Risk perception, safety behaviour, employment precarity and community attachment: the case of Newfoundland and Labrador fibreglass boat-building workers

Stacey Wareham-Fowler PhD, and Ken Fowler PhD, Memorial University, Canada

Abstract

Fibreglass boat-building and repair plays an important economic and cultural role in Newfoundland and Labrador, and in many cases is one of the few viable businesses in economically depressed rural areas. However, the process of constructing and repairing fibreglass vessels requires the use of styrene, a known neurotoxin, excessive exposure to which can have negative impacts on physical and mental health. Based on the concerns of provincial health and safety regulators who have suggested that workers are not using their personal protective equipment, citing a lack of perceived health risk concerning styrene exposure, the purpose of this study was to assess the attitudinal, cognitive, organisational and economic factors that may have an impact on perceptions of risk and safety behaviours. Given that this industry has never been the subject of previous occupational safety and health inquiry into employee attitudes and behaviour, the research objectives were quite fundamental. Accordingly, an exploratory approach was taken to address the objectives of this study. Questionnaires were distributed to all fibreglass boat-building and repair plants operating in the province, resulting in an 80 per cent response rate (n = 43). Findings suggest that while workers do perceive health risks concerning styrene exposure, they appear to lack specific knowledge about the various types. It was also observed that workers have strong connections to their community, are worried about the viability of their communities, and have notable feelings concerning employment precarity, factors which may play a key role in the degree to which employees perceive risk and engage in safety behaviours. The implications of these findings are discussed, specifically those concerning the roles that social, cultural and economic factors may play in terms of perceptions of risk and safety behaviour.

Key words

Community attachment, employment precarity, economic crisis, fibreglass, perceptions of risk, rural, safety behaviour, styrene exposure

Introduction

Boat-building has had a long history in Newfoundland and Labrador (NL) and continues to play a role in rural Newfoundland, both culturally and economically. More recently, as a consequence of NL’s 1992 cod fishery collapse, and subsequent industrial restructuring towards more deep-sea species such as snow crab, fibreglass boat-building and repair (FBBR) expanded rapidly in NL during the late 1990s. The dramatic population decline since the fishery collapse and dwindling employment prospects as a result of the economic downturn have also meant that communities have had to rely on one business or industry, such as FBBR, as a primary source of employment. The social and economic circumstances of these communities, and of the individuals residing and working in them, 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 the tolerance of risk, particularly if the alternative is to move away or to rely on government assistance programmes.

While there have been economic benefits to NL as a result of the surge in FBBR, the process requires the use of the chemical styrene, a known neurotoxin. Acute exposure to styrene is associated with:

- mood instability
- irritation and forgetfulness
- fatigue
- reduced colour vision
- hearing loss
- psychological symptoms, such as increased aggression, that have a negative impact on social relationships.

The most effective way to protect workers from styrene exposure in the workplace is through enclosure of production processes and proper plant ventilation. However, most FBBR plants in NL were originally built to produce wooden and/or store wooden and steel boats. Proper enclosure and ventilation were often not introduced when they began fabricating fibreglass vessels in the 1990s, creating work environments associated with potentially high exposures to styrene and forcing heavy reliance on the use of personal protective equipment (PPE) for health and safety prevention. In 2004, provincial health and safety regulators raised concerns with SafetyNet researchers about the potential hazards of styrene exposure for those involved in the FBBR industry in the province. The regulators were particularly concerned about the failure to use safety equipment or PPE in the industry, a problem they attributed to employees not perceiving styrene to be hazardous to their health. Consequently, the purpose of this study was to explore various organisational- and community-level factors to gain insight into reasons why employees may tolerate, deny or minimise risk in their work environment.

The study outlined below is exploratory in nature and is aimed at contributing to a current lack of research associating employment precarity, employee knowledge and community attachment with employee risk perception and safety behaviours.

**What impacts on employee perceptions of risk and safety behaviours?**

Research assessing employee safety behaviour in various industries (e.g., fishing, mining, offshore oil, firefighting) has suggested that a lack of risk perception is one of several key factors associated with ineffective safety behaviour. Many such studies are quite cognitive in focus, as they tend to explore attitudinal and/or knowledge predictors of subsequent risk perception and/or protective behaviour.

