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Young worker safety behaviors: Development and validation of measures

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ABSTRACT

We conducted four studies to develop and validate measures of workplace safety-related behaviors relevant to young workers. The conceptual basis for this set of measures is a range of behavioral responses to deteriorating conditions (e.g., exit, voice, and loyalty, Hirschman, 1970; exit, voice, loyalty/patience, and neglect, Rusbult et al., 1982). In Study 1, items were generated by young workers ($n = 39$) who participated in focus groups. The representativeness of these items was judged in Study 2 by a separate sample of young workers ($n = 79$). In Study 3, we found support for five factors using exploratory factor analysis with a sample of young workers ($n = 266$). Confirmatory factor analysis was conducted in Study 4 using a separate sample ($n = 282$) and this supported the five-factor model. Self-report data on these participants and other-report (co-worker) data on a sub-sample ($n = 26$) of the same participants provided additional support for the validity of the scales. Overall, these studies support the validity and reliability of this set of safety-related behaviors: intentions to quit an unsafe job (exit), speaking out about safety concerns (voice), adapting to a dangerous job hoping that safety conditions improve (patience), deliberately letting safety conditions worsen (neglect), and following safety policies (compliance). This set is useful for evaluating safety interventions aimed at young workers and studying safety-related behavior in a vulnerable work population.

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1. Introduction

Young workers, defined as workers aged 15–24 years of age, typically work temporary, part-time, low wage, non-unionized jobs in the service sector (Barling and Kelloway, 1999; Galarneau, 2005; Marshall, 2007; Usalca, 2005), and in terms of safety are at a greater risk of workplace injury than older workers (Loughlin and Frone, 2004; Salminen, 2004).

Understanding how young workers respond to hazardous work is vital to injury prevention. In the face of hazardous conditions, workers may comply with pressure from managers or co-workers to perform their jobs. Alternatively, they may prefer to make suggestions about how to improve safety, or they may choose to remain silent and hope they avoid getting injured on the job. Finally, workers may opt to quit unsafe jobs and search for a new employer who offers better working conditions.

This paper describes the development and validation of ecologically valid measures of young worker responses to hazardous work. Age-appropriate measures of safety behavior are warranted for

three reasons. First, despite ongoing efforts to understand and prevent workplace injuries among young workers, stakeholders know little about how this vulnerable group responds to poor quality working conditions. Reliable and valid measures of young worker safety behavior would be useful for evaluating the efficacy of safety interventions that target this group and understanding the range of behavioral responses. Second, existing typologies of safety-related work behavior measures may not capture the range of safe and unsafe behaviors relevant to this population. For example, a variety of measures classify safety behavior as broadly compliant (e.g., “I use the correct personal protective equipment for the task I am doing”) or participative (e.g., “I often take part in development of the safety requirements for my job”) (e.g., Griffin and Neal, 2000). While this distinction is useful (Burke et al., 2002) and widely adopted in safety research among adult workers, we argue that it may under represent the domains of change-oriented, compliant, self-protective, and unsafe work behaviors that characterise the work experience of young workers.

Third and finally, some current measures may not be appropriate for young workers given the nature of their frontline jobs. Young workers are less likely than older workers to have access to mechanisms for raising workplace concerns, such as a formal grievance process through a trade union (Mayhew and Quinlan, 2002). Hofmann et al.'s (2003) four-item measure of safety voice includes behaviors (e.g., “expressing opinions on safety matters

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even if others disagree”) that younger workers may be reluctant to engage in given both their organizational status and beliefs about not being taken seriously by managers and supervisors (Breslin et al., 2007a). The current measures are grounded in the types of experiences younger workers are likely to face at work.

2. The exit, voice, loyalty, and neglect (EVLN) model

A useful yet under-used framework for understanding worker safety behavior is the exit, voice, loyalty, and neglect (EVLN) model based largely on the work of Hirschman (1970). Hirschman proposed that *exit* and *voice* are two primary responses to deteriorating conditions. He defined *exit* as a “clean” and “once-and-for-all break” (Hirschman, 1992, p. 84), whereas he defined *voice* “as any attempt at all to change, rather than to escape from, an objectionable state of affairs” (Hirschman, 1970, p. 30). Acting on their own, reasoned Hirschman, exit or voice can have “an attention-focusing effect” (p. 45) because they can alert organizational agents and external authorities to problems.

