour than are older workers.

The OHS representative further suggested that it is possible to take advantage of the different strengths of young and older workers, suggesting that younger workers are more aware of workers' rights than older workers, and older workers have more experience and sense about the industry than younger workers.

Organizational Factors Affecting Safety Behaviours

Perceived safety climate. Employee 1 of Community A suggested that there was a lack of enforcement concerning PPE, implying that the organization's commitment to safety was questionable and, as such, employees could often choose when or if they would use PPE:

> *"Cause it's [use of a respirator] not really enforced here, it's pretty much your own...if you wanna wear a respirator, you gotta buy your own respirator, wear it, right -- nobody enforces that kind of thing." (Employee 1 – Community A)*

Employee 1 also reported that lack of enforcement contributed to 'carelessness' among employees. Lack of consistency with respect to enforcement of PPE use was implied by Manager 3 in Community C who described use of PPE as 'recommended':

> *"we highly recommend it [using the respirator], I mean, we can only tell them that we want them to do it at all times. And I'd say they're pretty good anyway. They don't wanna be subjected to it no more than we want them to be, so, they've*

got them on all the time. We generally don't have to be really enforcing it cause, you know, they've got them on anyway, so." (Manager 3 – Community C)

The wife of a former boat-building plant employee in Community C believed that her husband's employer did encourage the use of safety equipment. That being said, she also believed that PPE use should be more strictly imposed by management:

"I think so [management encourages employees to be safe]. I mean, they gave him a charcoal mask -- my husband -- and they gave him gloves and stuff like that, so, I think so. Sometimes they could be a little bit more [better], with it, I guess, but with [my husband] they were all right... Giving the employee the option of having a mask on -- I think that they should tell them, like, they got to have the mask on or, to work in a place like this -- like, be more forceful that way." (Wife of Former FBB Plant Worker – Community C)

Manager 2 in Community B and the Former Owner provided a great deal of information with respect to their commitment to enhancement of safety in the workplace:

"We don't ask for them to pay for anything like that. The gloves are supplied, if they're sprayin anything they're supplied with a full face mask. Whenever they're doing any other glassing, sanding, grinding, they're supposed to wear their other mask and their glasses. Everything is supplied, all their new filters, are supplied as they need it...I got books that I've ordered in since I came here, and I photocopied them, actually, for the boys. Books telling them what can happen with resins,...what can happen with your product. So I like to keep them informed on everything you know. I wouldn't want them using anything here that was unsafe for them to be using, without knowing it, because I wouldn't want to use it myself." (Manager 2 – Community B)

"And I've encouraged the boys to read them [Material Safety Data Sheets (MSDS)]...when I was there I tried to keep the dust collection equipment up to date, and make them wear their mask. I gave them all their own mask, and I kept giving the filters to them... And I used to encourage them to take them home and keep them in bags, keep them from getting contaminated -- that's the only way to do it." (Former Owner/Manager)

Manager 2 further indicated that upon taking over the company, many changes from a health and safety perspective were necessary and there was still work to be done:

> *"Well, we're trying [to create a safe workplace] -- ...the mask and everything, I know that was pretty much implemented when I came, but, since I came I've made it very important with other things like using the hose to spray themselves off, you know, I made sure that they don't do that anymore... I know about lung diseases and I know what chemicals can do to the body ...And there're still more improvements needed, I'm not going to tell you that it's perfect here cause it's not, you know, still we're, everyday we're doing something to upgrade [this plant]. And cleanin up was a big thing when we came here, you know, we've done a lot of cleanin up, and lot more to go, but everything seems to be comin into place here, you know." (Manager 2 – Community B)*

An interesting comment was made by Employee 2 in Community A indicated that employees at his workplace had a choice, when it came to working with styrene, suggesting that management would not force them to work in conditions where they do not feel safe:

> *"See, we're in a condition where we can refuse it [working with styrene], or we can go with it. If someone is gonna feel uncomfortable they don't have nothing to do with it. You're not, you're not forced to do anything, put it that way -- it's up to you, if I'm gonna do it [work with styrene] it's my choice, if I don't want to I don't have to do it." (Employee 2 – Community A)*

Economic constraints. Of the three managers who were interviewed, Manager 2 from Community B and Manager 3 from Community C indicated that employees were provided with respirators and replacement filters, without any charge to the employee. However, Employee 1 of Community A claimed that *'you gotta buy your own respirator'*. When asked, Manager 1 of Community A indicated that the respirators were

supplied to the employees free of charge but not the filters. Manager 1 gave this explanation:

> *" I provide the masks, but, not the filters -- employees are responsible for their filters, and that's because, what I found -- one of the growing pains – was, employees would chuck the filters before they were non-functional...it was costing the company a lot of money to keep replacing the filters." (Manager 1- Community A)*

The high cost of compliance with safety standards was commented on by other managers as well, particularly with respect to proper ventilation and air quality. For example, Manager 2 from Community B argued that it is difficult to maintain proper ventilation as the industry does not generate enough revenue to make major renovations or installations:

> *"...And we got a ventilation system here, but it's not, uh, like the ventilation systems they have up there [in Ontario]. And to have the ventilation system that we need, here in Newfoundland, the industry's not there to give it to you, to be able to put it in...You know, you can't afford to invest a hundred thousand dollars in a system in Newfoundland because you're not getting that kind of business...Basically what you're getting' is a Mom-and-Pop business that's surviving on, you know...which is OK for a, a livin', but you can't spend a lot of money in upgrades and whatever, right...we don't test [air quality] everyday, we only test when it's something major going on that we know that we probably could be up in the limits, right. It's too costly to test everyday -- you have to break open the shells and they're not very cheap, so we try to do it only when it's needed to be done. Like today wouldn't be anything in the air over any limit. You're going to get the smell of resins just the same as if you're working in a paint shop, you're gonna get paint smell there all the time, right." (Manager 2 – Community B)*

In addition to the cost associated with proper ventilation and the provision of PPE, there is the pressure to get the product on the market. The Former Owner of a FBB suggested that time constraints affected employee use of PPE:

"Back then we were in such a hurry, and you were always pushing trying to get that boat out the door, and meet a deadline for delivery...Well, when we're in painting inside of a boat or whatever, everybody wore it [mask]. But lots of times you would jump in the boat, and you got a little patch to put here, little bit of paint to put on there. And there's always some little thing to do, and the mask is hung up over on the bench, you jump and go, and you don't put it on, and you think, 'Oh, it's not that strong'. But, when it starts to kick over -- what I mean by kick over, is start to cure -- that's when the fumes are the hottest, they'll burn you then, if you breathe in too deep...usually by that time, I'd be putting the boat on the trailer and starting to strap it down, and buddy would still be aboard the boat painting, and it'd be ready to go." (Former Owner)

The economic pressure felt by these organizations was further endorsed by a member of the community who suggested that the precariousness of the industry does not support major investments into modifications to the physical plant environment:

"Well, I guess they [the organization] have to be shown that there's no cost, to them [to reach safety standards]. That's a big issue -- I mean, you know--here in Newfoundland, most of them are quite marginal, really. So any additional cost, could put you under." (Marina Associate 2 – Community B)

Physical properties of PPE. Several participants suggested that the equipment was uncomfortable or inconvenient to use and therefore, employees were less likely to use it, particularly the respirator:

"Other than steam, when you're breathin you're gettin warm, right. Sometimes hard to see." (Employee 1 – Community A)

"Some do [mind using the respirator], some don't...you'll get some who don't like to use it, and some will use it... I don't know why. Sometimes, a lot of them finds it, like the breathing especially is warm...the breathing part of it is, is uh, uncomfortable." (Employee 2 – Community A)

"...discomfort. They have to adjust it [the mask], and the straps get in the way" (Manager 1 – Community A)

"Then it becomes another reason why you wouldn't wear it [respirator]. You know, I've seen the boys haul them off, they're just wringing wet [from sweating], and "I can't wear that", and they throw it down and go with the roller again, right... Big, big issue. I mean, you take a mask, it's probably the weight of a cup of coffee, and you hang that on your mouth all day, and try and do your daily work -- it's not very comfortable, it's not very comfortable." (Former Owner/Manager)

The Former Owner suggested that if PPE was more 'lightweight, comfortable to wear' employees would be more likely to wear it. Otherwise, he stated that the only way to get employees to wear PPE was with 'shock treatment':

"So, I mean, give workers something that they can wear, and not die of the heat in the summer, something a bit cool, lightweight, and safe to wear -- that's the key to it. And, they just got to see --shock treatment is the only way to really educate some of those people...Seeing the result [of the styrene]. You almost got to take a lung and throw it on the table, and say 'This is what happens to you'. Some of those kids were young, and they couldn't care less." (Former Owner/Manager)

Summary. Organizational factors such as failure to enforce use of PPE and a sense of urgency were suggested as reasons for employee failure to use PPE. Employee 1 from Community A implied that lack of enforcement concerning PPE by management called into question the management's commitment to the safety of employees. However, Manager 3 from Community C reported that enforcement was not necessary because employees always used PPE. The wife of a former FBB plant worker in Community C suggested that management did enforce the use of safety equipment but also thought there was room for improvement. The Former Owner believed that a sense of urgency within the organization to complete a product affects employee use of PPE. Employee 2

from Community A suggested that employees have a choice - if they do not feel safe working with styrene, management will not force them to work in that environment.

While several participants implied that the organization did not strictly enforce PPE use, it is clear that managers have made efforts to develop a safe work environment. Manager 2 from Community B and the Former Owner/Manager indicated that they provided employees with information regarding the safe handling of materials and the potential health effects associated with the chemicals they are working with. Manager 2 provided a great deal of information with respect to the organization's commitment to enhancing safety in the workplace; however, while enthusiastic about these changes, Manager 2 admitted more work needed to be done to enhance the health and safety in the workplace.

Economic constraints within the industry were considered to affect PPE use and create barriers to a safe working environment. Managers 2 and 3 commented that they supplied safety equipment to employees without any fee to the employee. The equipment included respirators and the replacement filters for the respirators. However, Manager 1 indicated that employees at the plant had to pay for the replacement filters because they were not using filters to full capacity. The implication is that employees may delay replacing filters if they have to pay for them. With respect to proper ventilation, the managers argued that the industry does not produce enough revenue to allow for major renovations of the ventilation systems. It was also suggested that economic pressure prevents both management and employees from complying with safety standards. The

precarious nature of the FBB industry is not conducive for major modifications to the physical properties of a plant.

A number of participants suggested that the PPE, particularly the mask and respirator, was uncomfortable and awkward. The Former Owner suggested that workers would be more likely to wear the mask or respirator if it was more comfortable and less inconvenient. Otherwise, from his perspective, the only way to get employees to wear PPE was with "shock treatment" or having them face a frightening reality such as seeing someone ill due to styrene exposure.

Perceptions of Risk Associated with Working with Styrene

Participants were asked to indicate what they thought were the risks associated with working in this industry. It is important to note that the interviewer did not specify health risk so as to let the participants communicate whatever risks they perceived.

Community residents' perceptions of risk. When asked to comment on the risks associated with working in the fibreglass boat-building industry, community members largely provided accounts of health risks and symptoms they believed were associated with styrene exposure. Their beliefs were generally based on conversations with people who worked in the industry or with people who had a connection with someone working in the industry. The smell of styrene appeared to be an indicator to many that the chemical was a health risk. This was particularly true for residents of Community A:

> *"No, I don't. Sadly, I don't know [much about the chemical styrene]. I don't know too much about that. It's something that I'm conscious of,*

though, I'm wondering about it all the time, in terms of people who work in it, or whatever else, and I don't know, I assume the government has some safety standards that people have to follow, right. 'Cause I know when the wind is a certain way, it's eastern, you can sometimes smell the fibreglass through the community. People are afraid." (Teacher – Community A)

"Talking to a lot of the wives about their husbands who work there, they find it really bad, even on their clothes when they come home, that you get the scent through the house. And they find that their husbands, even from their breath, they can smell it. And they worries about that...they [wives of men working at the boat building plant] said they [their husbands] have been throwin' up a lot of blood, and one of the husbands, even driving now, he'll fall asleep -- so that's what they figure it was from." (Former Fish Plant Worker – Community A)

" I don't know [of the risks], I've heard a lot of people complain of it, that the fibreglass almost goes right down in [lungs]...they haven't got the right mask or right something...I've heard them talk about it. My brother's son, he couldn't take it, he used to work up there in [name omitted], for a while; he couldn't take the fibreglass. A lot people can't, eh...I've heard people talking about when they go home they can taste it...I'd say half that stays on [working with the fibreglass] will end up dyin' and that [chemical] will be the cause... same as in the mines." (Fisherman 1 – Community A)

"I wouldn't be able to fibreglass a boat, even if I wanted to. Because I can't stand the smell of the fibreglass. And to work in that environment, that wouldn't be good for me... I haven't heard about anybody, not here, getting' any disease from the fibreglass. But, I mean, if you walked in there, you—you wouldn't want to work there. But after those people are working there for a while, they get use to it and they don't notice it. But when they come home, they go back to their houses, I mean, after working all day at the fibreglass, well then, I mean, their kids and their wife can hardly bear the smell of it." (Fisherman 2 – Community A)

The wife of a former boat-building plant worker in Community C was adamant about what she believed to be the risk associated with the fibreglass boat building industry:

"Health risks...well, with my husband, I know with his breathing and stuff like that, because I mean, you could smell, smell the fibreglass right through him. You know, he would come home at night, when he's sleepin and that you can smell it... And I know, like his fingers and that, even though they had gloves, like sometimes you can't help but not have that on you, his hands used to be all chapped to pieces...I don't know how my husband managed that long. I mean, I could smell him when he came in the door and, I mean, he comes home like that, so imagine what he worked in." (Wife of Former Worker – Community C)

This participant further indicated that her husband never voiced any concerns to her about working in the industry; she believed that *'he just looked at it as a job'*.