As an associated issue, studies also suggest that effective knowledge transfer about work environment health risks and proper safety procedures are an important means of instilling a sense of risk within employees, thereby improving safety behaviours. However, such knowledge transfer does not happen evenly across different kinds of workplace. In the case of

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* Please note the distinction between ‘employment precarity’ and ‘employment precariousness’. The former refers to a general state of employment (i.e., underemployment or a lack of employment), while the latter refers to a form of employment (e.g., short-term work or unstable/inconsistent work hours).
NL FBBR plants (and in line with a knowledge–attitude–behaviour approach to establishing the degree of risk perception, as outlined above), a very important question concerns whether (and the extent to which) employees actually understand the risks associated with styrene exposure.

The impact of economic hardship and employment precariousness
The well-researched association between the degree of employee risk perception and subsequent protective behaviour tends to demonstrate that the relationships between employees’ perceptions of risk and what they do to protect themselves from occupational hazards can be quite complex. Multiple factors can play a role in whether employees who are given the tools and knowledge needed to perceive risk accurately actually protect themselves from occupational hazards. Such factors include economic hardship, organisational size, perceived enterprise stability and employment precariousness. For example, one study suggests that the relative economic circumstances of Hungarian and UK industrial radiographers had a significant impact on their perceptions of risk. Specifically, even though Hungarian radiographers experienced the same exposure risk as UK radiographers, their low pay and depressed economic situation seemed to translate into lower reported perceptions of radiation risk compared to their UK counterparts.

Similar studies have observed that while employees may acknowledge dangerous substances in their workplace, they underestimate or deny the risk associated with the chemicals in question. For example, a study of dry cleaners in the USA indicated that they voiced concerns about working with a probable carcinogen called ‘perchloroethylene’, although they tended to downplay the threat. In fact, many dry cleaners believed that stronger enforcement of regulations and new technology would be detrimental to small businesses.

Economic pressures are typical for many small businesses, particularly those competing in a global market or in an unstable and highly competitive local market. Such circumstances can have a significant impact on the health and safety perceptions and practices of workers. In fact, research suggests that smaller businesses have higher injury and fatality rates compared to larger organisations. Several explanations have been proposed for this, such as a tendency among employers in smaller organisations to place more of the responsibility for safety on workers, and that smaller organisations have less knowledge regarding occupational safety and health (OSH) regulations and procedures, more limited contact with OSH regulators, and don’t acknowledge the importance of government regulations in the workplace. These potential explanations for higher injury and fatality rates in small businesses have important implications in the present study, as many of the FBBR plants in NL are small enterprises.

Employment precariousness
Feelings of job insecurity have also been observed to be associated with low levels of safety knowledge, less self-reported safety compliance, and a greater likelihood of workplace injuries and accidents. Further, it has been proposed that precarious workers may be less likely to make workers’ compensation claims for injuries because of the potential negative consequences this may have for their employment status (eg losing their job or a cutback in their hours of work), or because they think that a claim will not result in coverage. In the case of the NL FBBR industry, the volatility of the ‘new’ deep-sea fishery has led to an uncertain demand for boat-building and repair. Consequently, after the number of registered FBBR plants peaked at 48 in 2000, many businesses closed due to financial difficulties, while those that remained in operation began to experience a great deal of economic strain. By 2004, there were 31 FBBR plants and this declined to 18 in 2006. This instability, coupled
with high competition for work and a non-unionised workforce, contributed to the precarious nature and status of the industry, as well as employment within the industry.

Community attachment and the assessment of risk
Current research has explored one’s connection to place as an interesting potential mediator of risk assessment (and subsequent protective behaviour). Studies have found that heightened place attachment and a sense of belonging may actually be associated with people’s willingness to remain in a hostile environment. Specifically, it has been suggested that a strong connection to one’s community may lead people to attenuate risk associated with a hazardous environment. Given that the majority of FBBR plants in NL operate in rural communities with a tendency for strong social connections, it may well be the case that the attachment to place that people have, and the desire to remain, may affect their willingness to acknowledge or tolerate risks in the workplace.