Additional responses, namely neglect and loyalty, were later incorporated into an expanded model (i.e., the EVLN model) by Rusbult et al. (1982) first in the domain of romantic relationships and then work relationships (Rusbult and Lowery, 1985). The concept of *loyalty* was conceptualized as a behavioral response to decline (defined as sticking with a relationship or organization when the going gets tough). Further, *neglect* represents behavior of individuals who give up trying to turn things around. In the current research, we interpreted loyalty as *patience* (defined as sticking quietly by one’s job through good and bad times, Leck and Saunders, 1992, p. 225). As signaling devices, exit and voice increase the likelihood that recovery efforts will be undertaken, whereas neglect and patience may maintain the status quo or facilitate further deterioration.

Despite calls for narrower definitions and facet-specific operationalizations of such constructs (Van Dyne et al., 2003; Withey and Cooper, 1989), the EVLN model has remained generic with regard to the referent organizational problem. While the EVLN model has practical appeal for studying workplace safety behavior, it has been sparsely applied to the issue and, more generally, to non-adult samples. We found 17 studies in the workplace safety literature that drew on Hirschman’s ideas about exit and voice; none of these studies systematically tested the EVLN model. Safety-related research using the EVLN framework has mostly examined exit and voice facets of Hirschman’s (1970) model (e.g., Barling et al., 2003; Cree and Kelloway, 1997). While there is limited support for using parts of the EVLN framework in the workplace safety domain, the constructs have not been consistently defined nor have they been applied to young worker samples. In the next section, we define each of the related constructs in the domain of occupational safety.

2.1. Exit

Hirschman (1992) described exit as an “impersonal” feedback mechanism to decline because, unlike voice, leaving does not involve a “face-to-face confrontation” with the management (p. 16). Two approaches have been used to study exit in the EVLN literature. The first involves operationalizing exit as actual quits. However, given that it can often take months or years for an unhappy employee to leave an unpleasant situation, researchers have tended to use turnover intentions as a proxy.²

Exit as a response to declining workplace safety is an act of escaping a dangerous situation. Growing dissatisfaction with one’s

surroundings can lead to temporary absences (e.g., leaving work early), increasing intentions to leave, or permanent exit. From a construct validity perspective, the difficulty with temporary exits is that they resemble acts of voice or possibly neglect, concepts which are discussed below. To avoid this problem, we focus in this study on turnover intentions and actual job search behavior among young workers, rather than attitudes towards leaving work for explicitly safety-based reasons.

2.2. Voice

Hirschman (1970) broadly defined voice as any effort to “change, rather than escape from, an objectionable state of affairs” (p. 30). He noted that, compared to exit, voice was a far more “messy” concept because “it can be graduated, all the way from faint grumbling to violent protest; it implies articulation of one’s critical opinions rather than a private, ‘secret’ vote” to leave (p. 16). For these reasons, voice is potentially politically dangerous, which explains why workers are sometimes hesitant to use it (Detert and Edmondson, 2007).

Voice in the context of safety would ideally motivate action to make work-related situations, procedures, and processes safer. Safety voice may include actions such as: raising safety concerns with a manager or union steward (e.g., Mullen, 2005), speaking before a safety committee (e.g., Eaton and Nocerino, 2000), reporting dangerous working conditions to government officials (e.g., Gray, 2009), and participation in safety programs (Cree and Kelloway, 1997). However, barriers to these actions, such as supervisory indifference and the shortage of alternative employment, may limit their use (Gray, 2002; Robinson, 1991).

Safety voice may manifest in different ways and be directed to different targets. A study by Walters and Haines (1988) found that when workers raise safety concerns, they most often raise them with a supervisor (42%), followed by their co-workers (16%), and with a safety representative (7%). Further, Freeman and Rogers (2006) found that 53% preferred to solve health and safety problems with the help of others versus 36% who prefer acting alone.

Based on these patterns, Tucker et al. (2008) conceptualized safety voice as (a) any action motivated towards improving safety, (b) flowing through formal and informal channels, and (c) directed towards internal and external targets (e.g., supervisors/managers, government officials). Further, safety voice may be collective or individual in nature. Safety voice shares similarities with general employee voice (e.g., LePine and Van Dyne, 2001) and safety participation (e.g., Neal et al., 2000); however, with safety voice, personal and co-worker safety is at the fore versus instead of merely complying with prevailing managerial agendas for safety (e.g., attendance at safety training sessions) or obeying safety rules and regulations.

2.3. Patience

What workers do when they are not contemplating exit or speaking up about concerns is of practical importance; however, it has mostly escaped conceptual and empirical scrutiny in EVLN literatures.³ Rusbult and Lowery (1985) proposed that employees exercise loyalty. The central problem with loyalty is that it has been difficult to define and measure (Minton, 1992), and thus it may not adequately define what employees do when they ‘wait’ for things to get better.