An interesting comment was made by the Town Council Representative in Community C who appeared to acknowledge the possible health risk but seemed to minimize the risk as he had used styrene himself:

"I guess when you're dealing with chemicals, there's always, there's always risk. No matter what, what it is -- it might be high, it might be low... I've had a, a small dealing with it [fibreglass] myself...other than the fumes, uh, you know, which are extremely strong, I didn't see too much other risk about it... I haven't heard of any [health risks]. And like I say, that doesn't mean there's none." (Town Council Representative – Community C)

Several members of Community A also suggested physical health risks in the form of accidents or injuries occurring at the boat-building plants:

"...and I suppose their using high-powered tools and stuff all the time, so there's always the possibility of accidents, and they're working on, if there're bigger boats they're working on scaffolds, and fear of falling or that possibility." (Teacher – Community A)

"...there's been a couple men that did fall, right. Broke their arms, and their foot, and stuff like that, right." (Former Fish Plant Worker – Community A)

Residents of Community B, as compared residents of Communities A and C, appeared to be more variable in their responses regarding the risks associated with working in the fibreglass boat-building plant in their community. For example, several participants acknowledged potential health risks but suggested that if the proper equipment was being used then there would be no risk:

> *"I don't know. I wouldn't say there'd be much of a risk, you know, cause if the proper emission controls are in place, you know... Well, you can get a smell like from the, it's like, uh, paint thinners you can smell, that sort of thing -- you're doin' polybond work on the car, or somethin like that -- that's the kind of smell comes out of there. But it's only within, you know, a radius of the building, probably a hundred feet out the building -- you won't smell it up on the road there, or anything.... Well, if they're wearing the proper equipment, like, uh, respirators and stuff like that, I don't see any problem with it." (Marina Associate 1 – Community B)*

> *"...well, for one thing it sticks to you and gets in your pores. You can smell it, off people. You can -- that stuff is, is lethal, right, if it gets in your system. That's the only concern -- now if they're following the proper precautions, it's not an issue. But I have no idea what, you know, what they do inside the plant with regard to --clothing, or Occupational Health and Safety -- I have no idea. But everyone knows that fibreglass is -- I mean, you inhale it -- it's glass, basically, is what it is, right. So if you inhale that stuff, in your lungs, and it's, it's -- and I have heard, and actually there's a lady that works here, her son used to work there. She said he'd come home, and you'd, it, the smell was unbearable. Cause it gets into your pores, right. The fibreglass sticks in your skin, right, is what happens. And it's, it's a job to get it out." (Town Clerk – Community C)*

However, the Marina Associate 2 in Community C contended that the risk associated with the industry was health related and would not work there himself:

> *"I think the risks would primarily be of health risks. Cause you're dealing primarily with pretty nasty chemicals... so, I think for the people who work there, the biggest risk would be, probably some respiratory-type things, from dust they inhale and from the fumes of the various stuff they use...I see them over there using the face masks, they're basically useless, really...And most of those little things [masks] are badly fitting, so they*

basically leak, they leak from the top and around the sides. So, in terms of protection, those things are very small -- in your own head it might feel well protected, but they're not really. So there are health risks... it would not be a job I would want to do... you put yourself at risk. And you breathe that stuff in, I mean, your liver gotta break it down, hopefully break it down, and I'm sure -- I don't see it as being healthy, you know, in the long term." (Marina Associate 2 – Community C)

In addition to health risks, Marina Associate 2 also believed there could be an economic risk associated with this industry:

"I suppose the risks in terms of the town itself, uh, like anything, if a um, should a business fold, well then, then they're left with a -- they lose money, obviously, and they'd lose jobs, which means there are people who probably depend on that, that would have an economic impact on the community, so there's a risk from that respect." (Marina Associate 2 – Community B)

Nonetheless, while this participant believed that there were various risks associated with this industry, he maintained that *'the biggest risk would be health risks'*. Compared to Community A residents, this participant believed that residents of Community B were not worried about any type of exposure to styrene:

"Residents, I suspect, probably not [worried about exposure], because most residents are sort of, for the most part, sort of far removed from it." (Marina Associate 2 – Community B)

This observation was partially supported by the Town Clerk in Community B, suggesting that, to the council's knowledge, there had only been one complaint about the smell coming from the plant:

"Well, they [residents living around the plant] don't like the fact that it's a bad smell. But, it's sort of two side of the coin -- they got no problem with the company, but they, they don't -- they're actually glad the business is there -- but, the smell -- and they want something done about it. But, I've only had one complaint since I got here [on town council five months

ago], and that was a couple of days ago, so I don't know if it's a, a widespread, a lot of people got a problem with it sort of thing. And it could be only, like these people live right behind it, so it could only be that small group, if the wind is right, they'll get the smell. I don't think they're worried about the effect of the smell, but at times there's quite a bit of the fibreglass dust that comes out of the building as well...Now, they are concerned over that ...Cause they don't know what effect that has on, people and, pets and, the whole, the whole issue... Now, you don't get a whole lot of those complaints either." (Town Clerk – Community C)

The Town Council Representative of Community C indicated that he had never received any complaints about the smell coming from the fibreglass boat-building plant and he believed that there was no concern among residents regarding the chemicals emitted by the fibreglass boat-building plant:

"I don't think they [residents] even think about it. It's, uh, like I said, it's been here for so long now that uh, it seems to be second nature." (Town Council Representative – Community C)

Employees' perceptions of risk. Employees were asked to identify the risks associated with working in the industry and whether or not they themselves or their coworkers were concerned about the risks. Employees 1 and 2 from Community A largely identified 'health' as the risk associated with working in this industry, telling of their own experiences and the experiences of co-workers that they had witnessed:

" Safety [is the biggest risk in this industry]...Now there's different ways, safety -- Now I could get up and fall down somewhere, but the health-wise, put it that way...That's the biggest[risk]...We've had, we've had people on the job that had to quit...Not able to handle the fumes, like...even with the mask on...They couldn't breathe good, so they just leaves it, eh...we've had that problem...It effects some people, and it don't, some people more, it don't... Yeah. We had a fellow come here for a couple days, long as he could stay...fibreglassing the boat, and he had to leave." (Employee 2 – Community A)

"A lot of itching, on the hands a lot of the time...I've done, I've got my own boat, right, and I've done a bit of the fibreglass work for it myself...oh man, you could tear yourself right to pieces [scratches his hands]...I can't go close to it. Uh, well, smoke from the welding; there's also fumes from the fibreglass work...that's pretty much it, I guess." (Employee 1 – Community A)

In addition to recognizing the health risks associated with working in the industry, Employee 2 described the job as 'dirty' and 'not a good job':

"-- it is a dirty job...really messy, eh, and you got a lot of things flying around that you don't want somebody to be breathing in, eh -- so you gotta really dress for it, equipment for it... It's not a good job, I'll tell you that. It's not a, a decent job...." (Employee 2 – Community A)

A similar description was given by the OHS Representative. However, in contrast to Employee 1 and 2 above, it was the OHS Representative's contention that employees in this industry do not perceive the health risks in the same way as they perceive physical injury:

"It's [working in the fibreglass boat-building industry]...unsafe. Dirty. You know what I mean -- scaffolding, lighting, there's a lot of different things... look at the health risks, people don't quantify them as much as they do the physical ones, ones that they can see. That's the ones that really gets to them -- dusty, dirty, cause you're generating dust because you're trying to sand things off. I mean, it's not well-paying, and those types of things that people will probably, if you ask a worker, 'What do you think about those things [risks]?' They would probably say 'Smelly, dusty, dirty, not very well-paying, hard old job, hard work', all those things." (OHS Representative)

When asked if he thought there were risks associated with working in this industry, Employee 3 of Community B claimed *'I don't see any risk'*. This statement supports the beliefs of the OHS Representative that employees do not perceive the risk

when working with styrene. He cited lack of education and awareness as possible reasons for the lack of risk perception:

> *"They [employees] don't perceive the risk at all...One [reason] is lack of education and awareness. I mean, that's probably about the biggest thing. A lot of these people, even though WHMIS [Workplace Hazardous Materials Information System] came in about in '87, some have received training, some haven't. A lot of them don't understand the Material Safety Data Sheets, to read it, willingly or unwillingly want to do it." (OHS Representative)*

The OHS representative also suggested that employees have difficulty perceiving the risk associated with working with styrene because, as briefly mentioned above, they have difficulty quantifying the risk:

> *"... And, styrene, of course, is in the air, you really can't see it, and of course your sense of smell with styrene becomes -- because it is a respiratory sensitizer -- gets in and people can't [smell it], if they can't physically see something, it's very hard for them to quantify... And you try to get them to understand that concept, and for people that don't have all the basic knowledge and education, they will look to see things -- if they can see a vapour coming from something, then they can understand, well this can't be good, otherwise." (OHS Representative)*

Furthermore, it was the contention of the wife of a former FBB plant worker in Community C that employees were not concerned about the health risks:

> *"... they're not so concerned [about health risks] as what they should be...I think they should be more concerned about health risks by working in a place like that. Cause I really don't think that they do take all the health risks into consideration." (Wife of Former FBB Worker - Community C)*

However, when Employees 1 and 2 were asked if they thought workers at their workplace were concerned about the health risks related to styrene exposure, employees believed they were concerned:

> *"Yeah, they're [workers] worried about it [exposure to styrene']...but now the last couple of years they been taking more precautions, doing it right -- a few more exhaust fans, and some do wear the respirators, some don't." (Employee 1 – Community A)*

> *"Oh, I would say...most of them [are concerned about their health]." (Employee 2 – Community A)*

Manager 3 in Community C contended that employees were concerned about the health risks but it was up to management to promote such awareness:

> *" yeah, I think that there's some sort of awareness there, definitely, yeah. But they look to us, I guess, for the, for the information on it. And the MSDS sheets are all supplied there for them, if they want to see them or read up on it. But they're pretty, they feel pretty safe that, with these masks and that sort of thing on, that's doin' the job properly for them, so." (Manager 3 – Community C)*

Managers' perceptions of risk: Health risk. Managers at the three boat-building plants acknowledged the health risk associated with working in this industry. However, compared to the majority of community members and employees, the managers had less to say about health risks and in some cases minimized the risk:

> *"None whatsoever [risks]. Perfect environment. [laughing] I guess, in manufacturing there's definitely a dust hazard. And there's a chemical hazard here ...And on the MSDS sheets, I mean, that would say that it's a carcinogen and all that sort of thing, but -- I mean, I've known guys that's been in the industry 30 years working with fibreglassing boats, using the chemicals, and most times this was years ago when they never used these masks, and are still alive and well and kickin' and nothing, you know. So, to my knowledge, I never heard of anybody that has died because of the use of this, right." (Manager 3 – Community C)*

"I never hear any complaints [from employees about health concerns], or anything. We had one guy that we hired on that we had to let him go because he had psoriasis really bad, and he found the grinding[bad] but that's gonna happen in a lot of industries -- people can't do fish, right, you got fish asthma and whatever." (Manager 2 – Community B)

Manager 1 in Community A stated that there were health effects associated with styrene exposure but insinuated that the onus is on the employees to take responsibility for their health and safety:

"Some of them [workers] have bad reactions to working with the fibreglass...employees know about some of the effects of styrene, so that if their eyes started to itch or there's a problem with their eyes, then that says that there is something wrong and you are not doing something right." (Manager 1- Community A)

Employee accountability for behaviour was reiterated by the Former Owner of a FBB plant suggesting that there should be policies in place that make the employee responsible:

"...if OHS came into the plant, the owner was always held responsible. Now, yes, the owner has a great deal of the responsibility, but he can't be there every minute. If I'm gone delivering a boat to [another town], and buddy [OHS inspector] walks in at the plant, and my boys aren't wearing their mask, well...So this is why, I think, OH and S should not only be looking at proposing penalties for the owner, but I think there should be some form of penalty for the employee. If he [OHS inspector] said to us, 'OK, that employee has to take a mandatory suspension for a week, cause he's not wearing his mask'... And I says, 'Well, look boys, I can't help it, the government's taking this from you for a week'." (Former Owner)

The Former Owner was adamant about the health risk associated with working in this environment:

"It's a very risky industry...Health-wise, very risky...Styrene's carcinogenic, and try as you might, and so much equipment as you want, you're still gonna breathe it...Very big health risk...." (Former Owner)