The present study
Using data collected for a larger research project about FBBR in NL, this study aims to explore perceived risk and safety behaviours reported by the employees of NL’s FBBR industry, as well as other organisational- and community-level factors that might serve to have an impact on risk perception and safety behaviour. The present study examined a variety of issues, including:

- the degree to which employees understand the effects of styrene exposure
- the potential health risks employees believe exist within their work environment and their judgments of workplace safety climate
- employees’ engagement in safety behaviour practices
- employees’ assessments of community status or economic viability
- the degree of employees’ community attachment
- employees’ feelings of employment precarity.

By investigating these various factors, we hoped to gain insight into the reasons why employees may tolerate, deny or minimise risk in their work environment.

Method

Key informant interviews to aid survey development
At the time of data collection, there were 17 FBBR plants on the island portion of the province of NL. Each plant was contacted to determine whether it was in operation and whether it manufactured fibreglass boats or repaired such boats (as opposed to aluminium or steel products). Three communities that had FBBR plants were visited in order to conduct key informant interviews with employers, workers and other members of the community. The aims of these interviews were two-fold: to explore perceptions of risk and safety behaviours and issues that might be associated with perceptions of risk and safety behaviour, in order to develop an appropriate survey for FBBR plant workers; and to assist in the interpretation of survey data. A total of 17 community members (14 males and 3 females) from the three communities participated in the interviews.*

* Please note that the primary focus of the current paper is to discuss findings associated with the employee survey. For detailed documentation on community selection, community participant recruitment, and qualitative findings, and a detailed description of survey development, see Wareham.
Survey development

Qualitative data resulting from the community visits were used to gain an initial understanding of the circumstances surrounding the boat-building industry and the individuals working in it. Interview data and insights from the literature were used to develop a survey that was distributed to boat-building plant employees.

A five-point Likert-type scale* was used for most sections in the survey, comprising:

1 = Strongly disagree
2 = Slightly agree
3 = Neither agree nor disagree
4 = Slightly agree
5 = Strongly agree.

In total (excluding demographic questions), the employee survey contained 183 items.

Description of scales included in the present study

For the purpose of the present study, seven scales (from an original 13) were selected for inclusion (items for each of the scales can be viewed in the tables that follow). Four scales represented:

- employee perceptions of safety climate (nine items)
- knowledge about the health effects of styrene (eight items)
- self-reported safety compliance (eight items)
- employee perceptions of health risk (eight items).

Scale items were largely derived from the qualitative interviews. However, with respect to the ‘self-reported safety compliance’ scale, two items were adapted from previous work,46 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?’.

The fifth scale, ‘perceptions of employment precarity’, contained six items and assessed how employees felt about their current employment situation. One item was adapted from Karasek’s Job Content Questionnaire,47 with minor wording changes: ‘I feel it is likely that I might lose my job in years to come.’ Five additional items were added based on interview data, eg ‘I fear not having a job’.

The sixth and seventh scales represented social circumstances that may affect employee beliefs, risk perception and behaviours. The ‘community status’ scale contained four items which together assess perceptions about community growth and sustainability, eg ‘Many people are leaving my community’. The ‘community attachment’ scale contained seven items and assessed the extent to which participants felt attached to their community. Four items in the ‘community attachment’ scale were adapted from Williams & Roggenbuck’s measure of place attachment,48 with minor wording changes: ‘My community means a lot

* A Likert-type scale, commonly used in attitude research, is an interval scale where the subject is asked to indicate the extent to which he or she agrees or disagrees with a number of statements.
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 during the qualitative component of this study,\(^4\) an additional component of the ‘community attachment’ scale included items related to community social bonding, which was captured using Kyle, Grafe & Manning’s social bonding scale.\(^6\) 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’.

Survey participant recruitment and procedure
A list of boat-building plants in Newfoundland was devised to determine the number of FBBR plants currently in operation. This list was developed using information from the Boat Builders Association of Newfoundland and Labrador website\(^1\) and the NL Yellow Pages. Given the small number of plants in operation at the time of the study, all 17 plants were selected to participate in the survey – a total of 14 agreed to take part. To ensure the greatest response rate possible, the investigator travelled to each of the 14 plants in Newfoundland to distribute the surveys. The investigator delivered surveys to each plant and went back approximately 24 hours later to collect the completed surveys.

Data analyses
The primary objectives of the study were to describe the perspectives of employees in an industry that (to the best of our knowledge) has never been investigated from the point of view of risk perception and safety behaviour. Given our objectives – and the fact that the number of respondents for many scale items was small and data distributions within each scale were typically skewed – we selected a non-parametric approach\(^1\) to the analysis of the survey data. Accordingly, a series of two-factor chi-square tests\(^2\) were conducted for each of the seven scales identified above to determine whether there were significant preferences for item response categories. All statistical testing was performed using SPSS (Statistical Package for the Social Sciences) 15.0 software.

Results
The participant response rate was quite high (80 per cent), with 43 out of 54 FBBR employees contacted – three (7 per cent) women and 40 (93 per cent) men – completing the instrument. The average age of participants was 41 (standard deviation (SD) = 9.13), with a range from 23 years to 62 years. The average length of time participants had worked in the industry was 11.8 years (SD = 7.06), with a range from one year to 30 years.

\(^*\) This means that when the scale was entered into the datafile, it read ‘I feel commitment to my community’. So, if a participant answered ‘1’ on the survey, it was entered into the datafile as ‘5’ (‘2’ was entered as ‘4’, ‘3’ as ‘3’ and so on). Negatively worded items, such as this, help control response bias.

\(^1\) A non-parametric approach is used where normal distribution of the data is not required. Non-parametric methods are also used when there are no population parameters.

\(^2\) Chi-square tests are non-parametric tests that determine whether the observed frequencies are significantly different than those we would expect to observe by chance. Like all non-parametric tests, the chi-square does not require a normal distribution of the data.
Scale 1 – Knowledge of the health effects of styrene
In terms of employee knowledge regarding the health effects of styrene, chi-square analyses revealed significant participant response preferences among all eight items on the scale (see Table 1). As indicated in the table, agreement (either ‘Slightly agree’ or ‘Strongly agree’) was evident for symptoms of eye irritation, skin irritation, lung problems and changes in mood. However, judging by the significant employee preferences for the ‘Neither agree/disagree’ category, many seemed unsure as to whether styrene caused aggression, depression, hearing loss or reduced colour vision.

Scale 2 – Perceptions of safety climate
Chi-square analyses were conducted for each of the nine items in the ‘perceptions of safety climate’ scale. As shown in Table 2, there was significantly greater preference for response options associated with three of the items.

In particular, the majority of participants (69 per cent) indicated that they were not worried about losing their job or being replaced if they brought up safety concerns in their workplace. Fifty-five per cent reported that safety issues are not kept under the table at their workplace. However, in terms of whether safety issues are seldom raised in the workplace, perceptions were split: 37.5 per cent demonstrated agreement, while 50 per cent indicated disagreement. For the remaining six items, the variability in responses suggests an absence of a dominant shared perception concerning safety climate among the workers.

<table>
<thead>
<tr>
<th>Excessive exposure to styrene is related to...</th>
<th>Percentage of respondents (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>reduced colour vision</td>
<td>13.5 (5)</td>
</tr>
<tr>
<td>hearing loss</td>
<td>10.8 (4)</td>
</tr>
<tr>
<td>changes in mood</td>
<td>5.3 (2)</td>
</tr>
<tr>
<td>depression</td>
<td>5.4 (2)</td>
</tr>
<tr>
<td>aggression</td>
<td>5.4 (2)</td>
</tr>
<tr>
<td>lung problems</td>
<td>10.5 (4)</td>
</tr>
<tr>
<td>causing skin irritation</td>
<td>5.0 (2)</td>
</tr>
<tr>
<td>causing eye irritation</td>
<td>12.5 (5)</td>
</tr>
</tbody>
</table>

* < .05  ** < .01

Table 1
Distribution of participant responses to the ‘knowledge of the health effects of styrene’ scale
Scale 3 – Employee perceptions of risk
One of the major objectives of this study was to determine if employees believed that there are health risks associated with styrene exposure. Chi-square analyses of the eight items revealed a significant preference for agreement on all items, suggesting that a significant