The Former Owner also suggested that the health risks extended beyond the workplace to home and family:

"It's not like it's something that you can just come home and take off your coveralls and throw them in the washer, it stays with you, day in and day out. And, even your family -- because I'd come home in the evening, with my old work shirt on and my jeans and whatever, and that would be stinking of styrene. I wouldn't smell it -- but my wife was always complaining about the stink I was bringing in the house. And, if the clothes are sitting in the hamper overnight, she was breathing it, and the kids were breathing it, and the smell of fibreglass was always in the house." (Former Owner)

Upon entry to the premises, the interviewers noticed an overwhelming smell of styrene in the office of Manager 2 in Community B. The manager was asked if the smell was bothersome:

"...some people can't handle [the smell] at all. For me, I don't smell it anymore. We don't smell it anymore, so I suppose it's like when anybody works on a farm, they don't smell it." (Manager 2 – Community B)

Becoming desensitized to the smell of the styrene was previously mentioned by the OHS Representative and reiterated by the Former Owner:

"Now, after a while, you don't know you're breathing it. You become very desensitized to it -- if walked off the street tomorrow, you'd hold your nose and, 'My god, how do you stay here?' But after a couple of days, you'd walk in and out that door and you wouldn't even know you were there, in regards to the smell." (Former Owner)

When asked if there was concern for personal safety associated with styrene exposure Manager 2 replied:

> *"No, I got a tester that I test it...And I'm usually in legal limit all the time -- well, I've never been out of the, the limit of it that you're allowed to have. And inspectors come all the time, the safety inspectors, they come and test that all the time and everything's fine in here... the winter, when we were doing the tanks, I was a little bit worried about it because we, we were building humongous tanks and I was a little worried about it then, but when they came and tested, and we test with our [tester], it was fine." (Manager 2 – Community B)*

However, the Former Owner felt differently contending that he was happy to be out of the fibreglass boat-building business:

> *"I was [concerned about my health]. I was glad when we got rid of it [the business]...Yeah. Like it was [physical structure], I didn't want to have any more to do with it." (Former Owner)*

When it came to beliefs about the safety of using styrene, Manager 2 contended that working with styrene was somewhat safe:

> *"Most of it's pretty safe. Styrene and acetone is probably the two most, uh, worrisome chemicals that's used in, in fibreglassing, anyway. And the styrene is pretty much, you try to keep the styrene down to a minimum as much as possible, right... the products that we're using is pretty much safe if your, you know, if you wear your mask properly, and, you know, you've got proper ventilation." (Manager 2 – Community B)*

Manager 2 acknowledged the health and safety concerns of styrene but suggested there was little evidence to support real health effects:

> *"Well, I guess it's so much, uh, so much, hooplah, about styrene and acetone, you know, that, um [they are trying to replace it] – but from the research that I've done, there's not much evidence showing sickness from [styrene]. But now, it's only from what I've done through the internet." (Manager 2 – Community B)*

This notion was reiterated by Manager 3:

> *"...I mean, they say that the chemicals do cause cancer, but they have not proven that there's anyone come out of the industry that got cancer because of this. And on the MSDS data sheets, I mean, that would say that it's a carcinogen and all that sort of thing, but -- I mean, I've known guys that's been in the industry 30 years working with fibreglassing boats, using the chemicals, and most times this was years ago when they never used these masks, and are still alive and well and kickin' and nothing, you know. So, to my knowledge, I never heard of anybody that has died because of the use of this, right." (Manager 3 – Community C)*

Manager 3 was the first participant to raise the issue of mood as an adverse health effect related to styrene exposure:

> *" The only thing I've, I've really heard about that, I can see, it [styrene] probably does do, like, mood: it definitely changes, like, if you've got high levels of the, the chemical thing, it does make you cranky at times, it makes you tired, that sort of thing. But that's if you're exposed to levels where you're not using your mask, and that sort of thing." (Manager 3 – Community C)*

The only other study participant to mention mood as an adverse health effect was the Former Owner who was convinced that styrene had had an effect on his and his father's moods and further suggested that styrene exposure impaired decision making:

> *"It can make you very depressed and moody -- cantankerous, maybe, that's what made my dad get a reputation, probably -- got a bit cantankerous, but, I mean, it made a big change to his [mood]. I think it affects your ability to make good logical decisions...he was worse than me because he never wore a mask...I could see him change, his personality. I was changing too, my wife told me the same thing, 'You're awful moody,' she said, 'there's something wrong'. And, I came to realize -- and we didn't know this at the time -- the styrene was a lot of what caused those effects... But the big thing [side effect], I think, is in your neurological part of it, in your mindset, and how it affects your ability to reason." (Former Owner)*

Manager 3 stated that generally people who work in the industry are not concerned about any related health risks. The manager also implied that if people were concerned about the health risk then it would be difficult to find employees:

> *"No, not really, no [people who work in this industry do not perceive a health risk]. I think there's definitely a comfort level there, with the industry, yeah. If there wasn't, it would be very hard to find people. I mean, it's not for everybody, no doubt, it's like anything, it's like, you know, carpentry's not for everybody, boat building's not for everybody. You know, I mean, it's one of those issues where, you know, you gotta be set out and you don't mind -- I mean, it's not a clean environment, that's one thing about it, it's definitely not a clean environment. But, I mean, it's like anything, I guess: if you wanna do it you can do it, if you don't wanna do it then go do something else." (Manager 3 – Community C)*

While managers did acknowledge a health risk, the OHS Representative contended that, like employees, they have difficulty quantifying the risk:

> *"Employers are not much different [from employees], really. They don't go into [understanding the health effects of styrene],-- well, some of them are very great at, giving a final product, and very skilled craftsmen. The risk associated with styrene is a little different...lots of times you can control the styrene levels with different work processes, and you're trying to get them to associate how the work process would decrease styrene -- it's something that they really can't see because they haven't seen the outcome. They don't see how it affects the central nervous system, they don't -- it's the difference between the physical hazard: 'Oh, it's hot', you touch it, 'Oh, it burnt me' -- now you're talking about something that can affect your central nervous system over a long period of time... and they look over it [the risk], they don't really see it." (OHS Representative)*

Managers' perceptions of risk: Economic risk. In addition to health risks, Managers suggested that there was an economic risk associated with the boat-building industry. Manager 1 was very candid with respect to discussing the risks related to the fibreglass boat building industry and identified 'economics' as the major risk:

"Economic. I want to say health but it [the risk] is economics. The health issues and the safety issues, you can work with them and make them better – you see the levels are too high, you turn the ventilation on more, you make sure you're wearing a mask. But without the economy, there is no reason for the health issues, if you don't have work, then obviously, you know, if the economics are bad, then you don't have health risks. The industry is at risk because they're heavily reliant on, the fishery so we need to diversify, in order for the company to, at least maintain itself, if not grow." (Manager 1 – Community A)

Managers 2 and 3 corroborated Manager 1's belief regarding diversification. Managers were quick to point out that the boat-building industry itself was not enough to sustain their businesses:

"That's gonna be the thing of the future [exporting], definitely, for us. I mean, that's what's gotta happen for us to survive. So that's what the provincial government is trying to get on board and, trying to promote. Cause, I mean, look at all the boat builders: where are they all to? They're all in rural Newfoundland. That's where they are. I mean, we're probably one of the smaller employers here because we build small boats, but once you get into 65-foot boats, the guys who are building those, I mean, they got an employment of probably a hundred people on staff. I mean, in rural Newfoundland, that's key -- that's a community there. That's feeding many families, so, I mean, it's [exporting] definitely a big issue, definitely." (Manager 3 – Community C)

"...[boat building is] not a viable industry... We can't stay in boats -- and it's too competitive – if there's a fella building backyard boats, they got no overhead, they got a little shed in their backyard, and they've worked in a fibreglass plant somewhere and learned the technique of how to do it, and then they're workin' in their shed that don't cost 'em anything, don't cost them any property tax, any overhead of employees or, you know, and they're doin' it for less than nothing, for probably a hundred dollars labour, a day, whereas we can't operate like that here, we got to have a certain price for our boats, to put out quality boats and to pay for overhead...that's just how it is." (Manager 2 – Community B)

Manager 2 elaborated on the economic implications to a business when untrained individuals fibreglass their own boats rather than having professionals do it:

"They wanna do their own work but they want you [the business owner] to teach them how to do it for nothing, you know what I mean? So, we try to stay [away from boat owners] -- we got a few customers that come here to get things done -- people that want it done professionally." (Manager 2 – Community B)

Manager 3 also perceived the unpredictable market as an underlying factor contributing to economic risk:

"... the problem with this industry, I guess is like a lot of different industry, it's one year it's up the next year it's down. And it definitely always goes in cycles. Back in 1988 to 92, it was definitely a slow period. But then the boom, it kind of hit, and now, the last couple years has been on its way down again...So, there's definitely an economic issue there, in the sense that, there have been boat builders that have gone under this year already. So, only the strong will survive, I guess, like anything." (Manager 3 – Community C)

Health Care Professional's perceptions of risk. The Health Care Professional was asked to provide insight from a health care professional's perspective on the risk associated with working in the fibreglass boat building industry. While not providing any comments related to health issues surrounding this occupation specifically, it was no surprise that the participant claimed that individual health was at risk:

"I haven't really studied this to any depth, but I know that there are some pretty potent solvents, and probably paints and so on, that would present a risk to anybody using them... to what degree people recognize that as a hazard, I don't know." (Health Care Professional)

This participant also suggested that employees of small industries may be at a higher risk of occupational illness and injury than their counterparts in larger industries:

"I think the small industries are, in fact, probably at greater risk. Potential for injury, potential for workplace problems -- they're flying below the radar of the system, because they're not big enough to have an occupational health perspective. I think that's where problems are the

biggest...you only have to look at fishing and farming, where injury rates are much higher compared to anybody else, and that's partly because it's a, relatively speaking, it's a small business focus." (Health Care Professional)

When asked if people working in the industry perceived a risk, the participant supposed that they may not have thoroughly thought about the health risk associated with this work:

"I suspect that people get involved, first of all in a small way, in something like this [boat-building], and don't necessarily identify the risk -- you know, patching a boat or something like that -- and say, 'Oh, well, that was no trouble and I did it quickly, and it wasn't that much trouble, and so I'll try something bigger'...it's a learn-as-you-go kind of operation, I'm sure, in many respects, where people are doing something on their own and then decide to branch out, without necessarily knowing all of the potential problems." (Health Care Professional)

Summary. All participants were asked to discuss what they thought were the risks associated with working in the fibreglass boat-building industry. The vast majority of participants agreed that there are health risks in this industry. The health risks identified were largely related to styrene exposure, though physical injuries and accidents were also listed.

Despite not working in the industry, many community members provided accounts of health risk and symptoms they believed were associated with styrene exposure. The wife of a former boat-building plant worker in Community C who had a indirect association with the industry, though an arguably closer association than the other community participants, expressed these concerns most clearly. Many community members used the smell of styrene as an indicator of negative health effects related to

styrene exposure. They listed breathing problems, smelling styrene on workers, and in one case, drowsiness, as indicators of styrene exposure.

There were interesting differences with respect to perceptions of risk between the community participants. Compared to those of Communities A and C, residents of Community B appeared to be more variable in their responses regarding the health risks associated with working in the fibreglass boat-building plant.

Employees largely identified 'health' as the risk associated with working in this industry (with one exception, Employee 3 from Community B who said *"I don't see any risk"*). They often spoke of their own health related experiences or the experiences of co-workers. The job was described as "dirty" and "not a good job". While it appeared that Employees 1 and 2 from Community A acknowledged the risk, the OHS Representative believed that employees did not perceive the risk and cited lack of education and awareness, and difficulty in quantifying the risk as possible reasons for the lack of risk perception.

Employees 1 and 2 from Community A maintained that their coworkers were concerned about the health risks related to styrene exposure. One Manager suggested that employees were concerned about the health risk and that it was the responsibility of the manager to promote awareness. However, the wife of a former worker reported that workers were not all that concerned about the health effects of styrene.

All Managers acknowledged the health risk associated with working with styrene; however, compared to the community residents and employees, there was noticeably less

dialogue regarding health risks. It was suggested by some that employees needed to be held more accountable for their health and safety at work.

Based on his personal experiences with the industry, the Former Owner was adamant about the health risks associated with working in this environment and expressed concern over his own health when he worked with styrene. He suggested that the health risk extended to his family where they were the recipients of second hand styrene exposure.

Manager 2 brought up the issue of becoming desensitized to the smell of styrene when asked about the obvious smell of styrene in the office. The participant was not concerned about personal health and safety with respect to styrene exposure. Desensitization to the smell of styrene was also supported by the Former Owner and the OHS representative.

The OHS representative argued that employers have trouble assessing the risk and do not fully appreciate the risk related to styrene exposure. Indeed, two managers acknowledged the health concerns related to styrene exposure but stressed that there was no evidence of adverse health effects. In contrast, Manager 3 of Community C and the Former Owner both described direct and indirect experiences of mood and cognitive changes which they attributed, in part, to styrene exposure. However, Manager 3 reported that, overall, people were not concerned about the potential health risk associated with this industry, claiming that if people were concerned then it would be hard to find workers.