<table>
<thead>
<tr>
<th>Safety climate items</th>
<th>Percentage of respondents (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>When I ignore safety rules my supervisor reprimands me</td>
<td>16.7 (7)</td>
</tr>
<tr>
<td>The owner of this company takes health and safety very seriously</td>
<td>21.4 (9)</td>
</tr>
<tr>
<td>I worry about losing my job or being replaced if I bring up health and safety concerns</td>
<td><strong>50.0 (21)</strong></td>
</tr>
<tr>
<td>Management know employees take risks while they work but they are not bothered by it</td>
<td>16.7 (7)</td>
</tr>
<tr>
<td>Management will turn a blind eye to rules being broken to get the job done</td>
<td>28.6 (12)</td>
</tr>
<tr>
<td>Sometimes workers are afraid to turn down a job that they consider to be risky</td>
<td>22.0 (9)</td>
</tr>
<tr>
<td>People seldom raise safety issues at my workplace</td>
<td><strong>25.0 (10)</strong></td>
</tr>
<tr>
<td>Safety issues are kept under the table at my workplace</td>
<td><em>37.5 (15)</em></td>
</tr>
<tr>
<td>H&amp;S concerns are not more valued than production concerns at my workplace</td>
<td>17.5 (7)</td>
</tr>
</tbody>
</table>

* < .05  ** < .01
The majority of FBBR plant employees believed that styrene poses a threat to their health (see Table 3). For instance, participants acknowledged:

- not feeling safe using styrene (63.4 per cent agreement)
- that styrene is harmful based on their own experience of using it (81.2 per cent agreement)
- that it will make them sick (72.5 per cent agreement)
- that their plant is not a healthy place to work (70 per cent agreement).

<table>
<thead>
<tr>
<th>Perceptions of risk items</th>
<th>Percentage of respondents (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>I do not feel safe when working with styrene</td>
<td>4.9 (2)</td>
</tr>
<tr>
<td>I believe that styrene is harmful because of my own experience working here</td>
<td>0</td>
</tr>
<tr>
<td>I believe styrene is hazardous to my health because science says that is the case</td>
<td>5.0 (2)</td>
</tr>
<tr>
<td>The health risks of working with styrene are not low</td>
<td>0</td>
</tr>
<tr>
<td>I sometimes worry that working with styrene will make me sick</td>
<td>5.0 (2)</td>
</tr>
<tr>
<td>I worry that I may get sick in the future because I work with styrene</td>
<td>2.5 (1)</td>
</tr>
<tr>
<td>This is not a healthy place to work</td>
<td>12.5 (5)</td>
</tr>
<tr>
<td>I believe working with styrene poses a threat to my health</td>
<td>2.5 (1)</td>
</tr>
</tbody>
</table>

* < .05  ** < .01
Scale 4 – Employee self-reported safety compliance

When participants were asked to give an account of their own safety behaviour while in the workplace, chi-square analyses of the eight scale items revealed significant agreement for five (see Table 4).

As the table indicates, the majority of FBBR plant employees suggested that they tend to protect themselves in the workplace. Specifically, many acknowledged wearing their safety glasses when grinding, wearing protective gloves when working with styrene, and cleaning their respirator after every use. The majority of participants also indicated that they never ignore safety regulations when working with styrene.

<table>
<thead>
<tr>
<th>How often do you...</th>
<th>Percentage of respondents (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>use a respirator/mask when working with styrene?</td>
<td>0</td>
</tr>
<tr>
<td>wear safety glasses when grinding?</td>
<td>0</td>
</tr>
<tr>
<td>wear safety glasses when spraying?</td>
<td>21.1 (8)</td>
</tr>
<tr>
<td>wear protective gloves while you work with styrene?</td>
<td>5.0 (2)</td>
</tr>
<tr>
<td>have your work clothes cleaned/washed every day?</td>
<td>12.2 (5)</td>
</tr>
<tr>
<td>ignore safety rules and regulations at work when working with styrene?</td>
<td><strong>36.6 (15)</strong></td>
</tr>
<tr>
<td>take shortcuts in safety guidelines related to styrene use or handling in order to get the job done faster?</td>
<td><strong>36.6 (15)</strong></td>
</tr>
<tr>
<td>clean your respirator after every use?</td>
<td>7.3 (3)</td>
</tr>
</tbody>
</table>

* < .05  ** < .01
Interestingly, while 36.6 per cent of participants indicated that they never take shortcuts on safety guidelines related to styrene use or handling in order to get the job done faster, 39 per cent of participants indicated that they ‘sometimes’ take shortcuts in safety guidelines to get the job done faster. The remaining items, while not showing a statistically significant preference for a response option, seem to suggest that employee safety behaviour in the workplace (albeit, self-reported) is quite variable. This finding also appears to reflect an absence of a response bias among participants. That is, participants did not acquiesce to the safety behaviour items to appear in a favourable light, suggesting that the results may well reflect the reality of safety behaviours in these workplaces.

On a general note, participants who responded to the options in this particular scale other than ‘Always’ (or ‘Never’ for items six or and seven) are of the greatest concern from a practical viewpoint, as they have indicated that there are times when they do not employ proper safety procedures. That being said, it is quite likely that this is also the case for those who responded to the items using the extreme ends of the scale. Consequently, it is possible that those individuals who did not respond to the items using the most extreme end-points of the scale more accurately reflect the safety behaviours of the majority of boat-building plant employees.

Scale 5 – Community status
With respect to the scale assessing ‘community status’, chi-square analyses for each item revealed an agreement preference for all items, indicating that participants generally felt that the economic and social circumstances surrounding their community were cause for concern. As shown in Table 5, the majority suggested that their community was not growing (70.8 per cent agreement), and that many people were leaving (90.5 per cent agreement). Similarly, most felt that it is difficult to keep younger people in their community (95.3 per cent agreement), and many feared that their community would not survive (61.9 per cent agreement).

<table>
<thead>
<tr>
<th>Community status items</th>
<th>Percentage of respondents (n)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>My community is not growing</td>
<td>Strongly disagree</td>
<td>4.9</td>
<td>19.5</td>
<td>4.9</td>
<td>17.1</td>
</tr>
<tr>
<td></td>
<td>Slightly disagree</td>
<td></td>
<td></td>
<td></td>
<td><strong>53.7</strong></td>
</tr>
<tr>
<td>Many people are leaving my community</td>
<td>Strongly disagree</td>
<td>4.8</td>
<td>0</td>
<td>4.8</td>
<td>16.7</td>
</tr>
<tr>
<td></td>
<td>Slightly disagree</td>
<td></td>
<td></td>
<td></td>
<td><strong>73.8</strong></td>
</tr>
<tr>
<td>People fear that this community will not survive</td>
<td>Strongly disagree</td>
<td>9.5</td>
<td>9.5</td>
<td>19.0</td>
<td><strong>40.5</strong></td>
</tr>
<tr>
<td></td>
<td>Slightly disagree</td>
<td></td>
<td></td>
<td></td>
<td><strong>21.4</strong></td>
</tr>
<tr>
<td>It is difficult to keep young people in the community</td>
<td>Strongly disagree</td>
<td>4.8</td>
<td>0</td>
<td>0</td>
<td>16.7</td>
</tr>
<tr>
<td></td>
<td>Slightly disagree</td>
<td></td>
<td></td>
<td></td>
<td><strong>78.6</strong></td>
</tr>
</tbody>
</table>

* < .05  ** < .01
Scale 6 – Community attachment
An analysis of the ‘community attachment’ scale indicated a significant preference for agreement concerning participant attachment to their community (see Table 6).

For instance, the majority of participants reported that they were attached to their community (90.5 per cent agreement), and acknowledged a sense of identification (85.3 per cent agreement) and commitment (71.4 per cent agreement). It was also evident that participants had fond memories of living in their community (92.9 per cent agreement), felt a connection to the residents (92.9 per cent agreement), and a desire to have their children raised in their town (87.5 per cent agreement).

Scale 7 – Employment precarity
An analysis of the items designed to assess employment precarity indicated a significant preference for agreement concerning three of the six items (see Table 7). Specifically, the majority of participants felt that they might lose their job in the years to come (78.6 per cent agreement), and that the future of the company for which they worked was uncertain (82.5 per cent agreement). A majority also agreed that there were very few jobs available for them in their community (85.6 per cent agreement).