Economic risks (e.g., ability to generate business and income) associated with the industry were emphasized by managers. Manager 1 of Community A suggested that economic risk was more important than health risk in that if a company is not in business then there is no need for health risk concerns.

Related to economic risks was the need to diversify to ensure an economically viable business, a common comment among managers and other participants. It was suggested that the economic well-being of these businesses is threatened by untrained individuals fibreglassing their own boats, and the unpredictable market for boat products.

The Health Care Professional claimed that there are health risks associated with working in the industry, though he could not speak to any particular illness or symptoms. He suggested that employees of small industries may be at a higher risk of occupational illness and injury compared to their larger industry counterparts because small industries may not be monitored as often as larger industries with respect to occupational health and safety. Given the comments made by the Health Care Professional (who is also very heavily involved in administrative health matters), there appears to be a lack of awareness among health care professionals in the province with respect to the health effects of exposure to styrene. This matter will be explored further in the discussion section of this study.

Future of the Fibreglass Boat-building Industry

Participants were asked to give their thoughts with respect to the future of the fibreglass boat-building industry in NL. Several community residents painted a very bleak picture of the future prospects for the industry:

"Well, the state the fishery is in now, I figure that's going to go out too...Because no fishery, no boats. You don't need boats if there's no fishery." (Fisherman 1 – Community A)

"... it depends on the fishery for the boat building. [Though] It has been prosperous, ever since it started...But if the plant there, the fish plant, was operating --it would be better even for the boat building, part of it, see." (Fisherman 2 – Community A)

"...I suspect that there will be some movement there [through diversifying], but again, that's limited what you can do with that... But I think it's pretty marginal, so I don't know, unless somebody came into a fair amount of capital, and come up with all the products, I would think it's a, it's a pretty iffy operation. I'd be surprised if they survive, really, down the road." (Marina Associate 2 – Community B)

"... [the industry is] Not [growing] right now...Not right now. Not that I can see, anyway. And that's only because of the fishing industry and all that that's holding that back." (Wife of Former FBB Worker – Community C)

Yet, others were more optimistic about the future of the industry:

"It will [grow], it's growin' every year...we're gradually improving too, doing things that we should be doin', eh, I mean, you don't do everything in one shot do you? So, to me, right now, it looks good...we're lookin' at doin' more model boats, like, yachts, probably... If the fishery goes, and if you can get at something like that [other products], it's gonna be [okay]...carryover somewhere else." (Employee 2 – Community A)

"I'd say 90 percent of the market now is fibreglass boats. And, with so many people involved in them, well then, if you get a big industry here, boat building, then you're gonna have a lot of people working there, you're gonna have a lot of sales, people buying the boats, using pleasure craft." (Marina Associate 1 – Community B)

"I don't think [the industry is at risk]...Not with the way it's goin' -- even with, with pleasure craft. Never mind fishery craft. But I think the way pleasure craft is goin' now, I don't think you'll see any problem with that industry... they're [the marina] full here now. And there's people comin' everyday, lookin' to get their boats, or new boats or whatever put into this facility. So, I mean, I don't think there's any risk, to that industry here in

Newfoundland now. Seems to be a lot more people are gettin' into the boating, aspect of it." (Town Clerk – Community B)

Manager 2 in Community B indicated that the company was moving into a number of fibreglass products other than boats and believed that there was a market for these products in various locations across the island. There was a great deal of pride demonstrated by Manager 2 and Employee 3 of Community B on the subject of work quality, new products and diversification:

"We do wonderful work. Our work is outstanding." (Employee 3 – Community B)

"Yeah. Oh, we really got plans, here. You know, we got other things that [we are manufacturing] -- our son came to work with us last year -- he's got so many ideas, he's got so many ideas for different things that we do." (Manager 2 – Community B)

Summary. While economic risk was not considered by most participants as the primary risk associated with working in the boat-building industry, the economic uncertainty of the fibreglass boat-building industry was brought up by many participants when asked about their beliefs regarding the future of the boat building industry. Several participants maintained that the success of the industry was reliant on the success of a presently precarious fishing industry.

However, several participants were more hopeful about the future of the industry and contended that it could prosper through diversification. Manager 2 in Community B gave several examples of new products and prospective markets. There was pride among Manager 2 and Employee 3 in Community B with respect to their creativity, quality of work and ability to expand their product line.

Knowledge and Access to Information Concerning the Health Effects of Styrene: Employees and Managers

When employees were asked how they had obtained information about the effects of styrene, the responses varied (Employee 3 was not asked as he left the interview early to return to work):

> *"Uh, probably from the boss or the foreman...most everybody gets it online-- I haven't, but I've heard talk of some of the boys did it." (Employee 1 – Community A)*

> *"Yeah, I think they know about that, because we always get the health inspector in." (Employee 2 – Community A)*

Several participants contended that it was largely the responsibility of the employer to inform employees of the risk associated with working in the industry:

> *"I think they [employers] should be [responsible], they should give their employees, like let them know exactly the health risks of, you know, before they start working and that, and give them the option if they wanna continue working there or not. Let them know everything, right." (Wife of Former FBB Worker – Community C)*

> *"... I would think that it would be in my best interests [if I were a Manager] to promote it [health and safety]." (Teacher – Community A)*

Managers 2 and 3 and the Former Manager/Owner maintained that they informed their employees about the health effects of styrene. For example, Manager 2 commented that employees were provided with MSDS and books to learn about styrene:

> *"Well, I think that it is the obligation of the employer, it have been made the obligation of the employer to keep them informed. That's why we supply them with the MSDS [Material Safety Data Sheets] sheets, to make sure that they know what the styrene can do...I photocopied them [books about styrene], actually, for the boys. Books tellin' them what can, and even what can happen with resins...So I like to keep them informed on everything that's, you know, I wouldn't want them using anything here that*

was unsafe for them to be using, without knowing it, cause I wouldn't want to use it myself." (Manager 2 – Community B)

Manager 3 in Community C and the Former Owner also indicated that in addition to providing information to employees, managers need to stress the need for PPE:

"It's, you know, just stressing that wearing their masks are definitely a good idea, and that's something that you should be doing when you're being exposed to these chemicals, and just let them know that the MSDS sheets are there if they're wanting to know any information on what they're using and that sort of thing. Cause gloves are an issue too, people should be wearing the gloves when they're handling the materials and stuff like that as well, so." (Manager 3 – Community C)

"Well I've told them enough [about the health risks]. And they have been educated, all the MSDS papers come, and they're there for to read." (Former Owner/Manager)

Manager 2 went on to elaborate on the information provided by the MSDS and how the MSDS are used by the employees both on and off site:

"...you gotta keep it [MSDS on hand], it's regulations. Like we brings in a new product here, whether it be a new resin, and MSDS sheets -- Material Safety Data Sheets -- got to come with the product, and the boys got to be supplied -- that's, that's rules. And they get to read it, and see what the styrene level is in it, and what you gotta be wearing to use it -- that's all, that's all supplied, right...There's a binder like this everywhere -- there's one in here, there's one out here, there's one out in the building -- so that they can, if they don't have their sheets with them, they can look it up in the plant...and if we go out on a job, whatever chemicals we take to do on another job [site], the MSDS sheets gotta go with us, to show the other people at that job what we're using, and what they need to be wearing to there when we use them, right." (Manager 2 – Community B)

Managers 1 and 2 and the Former Owner/Manager reported that they and their employees were well informed about the effects of styrene on employee health:

"no doubt, no doubt [workers know about effects of styrene]" (Manager 1 – Community A)

"Well, I take home, I read, I'm an avid reader, and I've read every one of those MSDS sheets, and I got books that I've ordered in since I come here...." (Manager 2 – Community B)

"I've read most of them [MSDS] myself, probably all of them, I guess, over the years." (Former Owner/Manager)

The OHS representative contended, however, that motivation to seek out information is also a key ingredient for awareness:

" I guess some [managers and employees] may know [about the health effects of styrene]. I mean, the knowledge is there, it's to them to take the initiative to go and read it. And, I mean, the requirements are there, there's all kinds of things in place, you have the right to refuse, your right to know and to participate in your safety program -- so those rights are there, but it's them taking the initiative to go and say, 'Pass me my Material Safety Data Sheet'." (OHS Representative)

When asked if workers receive enough information about the health effects of styrene, Employee 1 in Community A remarked *"Probably not"*. The uncertainty regarding the quantity and quality of information possessed by employees about styrene exposure was echoed by the wife of a former FBB worker in Community C:

"I don't know about that [that employee are well informed]. I don't know. Like, I know where my husband worked that he, the man who owned the place owned the place for a long time, so I assume he was well-informed." (Wife of Former FBB Worker – Community C)

This notion was reiterated by Manager 3 also of Community C who admitted that he did not know if employees were really aware of the health effects of styrene. The following

statement points to a gap in understanding with respect to Managers' awareness or degree of knowledge possessed by employees concerning styrene exposure:

> *"Uh, that's a hard question for me to answer -- I don't know. I don't know if they do or not [know about styrene]-- I don't know if they know it's styrene, they may, I don't know if they know that, but they know that the smell that's in the air--that is a chemical, that, you know, that sort of thing...they're definitely aware of it, without a doubt." (Manager 3 – Community C)*

The perceived lack of knowledge among employee and employers regarding the health effects of styrene may be related to insufficient training and/or formal education. For example, the following statement made by the Former Owner suggests that training, or lack thereof, is an issue for this industry:

> *"The only guy that ever did any training with us, as such, was this guy, [name omitted], and that was more or less on the sales line. We were told that there wasn't a lot of training. I think there should be more training, available, independent training, and the companies should have to send their employees to it, as far as I'm concerned. And have them educated... and if companies like Workers' Compensation would insist on this, I think that it would cut down the cost of, that the government has to pay, and compensation has to pay, in damages. Educate those people, right...." (Former Owner/Manager)*

When asked if he had had training himself or if he had just learned the building process on his own, the Former Owner responded:

> *"Training was from the guy who was selling it to us. He was down here for 3, 4 months. We hired him on after he done the actual training. He started us out, how to build a plug, to the mold, and the finished product. That was his job...We had training. I never had a clue what to do with fibreglass before he came in. I learned a lot from [him]." (Former Owner/Manager)*

In a similar vein, the OHS Representative contended that there is a major problem with getting people in the industry to participate in training initiatives:

> *"... training and awareness is obviously a key thing. But when we do certain incentives, the training related to fibreglass boat building -- very little uptake, no one wants to be involved into it...so the education is probably one of the key components, but getting people to take that education is not so simple. We do a lot of things with regards -- we have a creative sentencing option: I mean, now you've committed a violation, the court can order you to do different things -- like courses...we offered training through the [omitted] to [workers] -- free of charge -- no one took it. So, it's getting people to take that motivation to go out and take the training, participate in the training. Unfortunately, sometimes they won't do it unless they're written, 'Here you do it -- you must do this'." (OHS Representative)*

In addition, the Health Care Professional suggested that workplace risks may not be sufficiently acknowledged by small industries such that employees may not be as well informed as they could be:

> *"I think that's where smaller industries are a problem, where you have only one or two employees, the employer may well not know, properly, what the risks are, in order to pass along the information. The bigger you are, the more likely there are to have been -- you're more likely to have gone through some kind of process to define the work, and to define the potential hazards. The smaller it is, I'd say, the more haphazard your setup is." (Health Care Professional)*

The OHS representative suggested that companies in urban locations are held to a different standard with respect to OHS policies than their rural counterparts. For example, neighbours in urban communities are more likely to make complaints regarding an unsafe worksite. This participant also suggested that the training for workers may be different for those in urban worksites as compared to rural worksites:

"Yeah, I think there's some differences [between rural and urban worksites]...you get into more urban setting, I mean, your neighbours keep you honest to some degree -- we get a lot of complaints that come in and we follow up on every complaint that we get...in an urban setting where lots of people are watching you, and they're not intimidated, they'll phone in and say, 'oh, I'm gonna complain', so therefore, it increases our activity at the site, plus it keeps them [employers and employees] honest when we're not there ...If you're off into more remote sites, you're dealing with a different worker base. If you come into more urban settings, the workers are usually working in construction, they've received a lot of training, and they take that training with them, and the knowledge. If you're out into a very remote site, where the workers are, probably fishermen or -- could be anybody -- they're not exposed to the training the same as what the person on a construction site is, therefore, their degree of risk is a little different, and, they'll take the chances." (OHS Representative)

It also appears that community members may believe that employees are more informed than they actually are:

"I think they [employees] are aware [of the risk], yeah. I've talked to several people that have worked there, and they seem to be on top of what's, what's happening in that particular industry... They do training, I think, and health and safety training, and they do the WHMIS course -- Working with Hazardous Materials -- that sort of thing." (Town Council Representative – Community C)

While the Town Council Representative in Community C reported that employees were well informed of the health risk, Manager 3 in Community C revealed that while employees are given an orientation to the workplace, *'They [employees] don't all have that [WHIMIS]'*. As previously stated above (p. 132), Manager 3 also acknowledged uncertainty with respect to the knowledge his employees possessed with respect to styrene handling and exposure.