<table>
<thead>
<tr>
<th>Community attachment items</th>
<th>Percentage of respondents (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>My community means a lot to me</td>
<td>0</td>
</tr>
<tr>
<td>I am very attached to my community</td>
<td>0</td>
</tr>
<tr>
<td>I identify strongly with my community</td>
<td>2.4 (1)</td>
</tr>
<tr>
<td>I feel commitment to my community</td>
<td>0</td>
</tr>
<tr>
<td>I have a lot of fond memories in my community</td>
<td>2.4 (1)</td>
</tr>
<tr>
<td>I have a special connection to my community and the people living here</td>
<td>2.4 (1)</td>
</tr>
<tr>
<td>I want my children to grow up here</td>
<td>5.0 (2)</td>
</tr>
</tbody>
</table>

* < .05  ** < .01
Discussion
The observations of this study suggest that there are a number of factors that may contribute to employee perceptions of risk and safety behaviours. Based on the descriptive findings of this study, it would appear that despite the concerns of provincial health and safety regulators, most workers do believe that there are health risks associated with styrene exposure, and they are worried about its negative health impacts. Interestingly, however, we have also learned that, while most were aware of the acute health effects of styrene, they appeared to be unaware of the potential long-term effects of styrene exposure. Further, despite their concern regarding the health implications of working with styrene, workers reported that they do not consistently protect themselves from exposure and there appears to be variability among workers within and between workplaces concerning the safety climate in their workplace.

Of particular interest, we have learned that these workers have a strong attachment to their communities, in spite of economic hardship and employment precariousness. The majority of workers believe that there are few opportunities for employment in their community and they fear losing their job in the years to come. They also indicated that the future of the boatbuilding and repair plant in their community was uncertain; this is not surprising given that the number of FBBR plants on the island of Newfoundland sharply declined between 2000 and 2006, with approximately less than half of FBBR plants in operation in 2006, compared to peak operations in 2000.

<table>
<thead>
<tr>
<th>Perceptions of employment precarity items</th>
<th>Percentage of respondents (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel I might lose my job in the years to come</td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>I fear not having a job</td>
<td>11.9 (5)</td>
</tr>
<tr>
<td>I fear losing this job</td>
<td>14.6 (6)</td>
</tr>
<tr>
<td>I feel that the future of this company is uncertain</td>
<td>5.0 (2)</td>
</tr>
<tr>
<td>There are very few jobs available for me in my community</td>
<td>2.4 (1)</td>
</tr>
<tr>
<td>I feel like I have no other choice but to work at this job</td>
<td>17.1 (7)</td>
</tr>
</tbody>
</table>

* < .05  ** < .01
Might a strong connection to one’s community and to the people in it affect one’s willingness to tolerate risk in the workplace? The majority of survey participants indicated that:

- they felt their community was not growing
- the community was experiencing out-migration
- they feared for the survival of their community
- many of the younger community members were leaving – a rather bleak picture for rural NL.

Yet, despite the less-than-optimistic outlook on the viability of these communities, there is a great deal of fondness, appreciation and attachment to rural community life. Such community attachment can have beneficial outcomes for both communities and individuals. For example, close-knit communities can provide social support and other essential resources for community members. However, it is also the case, as previously mentioned, that community attachment may affect the extent to which people take risks in order to stay in their community.43,44

Previous research has found that when interview participants were asked why people would tolerate a work environment that poses a health risk, many of them suggested that employment precarity and connections to the community increase employees’ risk tolerance.45 In this study, it was suggested by an OSH representative that the pressing needs of employees (eg employment, financial security) override the long-term benefits of a healthy and safe workplace.45

Even though employees overwhelmingly agreed that their work environment poses a threat to their health, participants’ responses concerning their knowledge of the health effects of styrene are disconcerting. As mentioned above, it appears that for health effects that may have immediate outcomes, such as skin irritation, eye irritation, lung problems and mood changes, workers agree about the effects. For the remaining four items, which represented the longer-term health effects of styrene exposure, the response preference among workers was ‘Neither agree/disagree’. Such a finding may be interpreted as evidence of workers’ lack of knowledge about these health effects; and/or workers relying on their own experiences with styrene as a means to demonstrate their knowledge of the health effects of styrene (as indicated in the item ‘I know styrene is harmful to my health because of my own experience working with it’). It may also be the case, however, that workers do not acknowledge these health effects because they may take longer to develop and thus may not have been experienced by all of the workers. In either case, it is clear from the survey responses that workers require additional information concerning the health effects of styrene. It is, for obvious reasons, not wise for workers to learn about the adverse health effects of styrene through their own experiences. When this happens, the negative effects may be irreversible by the time they become aware of the problem.