Education and literacy concerns. An interesting issue surrounding education and literacy among employees emerged in the interview with the Former Owner. This participant reported that, based on his experience in the boat building industry, devaluing education and literacy affects employees' willingness to learn about, and adhere to, health and safety policies. This issue emerged as the Former Owner asked the interviewer if we (the interviewers) had spoken with many of the boat building plant employees. The participant was informed that the initial plan had been to hold focus groups with employees but that no one had replied to the invitation and that it had proved to be difficult to gain participation from employees in a one on one interview. The Former Owner cited devaluing education and literacy by employees as reasons for their lack of participation in the study:

> *"Getting those people [plant employees] to take the time to do that kind of stuff [focus groups] is hard to do. I don't like to knock it but, a lot of those guys, they're out of high school or they never finished high school, and they don't see the value of education. And it's a mindset in the smaller rural communities, they'd sooner be out to work, than going to school and spend 6 or 7 years getting a degree. And, they look at that [research information package], and some of them don't even read it. They can't read it... And some of those guys, when you pass them the information package--They'll toss it because, 'Geez, I can't answer that'. And they're too proud to ask their wife or their girlfriend or some one to read it for them. And that's a lot of the trouble with the industry. The people who are actually working the glass, are not educated to the point that they can really understand what they're doing. And I don't mean any disrespect or anything like that, but I mean, that's, you're job's like that." (Former Owner/Manager)*

The issue of illiteracy among workers brought up a very interesting issue with respect to providing employees with the MSDS as a means of educating them about the chemicals

they are working with. It is the contention of the Former Owner that, in his experience, there are workers who cannot read well and for whom the MSDS are therefore not useful:

> *"[the MSDS are] Useless. They [some employees] can't even pronounce the words. And that's what I always thought, I mean, if there's chemicals' names there that, I know I never looked it up -- it said, don't eat it, don't swallow it, don't get it in your eyes, and that's what I didn't do. You know, I'm not a chemist, I never done chemistry...[but if you can't read] You're not going to bother. And a lot of the industry is like that. Now, I've had kids work with me in the summer, students, university students, and those kids, I wish to hell I could have kept them, cause they were good." (Former Owner/Manager)*

Perceived knowledge of health care providers regarding OHS. With respect to knowledge about occupational health and safety issues in general, the Health Care Professional believed that the health care system may not be sufficiently prepared to deal with these issues:

> *"Our system is based on episodic care, and I think issues around occupational health require a long-term relationship and understanding of whatever the industry is and so on. I don't know that we're necessarily set up properly to deal with those kinds of things, and even family physicians may not be organized well enough to be able to recognize that what they're following are occupational health issues as opposed to the episodic things that come in off the street." (Health Care Professional)*

The degree of knowledge surrounding occupational disease was also explored. The Health Care Professional contended that there may not be enough awareness among healthcare professionals in the province with respect to occupational illness and disease:

> *"They [family physicians] may not be [aware of health issues surrounding the fibreglass boat-building industry]. Because I think that there are some very specialized areas of toxicology and chemical kinds of injuries that people may not be familiar with -- you could very quickly become familiar with them -- but they may not be tuned in, probably not off the start... I*

think they do need to be aware of occupational health issues, and this goes back a long time, where somebody's occupation can be very meaningful in the consequences to health down the road." (Health Care Professional)

One explanation for the lack of awareness of occupational disease provided by the Health Care Professional was lack of communication between the client and the health care provider:

"...the health care professionals may not be aware of the issues, the employer or the fellow who's undertaking it may not be aware of the potential risks and so on, and it's easy for a miscommunication to occur, or just a failure to recognize the problems. And it's all related to the lack of organization, lack of formal processes...." (Health Care Professional)

The Former Owner supports the previous statement in that it was his contention that the client had to draw attention to the workplace before the healthcare provider considered the work environment as a possible health risk:

"I think my doctor was [aware of the risk and symptoms] because, I mean, I did have some problems with it myself. But, most medical professionals don't think about the environment around them until they see the patient that's sick. They don't think, 'Well, maybe I should talk to Bill up the road there, because he's laying glass and some of those guys could get sick'. They don't take the initiative unless something comes to them...Now, once they find out where you're working, they will try and associate it, but they won't think about it if you don't tell them." (Former Owner/Manager)

The Health Care Professional also suggested that economic challenges may affect physician awareness of occupational disease. The participant suggested that due to economic constraints experienced by physicians in rural communities, the physician must be responsible for individuals in a number of communities working in many different industries in order to sustain a practice:

"...for a physician's practice to be viable, you've got to have a certain population base. And, if you're talking about a community of a couple hundred people, the likelihood of a physician being in that community and being aware of the small businesses and the risks, is pretty small. Because, in order to make a living, his patients are coming from all over the place, a dozen communities, where there's all kinds of different things [health issues]. It's difficult to see a physician taking that responsibility [to learn about the risk associated with a particular industry], because of the size. As the size of the community grows, then it's not going to be a single-industry community anymore, it's going to have a more varied economy, there's going to be more things going on, more people aware of issues, and so on." (Health Care Professional)

The Health Care Professional implied that the division of responsibility between health care professionals and government agencies responsible for workplace health and safety may contribute to the lack of knowledge of occupational health issues among health care professionals:

"I think there's a division of responsibility that's been given over to the Workplace Health and Safety Commission, that creates a bit of a dividing line. I've been involved, from time to time, somebody calls up and says, 'What are the risks of such-and-such in my community, or to me?'. I might be interested in finding something out, but it's more likely I'm going to direct that person over to the Occupational Health and Safety inspector, or something like that, as opposed to a community issue that arises because of a potential pollution problem. So the individual health and safety issues would be somebody else's responsibility, the broader community concerns would come to my attention, the attention of the, quotes, 'public health system'." (Health Care Professional)

The participant also suggested that there may be insufficient documentation of employee health and occupational health related issues among employers and physicians. Such information has the potential to contribute to physician knowledge of occupational disease:

"What probably doesn't happen is that, early on in somebody's you don't necessarily get the baseline measures related to whatever the occupation might be; so that, over time, you're not systematically collecting information that would help understand why somebody's health has gone in a certain direction... So it's kind of the idea of long-term record-keeping, for somebody in an occupational setting... I think it might be interesting to look at physician practices to see how well people are actually documenting occupational health related data." (Health Care Professional)

The participant provides an example of how larger industries continuously document the health of employees and compares this with the lack of information collected by small industry:

"In a big industry, for example ... one of the steel mills in [name omitted] have a tremendous database of every employee; they know everything about every employee because they have mandatory physicals, they have documented episodic care, they have an occupational health service with physicians and nurses, and so, they maintain a database of health issues. And so in that large industry setting, you can easily tease out information that will give you the risk factors related to working in a blast furnace situation. In a small industry you don't have that, you don't have the longitudinal information to develop the risk factor information." (Health Care Professional)

The Health Care Profession proposed that the awareness of occupational illness among health care providers could be improved through *'continuing education, directed by Workplace Health and Safety, to highlight the kinds of issues, the kinds of problems that might arise, and target doctors, target hospital staff'*. A further suggestion was made to incorporate occupational health and safety issues into the mandate for Public Health Officers and Medical Officers of Health.

Summary. Employees (with the exception of Employee 3 who was not asked this question) reported that they received information regarding styrene exposure from their boss or foreman and from the OHS inspectors. Employee 1 from Community A suggested that workers may not receive enough information as it relates to styrene exposure. The OHS representative contended that in addition to passive receipt of information, employee motivation to seek out information is also a key ingredient for awareness surrounding health risks of working with hazardous substances.

Several participants reported that it is largely the responsibility of the manager to ensure that employees are aware of the health effects of styrene. Managers 2 and 3 reported that employees are provided with reading materials in the form of the MSDS and books.

While most managers largely believed that they and their employees were well informed about the health effects of styrene and how to properly handle hazardous chemicals, Manager 3 in Community C acknowledged, rather uneasily, that he was uncertain about employee knowledge of the health effects of styrene. He did suggest that because of the smell he believes workers are aware that they are working with a chemical. The honesty expressed by Manager 3 exemplified the gap that potentially exists between employees and managers with respect to knowledge concerning styrene exposure.

It was suggested by the Former Owner that the perceived lack of knowledge among employees and employers regarding styrene exposure may be related to lack of training and formal education. Similarly, the OHS Representative believed that while

educating people in the industry is important to increase knowledge and awareness, there is a major problem with getting people in the industry to participate in training initiatives.

The Health Care Professional suggested that workplace risks may not be properly acknowledged by, or be a priority for, small industries and, consequently, employees may not be as well informed as they could be about OHS. Similarly, the OHS Representative suggested that companies in urban locations are more accountable for their actions than those in rural sites. The OHS Representative also suggested that there are variations in the types of training received by rural and urban workers.

The Town Council Representative in Community C's comments regarding employee training suggest that residents believe that employees have received proper safety training. However, Manager 3 from Community C revealed that while employees are given an orientation to the workplace, all the employees at his plant did not have the basic, legislated training. There appears to be differences among participants with respect to employee knowledge and training.

A somewhat unexpected issue surrounding literacy emerged in the interview with the Former Owner. The Former Owner suggested that some individuals in rural communities do not see the value of education and therefore may not be willing to participate in a research project such as this one. In addition, he believed that employees may not participate because of poor literacy. The Former Owner suggested that the MSDS are not sufficient for educating employees about the potential health effects of working with styrene since in his experience there are workers who cannot read at the level required for comprehension of the material.

Awareness and knowledge concerning occupational health risks on the part of health care providers is essential to accurate diagnosis and treatment. Therefore, the interview with the Health Care Professional was extremely important for providing insight into the level of awareness, and degree of knowledge, of the health care providers who are interacting with clients experiencing illness or injury associated with the workplace (the author is aware that the insights provided are those from a single health care provider and may not necessarily represent the experiences and opinions of other health care providers). The Health Care Professional suggested that the health care system in general may not be sufficiently prepared to deal with illnesses related to occupational exposure and spoke to a lack of knowledge among health care providers with respect to occupational diseases.

The Health Care Professional offered several explanations for the lack of awareness among health care providers such as a lack of communication between a client and the health care provider, economic constraints felt by physicians, the division of responsibility between health care professionals and government agencies responsible for workplace health and safety, and insufficient documentation of employee health. It was the participant's contention that awareness of occupational illness among health care providers could be improved through continuing education.

Factors Affecting Employee Risk Tolerance

Employment and connectedness. The majority of participants reported that people worked in the industry, despite knowing the health risks, out of necessity. For example, several participants pointed to the need for work as reasons for tolerating risk:

"Wherever they can get a job they're lucky to get one here." (Fisherman 1 – Community A)

"I think the only thing that's keeping them here [working at this plant] is there's nothing else to do…There's nothing else to do, so what do you do? Put it that way, yeah. You can almost do anything when you're forced to do it. Put it that way…It's not a good job, I'll tell you that. It's not a, a decent job...a lot of people would go for something better if we had it...'cause like I said before, it's all that's keepin' em here is there's nothing else to do." (Employee 2 – Community A)

"Well, the people that's workin' at the plant there right now, must continually work in there if they wants a job, if they quit, there's no other job, there's nothing they can do…You still worry about your family at home with nothing to live on." (Fisherman 2- Community A)

"Money. We paid decent wages, when I was there you could get lots of hours -- we worked 20 hours; 10-hour days, 5 days a week, 6 days if you want -- 7, if they wanted it, they could work it. And, right around the clock, and the dollars was there." (Former Owner/Manager)

"Jobs are hard to come by, and I guess they're just gonna try to take what they can get, right." (Wife of Former FBB Worker – Community C)

"It's, it's a problem we have in Newfoundland, where jobs are scarce, hard to come by. So if you have a job, and if have a house, let's say they do have a house there, which is probably the largest bit of investment that they have, and you weigh the pros and cons, to give it all up, to the uncertainty of elsewhere, whereas the health risks are not always, are not always obvious… so you feel you can risk it, and perhaps next year or in 5 years things might change. So, I think they do a little internal calculus, and they weigh it -- I'll stay -- you know." (Marina Associate 2 – Community B)

It was also suggested that people stay at a job despite the health risk because of a fondness for their community:

"I suppose it's because of the love of the community, and the love of the fact that they've got a job, and as they can stay here, they don't have to go away. And there's employment for them, and there's something for them to do. That's what I would assume, right…And they don't wanna move…Unfortunate that it's that way, but, what do you do?" (Teacher – Community A)

"'Cause they [workers] don't wanna move, so they take anything to stay." (Wife of Former FBB Worker - Community C)

The OHS Representative agreed that while employees want a safe working environment, the uncertainty of employment opportunities and desire to remain in their community increases employee risk tolerance:

"... the majority of workers do want a safe working environment. ...we want to feel that we're safe and secure in whatever we're doing... if the employer meets your needs and satisfy your needs, then you're gonna feel comfortable and stay there. If they don't, then you're gonna look for other opportunities. ...If you don't have that diversity and those options, and you're left with no choices say, 'do I leave the area' -- and for some people that is a very intimidating factor, 'I don't wanna leave, and I feel this is my hometown, feel very connected to that' -- and therefore, they'll go and do whatever they need to do, to get work... So, you know, it would be true, obviously, that the less options [employment opportunities] you have, the more risk that you'll take." (OHS Representative)

The OHS representative also suggested that the pressing needs of employees override the long term benefits of a healthy and safe work place:

" I came from a small community my own self, so I know what some of the attitudes are out there ...some people, they're willing to take that risk, because they need to, I guess, to take care of the immediate needs, if the immediate need is money -- I need to have money to, if I'm going to stay here. And, leaving, sometimes, is not an easy option to do... And people go home, and then the concern is, it's not, "How safe was your day today?", realistically, I mean, the person is working, it's that you gotta pay the bills, "I need the money, I need the money, I need the money" -- this is all going in his [worker] head, while he's taking that risk. And that's what you're trying to fight against...." (OHS Representative)

The OHS representative asserted that willingness to take risks at work is a world-wide problem, particularly in places experiencing stressful economic times:

"...in a province where the unemployment rate's so high, it's so different, we went through, generations and generations of thinking that, 'Well, we can do whatever we need to do to get the job done -- safety, or not'. And it's that attitude ...it's not only unique to Newfoundland, but it's right across the world. It's that people will take [risks], perceive risks, especially in the areas where there's a very high unemployment rate." (OHS Representative)

In communities where unemployment is high, the OHS Representative emphasized the critical role that managers have to play in promoting health and safety and creating a culture of safety in the workplace:

"...that then requires a very, very proactive, aggressive company to ensure to get the workers to do what they need to do, for their own safety. Cause if you rely on the workers to push it at that point, it won't happen. At that point, it needs to come from the employer, to strive to get it done, cause if they don't strive to get it done and make it part of the culture, make it part of it that you actually care about them, and that you're genuinely concerned with the health and safety, and you're aggressively gonna look at the hazards, you're aggressively gonna control the hazards, and that you're gonna make sure that things are put in place so that everybody goes home accident and injury free. And, but, if you're in a high unemployment rate, people will wait, they'll wait because they associate, 'Risk of losin my job, risk of doing the job safely -- uh, risk of losing my job's up here, I can take that risk'." (OHS Representative)

Denial. Several participants suggested that people continue to work in an industry where they know they are at a health risk because they deny or refuse to acknowledge the risks:

"Perhaps they thinks it's not really going to hurt them; some people thinks they can work on it and it don't hurt them, but in a once it's going to hurt them -- same as smokin'." (Fisherman 1 – Community A)

"Well, I suspect people do a little internal calculus, where they weigh the risks, the pros and cons... I suspect some cases, um, there might be a little bit of denial involved as well." (Marina Associate 2 – Community B)

The OHS Representative compared styrene exposure to tobacco smoking. That is, because people do not see the immediate effects of their actions they do not take account of future health consequences:

> *"It's very similar to smoking, right: people understand, you can read it on a pack, but yet, "Ah, I'll try one anyway". Until that actually happens to them or they can see someone associated with it -- die from cancer or some other disease -- And they're more reflective of today – 'Today I need to work, I need to make money, and I'm going to focus on that'...when we talk about styrene and any type of chronic exposure, we're not talking about today, we're talking about 10, 15, 20 years... it's [chronic effects] a long ways down the road. ...Any investigation, of any incident that happened, it's the first thing people say, 'Well, I didn't think it would happen to us'. Obviously, hopefully not, but, you know, you have to consider those things, that, well, what could happen when you're doing your work.*

Pride. Several participants reported that some workers enjoy building boats and take pride in being craftsmen:

> *"Now, there are some people, mind you, take pride in boat building, and so on, and I don't know what they all think, or whatever else, and I think that some of them might want to keep at that." (Teacher – Community A)*

> *"Uh, I think anyone who enjoys manufacturing, getting to see the end product at the end of the day, I think that would be self, you know, gratifying." (Manager 3 – Community C)*

When participants were asked if they thought people would work at another job if given the opportunity several believed employees would choose another job:

> *"If there was something else, there are a lot who would go at it [get another job]. They wouldn't be here, simple as that... I believe that, I really do..." (Employee 2 – Community A)*

> *"Some people would [work elsewhere]." (Teacher – Community A)*

Nevertheless, one participant believed that if they enjoyed building boats they might like to stay working where they are; but if they worked there only out of necessity, then she believed they would choose to work elsewhere:

> *"Definitely. I would think so... Ah, well, it depends, if they enjoy making the boats and stuff like that, well, people are gonna go that way, right. But, I mean, if it's job-wise where they need the work, well, I think they would choose something else." (Wife of Former FBB Worker – Community C)*

Summary. Participants were asked why they thought people continued to work in the industry given the health risks. The majority of participants considered need for employment as the reason. Tolerating risks, according to several participants, is especially likely in rural communities where employment prospects are scarce and there is a desire to remain in the community. The immediate needs of employees take priority over the long term benefits of a healthy and safe work place. As the OHS Representative suggests, this is not a problem unique to NL but is rather a common problem around the world in places experiencing stressful economic times. Consequently, according to the OHS Representative, it is critical for managers to promote health and safety among employees and create a culture of safety in the workplace.

Several participants suggested additional explanations such as denial and lack of knowledge regarding the health risks, and pride and enjoyment in boat-building. Yet, participants believed that many workers would choose another form of work if the opportunity existed in their community.

Factors Affecting Employee Willingness to Raise Safety Issues

Job security. Related to employee willingness to take health risk, is the willingness to raise safety issues in the workplace. For example, the wife of the former boat-building plant employee in Community C suggested that the lack of employment alternatives influences employees' willingness to raise safety issues and concerns with their employer. It was this participant's contention that employees who felt they were working in unsafe conditions would "stand up for themselves" but that the economic situation in the community "holds a lot of people back". This belief was echoed by the Former Owner and the OHS Representative. They suggested that comfort levels with discussing health and safety issues with the manager or person in charge depended on whether individuals were concerned about losing their job or being perceived to be creating trouble for the company:

> *"...it depends on the individual. I think they'd have concerns about losing their paycheck. Jobs are very hard to get in this province, especially in rural Newfoundland...Well, you know, if they [workers] think, 'Well, geez, if this is going to be a compensation deal, they'll probably try and get rid of me'. Because compensation is 100 percent the employer, and if, you know, the employer gets anxious, [the employer might say], 'Geez, he's going to drive my rates through the roof, maybe I'll try and get rid of him, first'...." (Former Owner/Manager)*

> *"The problem is, they [workers] feel so intimidated, that they don't take the initiative to say, 'listen, I do have a right here, and I do have a say into, well, make sure that I have a safe and healthy working environment'. ...And I know that's very easy for me to say here from the enforcement side, but it's not so easy for a worker out there...." (OHS Representative)*

Social consequences. The OHS representative suggested that potential social consequences may affect employee willingness to raise safety issues.

Firstly, motivation to make a 'good impression' on their employer may affect the extent to which they will bring up safety issues:

> *"...and it's no difference with young workers, they feel that they don't have many options, and they'll do whatever's told to them cause they wanna make a good impression. But sometimes that good impression is not one that you want to leave, and could cause injury or harm." (OHS Representative)*

Secondly, employees may be inhibited by the possibility of negative reactions from their peers such as being labelled as a trouble-maker or considered to be creating difficult situations for other employees:

> *"And it comes down to, 'Do I speak up, get the inspector come in, who could, in turn, shut down the full operation, and that we're all out of work. And then now, I'm still living in the same community that I started out living in' -- and then it's not gonna be so good -- you're not very well received when you look across the table at all your friends and says, 'Well, we'd be still be working, we'd got our stamps this year, we'd had an income, if you never called that inspector guy to come in'. Versus, waiting to say, 'Hopefully the inspector guy come in and make his rounds around the province take the initiative.' At least, at that point, he [the worker] wasn't the one saying, 'I played a part in shutting this place down'. And it's sad, it truly is sad that we're into such a bad place." (OHS Representative)*

Summary. Job insecurity and scarce employment opportunities were cited as barriers for employees with respect to their willingness to raise safety issues. The wife of the former boat-building plant employee in Community C suggested that employees who felt that they were working in unsafe conditions would be more likely to raise safety concerns with their employer if there were alternative means of employment in the community. The Former Owner and OHS Representative supported this claim and also

suggested that that an employee's comfort level with discussing health and safety issues depended on whether the employee is intimidated by management, or concerned about losing their job or being perceived to be creating trouble for the company.

In addition, potential negative social consequences to raising safety issues were raised by the OHS Representative. Workers who raise safety issues may be ostracized if the company experiences any harmful repercussions due to the employee's complaint.

Chapter 4

Study 1 Discussion

Study 1 Discussion

Introduction

The impetus for this study derived from the concern among OHS personnel in the province of NL regarding the inconsistent PPE use among workers in the NL fibreglass boat building industry. This issue has gained a great deal of attention from those monitoring the industry, particularly since many fibreglass boat-building plants do not have the economic resources to modify existing ventilation systems or to install new ones to ensure minimal exposure levels. As a consequence, the use of PPE becomes increasingly important for the protection of workers. In addition, it is the contention of OHS personnel that employees and managers do not perceive the health risks associated with working in the FBB industry citing that the prevailing attitudes toward workplace health and safety affect the extent to which employees engage in self-protective safety behaviours in the workplace (Personal Communication, March 2004).

Through the experiences and observations of participants, the purpose of the following discussion is to deliberate and identify (1) the factors affecting safety behaviours in the workplace; (2) the extent to which participants perceive the risk with respect to the industry and the risks identified by participants; (3) the extent to which social circumstances may affect safety behaviours; and (4) the motivation for tolerating risk or engaging in risky behaviours in the workplace. Findings from participant interviews will also be integrated with existing social psychology and safety behaviour literatures.

Participants' Attitudes Toward Workplace Health and Safety

While respondents from each community revealed an awareness and concern for OHS issues, it seemed that workplace safety was not a priority topic. For instance, an employee from Community A suggested that the lack of discourse about workplace health and safety meant that new workers needed to be educated about OHS policies and practices. This employee also proposed that the responsibility for providing this education to new workers had been bestowed upon experienced workers rather than management.

Eakin's (1992) interviews with 53 small business owners also revealed that the most common approach used by managers/owners for managing OHS in the workplace was to leave that responsibility with the workers. Managers/owners tended to normalize risks in the workplace and felt that monitoring employee behaviour violated individual autonomy. However, any time management downplays its role with respect to the OHS training of new employees should be considered a regulatory failure as it is the responsibility of management to ensure that all employees are properly trained (Eakin, 1992).

Managers. Overall, managers expressed a concern over the health and safety of employees, providing descriptions of changes they had made (or were in the process of implementing) to enhance OHS standards and practices in their workplaces. Unexpectedly, the boat-building plant Manager in Community A candidly admitted that

workplace health and safety was not a priority for his business, although he recognized the need for change, albeit as a necessity for staying in business.

Despite the Managers' reported concerns about health and safety, the OHS Representative suggested that productivity has a tendency to take priority and that changing such attitudes and getting workers to internalize the significance of OHS has been a slow and frustrating process. Indeed, while the interviews with Managers indicated that they were concerned about the health and safety of employees (albeit the degree to which each Manager perceives a health risk to employees varied), they were also quick to point out that the FBB industry in NL is struggling and, therefore, it is difficult to make some of the recommended changes. The Former Owner stated that while it is important for managers to adopt the ideas and recommendations of OHS inspectors, there are limits to what the industry can do with regard to meeting the recommendations. The Former Owner further suggested that the extent to which managers have positive attitudes toward safety is dependent upon the resources of the company, such that when a company is in crisis, health and safety concerns are not a priority.

This finding is a key point that is supported by the literature. For example, in a review of the effects of precarious employment arrangements on health and safety, Quinlan, Mayhew, and Bohle (2001) identified one of the causal factors, often the dominating factor, associated with poor regulation of OHS policies and procedures in small workplaces/businesses as the pressure to make an income and maintain a business (e.g., Mayhew, 1997a; Mayhew & Quinlan, 1997). Small businesses such as the FBB industry in NL may be considered a form of precarious employment - jobs that are

considered insecure or associated with high uncertainty that they will continue. Quinlan, Mayhew, and Bohle (2001) argued that small businesses can be considered precarious employment as the "growing significance of small business in terms of employment has been a direct consequence of outsourcing/competitive tendering and organizational restructuring... small business employs a disproportionately high number of temporary, part-time, home-based, and other types of contingent workers in comparison to larger enterprises" (p. 339). As the managers from Study 1 reported, the FBB industry in NL is struggling to maintain economic stability and compete in the global market. Such pressure felt by managers and owners appears to be having an effect on the implementation of OHS practices within these small businesses.

Research has also shown that management attitudes toward health and safety can strongly affect an organization's safety climate, that is, the extent to which employees believe that their organization (i.e., management) is concerned about the health and safety of employees (e.g., Neal & Griffin, 2003; Zohar, 2003). When employees feel that management is committed to the health and safety of employees, employees are more likely to engage in safety behaviours at work (Neal & Griffin, 2003).

Managers' attitudes toward safety appeared to be linked to their attitudes towards Government Services OHS inspectors. For example, the manager in Community A described his attitude towards OHS inspectors and OHS regulations as changing when he embraced a new way of thinking surrounding OHS. The boat-building plant Manager from Community C was particularly negative about OHS inspectors, suggesting that their requests for modifications are not always realistic and that they do not understand the

logistics of the boat-building process. These findings are similar to those from Mayhew's (2002) investigation of the health and safety risk for employees of small business. Mayhew reviewed the results of eleven studies (2,781 interviews in total) devoted to OHS and small businesses in Australia. She concluded that there are a number of reasons why small business owners/managers do not readily accept the presence and recommendations of OHS inspectors. One of these reasons, as suggested by Manager C, is that managers consider the OHS inspectors as outsiders policing their workplace practices with insufficient practical knowledge. That is, the practices and recommendations inspectors expect small business owners/managers to adhere to are not applicable to small business operations and do not reflect the actual production process. Mayhew (2002) also suggested that distrust in government (and related public servant officials), resentment of government requirements, and communication practices (e.g., personal contacts) also affect acceptance of OHS inspectors by small business owner/managers.

Negative attitudes espoused by managers toward OHS may therefore be a reaction to frustration. That is, they understand the concerns of OHS inspectors but are unsure how to enhance the health and safety of employees without affecting profitability. As such, the attitudes expressed by the managers in this study raise concerns with respect to the safety climate of these organizations.

Employees. Employees expressed their attitudes toward health and safety largely by providing examples of the safety procedures they follow at work such as wearing their

safety equipment and making sure they follow safety procedures. Employee interviews revealed a positive attitude toward health and safety and an awareness of times when their workplace may not be up to standard. Positive attitudes toward safety are associated with increased perceptions of risk (e.g., Mearns, Rundmo, Flin, Gordon, & Fleming, 2004; Sjoberg, 2000) such that employees are more likely to be aware of the potential hazards in the workplace and to engage in safety procedures. Conversely, negative attitudes toward safety are associated with decreased employee perceptions of risk and, consequently, employees may be less likely to engage in safety behaviours. Given that attitudes toward health and safety at work appear to affect employee perceptions of risk, then the extent to which employees embrace a positive attitude toward their own health and safety at work (and the health and safety of their coworkers) is extremely important as such attitudes have the capacity to affect behaviour (e.g., Ajzen, 1988; Fishbein & Ajzen, 1975; Lingard & Yesilyurt, 2003).

Participants' Perceptions of Risks: Are There Risks With Working in this Industry?

Much of the risk perception literature presumes that the risks proposed by the researcher (usually physical health risks) are the same as those perceived by participants (Wilkinson, 2001). Accordingly, the emphasis on perceived health risk in the literature may have prevented researchers from identifying other perceived risks (Wilkinson, 2001). Because there may be other risks perceived by individuals in the workplace such as social or economic risk, the interviewers in the present study purposefully did not specify any particular types of risk when questioning participants. Only when participants had

identified what they considered to be the risks did the interviewers further explore the issue. Nonetheless, the vast majority of the risks identified were, indeed, health related.

Community residents. Despite not working in the industry, community residents provided many accounts of what they considered to be health risks and symptoms associated with styrene exposure. Given the close knit nature of these communities, it stands to reason that residents who were not directly associated with the industry would be familiar with some of the issues. The beliefs reported by community residents stemmed from conversations with other members of the community who were either directly associated with the FBB plant (e.g., employee, spouse of an employee) or who themselves knew a person working in the industry (e.g., a neighbour or friend).

Residents from each community reported that the risks associated with working in the FBB industry are largely related to styrene exposure, though physical injuries and accidents were also identified. Many community members considered the smell of styrene as an indicator of negative health effects related to exposure. In addition, community residents believed that breathing problems, employees smelling of styrene, and, in one case, drowsiness were indicators of styrene exposure.

On a community level, there were interesting differences with respect to perceptions of risk among participants. For instance, compared to those of Communities A and C, residents of Community B appeared to be more variable in their responses. In marked contrast to residents in Community A, participants in community B suggested that people in the community were not worried about styrene exposure - for the most part,

residents did not complain about the smell and there was only moderate concern regarding the dust coming from the plant.

The extent to which residents perceive risks in their community may be a function of community cohesion. In their statements about community life, residents of Communities A and C appeared to be more socially connected with one another (i.e., know more people in their community and have tighter social networks) than those of Community B. This fits with Moscovici's (1988) Social Representation Theory (SRT), in which he suggested that social representations (i.e., social knowledge, practices and beliefs) are formed through communication and interactions with others in our environment. Similarly, Joffé (2003) has suggested that the social and cultural environment is a significant component for forming social representations of risks. Such a finding in this study may be particularly important for the transfer of safety knowledge to workers in a community. Highly integrated communities may facilitate the promotion of OHS practices (with increased awareness and training) by creating discourse about hazards in the workplace and how to manage OHS issues in the workplace.

Employees. All but one of the employees identified 'health' as the risk associated with working in the FBB industry. Employees often spoke of their own health related experiences or the experiences of co-workers. They also suggested that their coworkers were concerned about the health risks related to styrene exposure.

While the interview data suggest that employees acknowledged the risk, the OHS Representative believed that employees did not perceive the health risks and cited lack of

education, awareness, and difficulty quantifying the risk as possible reasons for the lack of risk perception. The relative of a former worker reported that workers were not all that concerned about the health effects of styrene. Indeed, there was one employee who asserted that there were no risks with working in this industry.

There is an obvious discrepancy between employee reports and those of other participants with respect to employee risk perceptions concerning styrene. It appears that most employees *are* aware of the health risk. If it is the case that employees do perceive a health risk with respect to styrene exposure, why are employees, from the perspective of the OHS Representative, not engaging in self-protective behaviours in the workplace such as the use of personal protective equipment (PPE)? This issue will be revisited later in this discussion.

Managers. All managers acknowledged the health risk associated with styrene exposure, although, compared to community residents and employees, there was noticeably less dialogue on the topic of health risks. The Manager in Community C suggested that, overall, people were not concerned about the potential health risks associated with this industry claiming that if people were concerned then it would be hard to find workers. However, based on his personal experiences with the industry, a Former Owner was adamant about the health risks and expressed concern over his own health when he worked with styrene. He also suggested the health risks had extended to his family in that they were subject to second hand styrene exposure. The Manager from Community B brought up the issue of being desensitized to styrene when asked about the

obvious smell of styrene in his office. Such desensitization may reduce perceived health risk as workers become less aware of their exposure to styrene. Mayhew (2002) found that managers/owners of small businesses have a tendency to discount or trivialize hazards in the workplace that they consider to be common or familiar risks associated with the job. Such beliefs may be reflected in the extent to which managers/owners implement OHS policies and procedure in the workplace.

Overall, managers acknowledged the health concerns related to styrene exposure but stressed that there was no evidence to support adverse health effects. That being said, both the Manager from Community C and the Former Owner reported that they had experienced and observed mood and cognitive effects resulting, in part, from styrene exposure and long working hours. Styrene exposure has been associated with mood instability (Campagna et al., 1995), fatigue and depression (ATSDR, 1992), and increased aggression (Julien, et al., 2000), all of which can have a significant negative impact on social relationships. Long working hours is typical of precarious employment operations (e.g., Quinlan, Mayhew and Bohle, 2001) and contributes to fatigue, consequently affecting employee adherence to safety protocols.

Managers also identified economic risks associated with the industry. One manager asserted that economic risk was more important than health risk, pointing out that if a company is not in business then there is no need for health risk concerns. Related to economic risks was the need to diversify to ensure an economically viable business, a frequent comment among managers and other participants. Perceived threats to the economic well-being of these businesses were untrained individuals fibreglassing their

own boats, and the unpredictable market for boat products. As mentioned above, economic pressures are typical for small businesses competing in a global market and such pressures can have a significant impact on the health and safety of workers (e.g., Mayhew, 2002; Mayhew & Quinlan, 2001; Quinlan, Mayhew, Bohle, 2001)

From a health care perspective, the Health Care Professional proposed that employees of small industries may be at a higher risk of occupational illness and injury compared to their larger industry counterparts because smaller operations may not be monitored as often. This notion is supported by extant research that suggests that smaller business have higher injury and fatality rates compared to larger organizations (e.g., Quinlan et al., 2001; Suruda & Wallace, 1996). Several explanations have been proposed for this finding such as more of the responsibility for safety being placed on workers (Eakin, 1992), less knowledge regarding OHS regulations and procedures, more limited contact with OHS regulators, and less acknowledgement of the importance of government regulations in the workplace (Quinlan, 1999).

Factors Affecting Safety Behaviours

Based on interview analysis, a number of factors appear to affect the extent to which people perceive a risk with working in the industry and comply with safety standards and practices, particularly PPE use. Such factors as social influences, organizational context, education, and community characteristics are largely consistent with other literature, much of which is social psychological in nature. Social psychological concepts such as social influence, group membership, informational and

normative influence, and social representations will be incorporated into the following discussion.

Social Factors Affecting Safety Behaviour

Family influence. Research related to workplace safety and perceived risk has highlighted the potential importance of social influence inside and outside the workplace. Specifically, studies have shown that spouses and parents can affect workplace safety behaviours (e.g., De Vris & Lechner, 2000; Westaby & Lowe, 2005). In the present study, there appeared to be disagreement concerning the extent to which family members were concerned about the health and safety of those working in the FBB plant. One participant, the spouse of a former FBB plant worker, suggested that the extent to which family members influence the safety behaviours of a worker is largely dependent upon the employment options of the employee. That is, the weight of having to provide for a family (or as a family member having to be provided for) affects the extent to which other family members will voice concerns regarding safety practices at work.

Further, an OHS Representative perspective contended that the family has been instrumental in reshaping the attitudes of employees in other industries, most notably, the fishing industry. According to the OHS Representative, involving family members in OHS awareness and promotion has contributed to enhancing safety practices and safety attitudes in the fishing sector and can have an impact on PPE use. This notion seems supported by the literature as De Vris and Lechner (2000) found that social support received from spouses affected employee intentions to use safety equipment. Family

social influence takes the form of developmental experiences and parental modeling of risk-taking behaviours (Westaby & Lowe, 2003).

Overall, much of the safety literature has focused solely on the relationships and networks *within* an organization with little attention given to the potential role of social influence beyond the workplace as a contributing factor to employee willingness to engage in safety behaviour. However, as shown here, familial social influence may have a significant impact on the development of safety promotion campaigns and education programs. The impact of family and significant others on safety behaviours in the workplace requires further exploration.

Co-worker influence. There was also variation among participants regarding the extent to which co-workers were perceived to influence safety behaviour. As suggested by Terry et al. (1999), attitude change and the impact of persuasive communications cannot be fully understood without reference to group memberships. Attitudes can be considered social products to the degree that they are likely to be influenced by social norms (Terry et al., 1999). These norms can influence an individual's willingness to engage in specific behaviours and hold particular attitudes (Terry et al., 1999). For example, De Vris and Lechner (2000) found that colleague use of safety equipment accounted for 56% of the variance in employee use of personal safety equipment. Similarly, Westaby and Lowe (2005) found that young workers who believed their coworkers took risks were more likely to report an increased awareness of risks in the

workplace and that coworker influence was a stronger predictor of risk-taking orientation than supervisory influence.

The Former Owner suggested that co-workers were likely to encourage each other to be safe *only* if employees were interested in (and aware of) OHS practices and guidelines. This belief is consistent with findings by De Vris and Lechner (2000) who, as a result, contended that workers need to be aware of their co-workers' safety practices and that the social norms favouring desired behaviours should be clearly communicated and emphasized in the workplace.

The role of informational and normative social influence emerged when an employee from Community A suggested that veteran employees need to teach new employees the importance of health and safety procedures. As previously mentioned, it was suggested by this employee that workers are not aware of OHS issues due, in part, to the lack of a safety culture in the community. This view was supported by the OHS Representative who suggested that through the absence of discourse surrounding OHS issues, workers have not created an association between health, safety, and the workplace. This is a very important finding from an OHS promotion standpoint. The notion behind SRT (Moscovici, 1988) suggests that social representations are formed through communication and interactions with others in our environment. The social and cultural environment contributes to our knowledge and understanding (Joffé, 2003). Therefore, if discourse around health and safety in the workplace is not occurring within communities, then workers, particularly those new to the workplace, may not have knowledge or awareness of OHS. As previously mentioned, SRT may explain the extent to which

community residents perceive risks in their community (e.g., the FBB plant) - highly integrated social networks may facilitate discussion about risks in the workplace. The same notion can be applied to enhancing the awareness and knowledge of workplace health and safety. That is, increasing OHS discourse among community members may affect the extent to which OHS is embraced in the workplace.