Employees who lack information concerning the health effects of styrene may be less likely to engage in appropriate safety-related behaviours. A great deal of research suggests that a positive safety climate is extremely important with respect to employee safety behaviours in the workplace,46–54 and the transfer of knowledge to employees concerning health risk is important for establishing or improving perceptions of risk.30–32 The variability in participant responses among FBBR workers concerning the safety climate in their workplace suggests an absence of a dominant shared perception regarding workplace policies and procedures among workers. It is possible that policies and regulations are not being implemented in some plants but are maintained in others, contributing to differences among workplaces with respect to safety climate. Unfortunately, due to the small number of workers associated with several of the FBBR plants in this study, a comparison of such safety climate differences across plants was not possible. However, it may also be the case that managers are failing to communicate to
employees the standards of workplace safety that their organisation should be striving for, and that employees may be failing to communicate to managers that their working environment should be safer than they perceive it to be. An analysis of differences in workplace perceptions among managers and employees within the NL boat-building industry is currently underway. Such findings could provide information and recommendations for effective communication between managers and employees and, consequently, may lead to a safer working environment.

Certainly, a limitation of this study is that it does not establish cause-and-effect relationships between the variables of interest. However, the objective of this study was to describe, to the best of our ability, the social, economic and organisational circumstances surrounding this group of workers and their potential relationship to risk perception. Unfortunately, a small sample size and skewed distribution of numerous survey items violated the assumptions of parametric statistical testing. That being said, through the use of non-parametric statistical tests, an initial understanding concerning the lives of these workers begins to take shape. More specifically, the findings of this study suggest that investigating the extent to which social and cultural connections have an effect on risk-taking behaviours, such as those behaviours related to workplace safety, is pertinent. Understanding employee behaviour requires an exploration of all aspects of an individual’s life, including the social, cultural, cognitive and psychological. Many studies with the objective of studying safety behaviours have largely, or exclusively, focused on the organisation as the context for safety behaviour, safety motivation and safety outcomes. However, employees cannot be studied in isolation. For employees, the motivations for their behaviour (or lack thereof) may extend beyond the boundaries of their workplace. Indeed, recent studies have suggested that social influence in the form of spousal beliefs and parental risk may have an effect on employee safety behaviour.55,56 Thus, it is not a stretch to hypothesise that a social factor, such as community attachment, may affect employees’ safety behaviour and/or their willingness to tolerate health risks in the workplace.

Furthermore, it is well established that employment precarity (with small businesses as a prime example) has negative consequences for employee health.38–40,57,58 Consequently, the compounding effect of employment precarity and employee community attachment may have serious consequences for employee health. This association requires further exploration, although to do so, a larger sample size would be needed to carry out parametric tests, which could provide a more detailed account of the relationships between the variables, such as worker beliefs, behaviours, and social and economic circumstances.

Conclusion
This study has provided insight into employee safety, not only through the replication of findings from previous works, but by revealing novel areas of interest requiring further exploration, namely the importance of community vulnerability and community attachment to perceptions of risk and safety behaviour. Future research must consider the potential effects of social, cultural and economic factors, such as community attachment and community vulnerability, when attempting to understand attitudes and behaviours of individuals and/or groups. The organisation (ie, the workplace) creates a unique social environment for the worker, eliciting certain attitudes, behaviours, and perceptions of risk. However, this is not the only social environment in which workers are exposed and interact. The social environment beyond the workplace (eg community interactions, family life) appears to contribute to worker attitudes, behaviours and perceptions of risk. An in-depth exploration of the effects of social environments extending beyond the workplace should be considered in future research aimed at understanding employee safety behaviour and perceptions of risk.
Acknowledgments
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