Group membership: younger versus older workers. There are various social groups within the workplace. Two such groups may be younger and older workers. A worker's age has been suggested as a factor contributing to safety behaviours in the workplace (Siu, Phillips and Leung , 2003). In the present case, participants agreed that workers are aware of the health risks, but trying to get them to appreciate the magnitude of the risk and protect themselves from hazards is extremely difficult. According to the interview data, this attitude is especially true for younger workers. Several participants suggested that it was more difficult to convince younger workers of the significance of PPE use and linked this type of risk taking among young workers to behaviours such as smoking and excessive alcohol consumption. That is, the young workers are considered in general to be unable to understand the future consequences of their present behaviour. The experience and knowledge of veteran workers is seen as critical to promoting safety in the work environment. This, of course, assumes that they are knowledgeable about OHS and are diligent with respect to these practices. The effect of age on risk perception and, consequently, safety behaviours has been demonstrated in the literature. For example, Siu, Phillips and Leung (2003) assessed the relationship between employee age and

safety attitudes in a sample of construction workers in Hong Kong. The results of their study suggest that age appears to be associated with safety attitudes and, consequently, safety performance. Older workers had more positive attitudes toward safety behaviours in the workplace than younger ones. Furthermore, older workers were likely to view general housekeeping and checking of safety equipment in a more positive way and perceive more support from management/supervisors than younger workers.

However, young employees were not the only workers described as being of particular concern with respect to safety behaviours. The OHS Representative suggested that the influence of coworkers with respect to work safety practices could have a positive or negative impact depending on the workers' commitment to OHS. Lack of experience among young workers *and* complacency among older workers were reported by the OHS Representative as possible reasons for a lack of PPE use and lowered risk perception. For example, if young workers look to experienced workers for guidance, and the experienced worker does not comply with proper safety practices, this informational social influence can have a detrimental effect on a young worker. This relationship is a concern among OHS regulators given that they describe changing the old methods of doing the job and reshaping attitudes among experienced workers as extremely challenging.

The notion of experienced versus inexperienced workers is very interesting. While it appears that age may affect safety attitudes and behaviours in the workplace, it may also be the case that experience in the job, regardless of age, may affect safety behaviours. For example, a young worker may have had a longer tenure at the workplace

than a recently hired older worker. It then becomes unclear the extent to which age versus experience (or an interaction between the two) is affecting safety attitudes and behaviour. Dissociating the effects of age and experience on safety behaviours in the workplace requires further attention.

That being said, it was further proposed by the OHS Representative that it is possible to capitalize on the respective strengths of young and older workers in order to facilitate positive social influence in the workplace. This participant suggested that young workers tend to be more knowledgeable about workers' rights, while older workers have experience and a sense about the industry not apparent among younger workers. These strengths, from the perspective of the OHS Representative could have a constructive influence on safety practices in the workplace as the young and old could positively impact each other's work environment. As suggested by Terry et al. (1999) social influence (including group memberships) can have both positive and negative effects on attitudes and behaviours. Such social influence requires greater consideration particularly with respect to the factors contributing to the impact of different sources of social influence (e.g., coworkers, family, etc.).

Organizational Factors Affecting Safety Behaviour

Safety climate. As suggested by a variety of studies (e.g., Donald & Canter, 1994; Neal, Griffin & Hart, 2000; Neal & Griffin, 2003; Rundmo, 1997), an organization's perceived commitment and concern regarding employee health and safety (otherwise known as safety climate) is an important influence on employee use of PPE and

compliance with safety standards. In particular, if employees do not perceive a commitment to safety (e.g., through the enforcement of PPE use), employees may be less likely to comply with safety standards. In this respect, it was reported by Employees from Community A that management did not enforce PPE use and these participants maintained that employees could choose whether or not to use PPE.

The perceived lack of enforcement was rationalized by several participants. The Manager from Community B, for instance, believed that enforcement was not necessary because employees always used PPE; yet based on the concerns of OHS inspectors, this is not always the case. An Employee from Community A suggested that when it comes to working with styrene, management will not force them to work in that environment if a worker does not feel safe; so it seems that employees have a choice. On the other hand, the wife of a former FBB plant worker in Community C believed that management *did* enforce the use of safety equipment but she also thought there was room for improvement with respect to ensuring employees' adherence to proper safety practices.

Such variability with respect to perceptions of managements' commitment to safety is a notable finding. Given that safety climate has been identified as a significant factor contributing to employee safety behaviours (Donald & Canter, 1994; Neal, Griffin & Hart, 2000; Rundmo, 1997; Weyman, Clarke & Cox, 2003), discrepancies regarding the perceptions of managements' commitment to safety could affect employee safety behaviours and employee perceptions of risks. For example, if PPE is considered optional, there may be the perception among employees that management is not concerned about the risk and perhaps they (employees) should not be concerned either.

Economic challenges in the industry. The influence of economic challenges within the industry was outlined above within the context of management's *attitudes* toward workplace health and safety. However, economic constraints typically experienced by the industry also emerged as a factor affecting management's *actions* in addressing the health and safety of employees. For instance, limited budgets, intense competition for contracts and significant fluctuations in the demand for product may negatively affect safe working conditions (Mayhew & Quinlan, 2001; Quinlan, Mayhew, & Bohle, 2001). As proposed by Lingard and Yesilyurt (2003), the precariousness of the industry may create barriers to implementing and performing safety-related activities. For example, all managers argued that the industry does not produce enough revenue to upgrade existing ventilation systems.

According to managers from Community B and C, employees are provided with safety equipment free of charge, including gloves, safety glasses, respirators and the replacement filters for the respirators. However, the Manager from Community A indicated that he had to resort to having employees pay for the replacement filters as they were not using respirator filters to full capacity, thus costing the employer money. While one might understand the dilemma faced by the Manager, the implication of this course of action may be that employees will not replace the filter when appropriate if they have to pay for them, thereby putting their health at risk.

Similarly, it was suggested by the Former Owner that workers did not "value" and take care of their PPE. The effects of this were twofold: employees were not wearing PPE and the owner refrained from providing equipment free of charge to employees, perhaps

facilitating the under-utilization of safety devices. Managers' unwillingness to provide free safety equipment to employees could further compromise the safety climate of the workplace as such actions could call into question management's commitment to the health and safety of employees. As discussed above, a negative safety climate could then further impede employee motivation to practice safe working behaviours.

While several participants suggested that the organization did not strictly enforce PPE use, it was clear that managers had made attempts to develop safer work environments. Managers maintained that their organizations were committed to the OHS of employees by providing them with information regarding the safe handling of materials and the potential health effects associated with hazardous chemicals. They also were committed to making improvements to the physical environment of the workplace. That being said, one manager conceded that more work needed to be done to enhance health and safety in the workplace.

Physical properties of PPE. Participants reported that the physical properties of PPE, such as the discomfort associated with respirator use, could contribute to under - utilization. It was suggested by the Former Owner that workers would be more likely to wear a mask or respirator if it was more comfortable and convenient. Similar studies (e.g., De Vris & Lechner, 2000) also found that one of the factors that contributed to workers' use of PPE was whether workers thought the equipment was useful and not unpleasant to use. Those workers who were identified as infrequent users of PPE perceived the equipment as unpleasant and reported that its use impeded their progress at work.

Overall, it appears that organizational factors such as safety climate and economic constraints may contribute to the under-utilization of PPE. As mentioned above, safety climate is thought to be significantly related to employee safety attitudes and safety behaviours. The interview data in this study suggest that within the NL FBB industry, safety climate could be improved, to some extent, by enforcing PPE use. The managers in this study argued that steps are being taken to improve the health and safety of the workplace. The discomfort employees feel when wearing a respirator and mask may be a reflection of the quality of the equipment provided by management. However, it may also be the case that equipment discomfort is beyond the control of management.

Are Employees Well Informed Concerning the Hazards of Styrene Exposure?

It is well established that knowledge and education are important for increasing awareness of workplace safety and risks (Cheung & Chan, 2000; Cree & Kelloway, 1997; Harvey et al., 2001). The opposite is also true, in that a lack of knowledge can negatively affect employee safety behaviours and perceptions of risks (e.g., Kovac et al., 2001; Quandt et al., 2001; Sjoberg and Drottz-Sjoberg, 1991). Employees from Community A reported that they received information regarding the effects of styrene exposure from the manager, the foreman, and the OHS inspectors.

However, there were discrepancies among participants regarding the extent to which employees were informed about the health effects of styrene. Managers in Communities A and B believed that those working with styrene were well informed about the health effects and the proper handling of such hazardous chemicals, citing the

provision of reading materials in the form of the MSDS and books. Interestingly, community residents also suggested that employees were well informed about the hazards of styrene. In contrast, one employee in Community A argued that workers may not have received enough information as it relates to styrene exposure. Further, the manager from Community C acknowledged, rather uneasily, that he was uncertain about employee knowledge with respect to the health effects of styrene. This manager also revealed that while employees are given an orientation to the workplace, all the employees at his plant did not have the basic, legislated WHMIS (Workplace Hazardous Materials Information System) training. The candour of this manager's comments supports the notion that there may be a gap between employees and managers with respect to the sufficiency and accuracy of knowledge concerning styrene exposure.

If there is a lack of knowledge regarding styrene exposure among employees, there may be several reasons. The OHS Representative suggested that plant location may have implications for the quality of employee training and knowledge. For example, it was suggested that urban workers may receive more intense training. Additionally, the Health Care Professional suggested that workplace risks may not be properly acknowledged by (or a priority for) small industries and, consequently, employees may not be as well informed as they could be about OHS. Studies related to the OHS knowledge of employees in small business have indeed found that there is often a low level of worker knowledge and training (e.g., Quinlan, 1999; Quinlan, Mayhew, & Bohle, 2001).

Community Factors

Community connectedness. Participants in this study provided insight into the characteristics and well-being of their respective communities. There was a prevailing consensus that their communities were very important to the participants, and that they considered them to be desirable places to live and to raise children. People felt connected to their communities, citing a great deal of resident integration and support. While the supportive social networks in the community were largely seen as a positive attribute, it was also suggested that the family-like atmosphere and cohesive feeling could have a downside as residents can become aware of (or involved in) one another's affairs even when such involvement is not desired. With respect to the present study, the interconnectedness suggests that the thoughts and observations of the participants in the study who had no direct association with the FBB industry are meaningful given the extent to which they engage in community social networks.

Economic hardship and importance of the FBB industry. Despite the positive feelings participants expressed concerning their communities, there was notable variability in terms of other factors. For instance, an overarching theme for participants in Communities A and C was poor economic status and economic hardship. Indeed, concerns regarding economic viability were supported by the Community Accounts Database (2001; refer to Table 2.1 in Chapter 2, p. 63 for comparison data). These findings could imply a heightened competition for employment among residents in these communities. According to participants, both Communities A and C had been extremely

dependent on the work provided by fish plants for economic well-being of residents and overall community sustainability. However, as a consequence of the fishery crisis in NL, the fish plants in these communities, like many throughout NL, have been closed for some time. The demise of a lucrative industry has many participants in these communities feeling uneasy about their community's future, fearing further economic crisis and out-migration.

However, compared to Communities A and C, the interview data revealed that Community B is prospering, or at least maintaining economic stability. Again, resident perceptions are validated by the Community Accounts data (2001). Community B respondents cited the number of new businesses in the area as an indicator of community growth. Several participants also suggested that the perception of a more relaxed lifestyle typical of rural community life has resulted in an "in-migration" of people from more urban areas which has contributed to the growth of Community B. Overall, it is clear from participant statements that there was little or no sense of fear about the future and sustainability of the community amongst residents of Community B.

It appears that with very limited employment opportunities in towns dependent on one or a few industries, existing businesses become extremely important from the perspective of the people residing in the area. Given the importance of the FBB plants in highly dependent areas, people have much to say about issues relating to the industry, such as potential health risks. It is the investigator's contention that in Community B, where there appears to be less reliance on the FBB plant, residents are less engaged in the

issues surrounding the industry and, consequently less emotionally charged than those participants in Community's A and C.

Employment scarcity and community connections. Given that participants acknowledged the health risks with working in this industry, they were asked why they thought people would choose to work there. The majority of participants believed that people continue to work in a potentially unhealthy work environment because of their need for employment. Tolerating risks, according to several participants, seems especially likely in rural communities where employment prospects are scarce and there is a desire to remain in the community. As discussed in the above section, participants feel connected to their communities. The immediate needs of employees (rather than the long term benefits of a healthy and safe work place) can indeed increase employee risk tolerance. As the OHS Representative suggested, this is not a problem unique to NL, but is a common problem in places experiencing stressful economic times.

As previously mentioned, Billig's (2006) study found that the feelings people have toward their place of residence can affect perceptions of risk and their behaviours. Participants who reported heightened place attachment were more likely to remain in a hostile environment (i.e., terrorist attacks in their community) than those who did not report being attached to their community (Billig, 2006). Masuda and Gavin's (2006) study also suggests that the extent to which a person feels a sense of belonging to a place appears to affect the extent to which they will amplify or attenuate risk associated with that place. These findings may contribute to an explanation for the findings of the current