Leck and Saunders (1992) proposed that employees exercise *patience* in most situations, which they defined as sticking with an organization through good times and bad. We believe that the con-

² We thank Bill Cooper for an interesting discussion of this idea.

³ We thank Bill Cooper and the students in Commerce 451 for a thought-provoking discussion of this question. The ideas that are discussed here belong to the class.

cept of patience has merit and can represent a somewhat elusive safety-related behavioral response category.

In a safety context, we propose that patience can have both passive and active manifestations. It can be seemingly passive insofar as it can lead to self-protection and adaptation under hazardous conditions without resorting to voice or exit. In contrast, patience may engender actions that subtly and indirectly support change (e.g., agreeing with a co-worker that a hazard needs to be addressed).

2.4. Neglect

Rusbult et al. (1982) defined neglect as “passively allowing a relationship to atrophy” (p. 1231). In a work setting, neglect is interpreted as putting in less effort, lateness, and letting things fall apart (e.g., Withey and Cooper, 1989). When neglect is considered in safety research, passive safety leadership from supervisors (e.g., Kelloway et al., 2006) and unsafe employee behavior (e.g., Hofmann and Stetzer, 1996) have been the focus. Given that most young workers have non-supervisory roles, here we define neglect as unsafe behavior by frontline employees. Existing measures of unsafe behavior relate to how often workers ignore safety regulations and procedures, or put others at risk (e.g., Hofmann and Stetzer, 1996; Seo, 2005), but are often developed in relation to a particular plant or occupational group.

Safety neglect can also be understood as being in opposition to safety compliance, which is broadly defined as “the core safety activities that need to be carried out by individuals to maintain workplace safety” (Griffin and Neal, 2000: 349). Drawing on these streams of research – unsafe employee behavior and safety compliance – the domain of safety-related neglect includes employee behaviors such as: non-compliance with safety rules and procedures (e.g., Hofmann and Stetzer, 1996), not reporting observed hazards or injuries (e.g., Probst et al., 2008; Probst and Estrada, 2010), and any other behavior that undermines the upkeep of occupational safety.

3. The present studies

We followed established scale development procedures to develop short and ecologically valid measures for general exit, safety-related voice, safety-related patience, and safety-related neglect (EVPN). Withey and Cooper (1989, 1992) recommended using an act frequency approach (AFA) (Buss and Craik, 1983) for developing EVLN scales. The primary advantage of the AFA is that it identifies prototypical behaviors associated with a construct.

In practice, Buss and Craik's (1983) AFA for scale development has involved four steps (e.g., Mahaffey et al., 1991). First, items for the target constructs are generated by lay people. In contrast, measurement development studies often rely on experts to generate an initial list of items. Second, the prototypically (i.e., representativeness) of the items is assessed vis-à-vis the focal construct (Ivcevic, 2007). Less representative items are eliminated (Buss and Craik, 1983). Third, participants report how frequently they engage in the prototypical acts. Fourth, a card-sorting task is generally used for testing dimensionality of the factors (e.g., Mahaffey et al., 1991). We followed the first two steps and added additional steps for testing the dimensionality of the scales using exploratory and confirmatory factor analyses (e.g., Bennett and Robinson, 2000; DeVellis, 2003) and convergent and discriminant validity.

Specifically, Study 1 used focus group participants ($n=39$) to generate items for these measures. In Study 2, participants ($n=79$) rated how representative each of the nominated EVPN acts was of the related construct. In Study 3, a larger sample ($n=266$) reported how frequently they engaged in the 10 most descriptive EVPN acts.

We explored the factor structure using exploratory factor analysis and eliminated inadequate items. Finally, in Study 4, confirmatory factor analysis was conducted using a separate sample ($n=282$). Support for the validity of the measures was also present, partially by analyzing data from a sub-sample of co-workers ($n=26$) who provided third-party reports on these behaviors.

4. Study 1: item generation

4.1. Sample

Eight focus groups with 39 employed or recently employed participants aged 15–18 years (49% female) were used to generate examples of EVPN behaviors. The average participant age was 16.56 years ($SD=.94$). Participants (85% employed) reported working their main job an average of 6.67 months ($SD=8.51$) and 11–20 h per week (mode). Most participants worked in restaurants (44%) and grocery or convenience stores (35%).

4.2. Procedure

Participants received \$50 (Canadian) for participating in a 2-h focus group interview. The interviews discussed several aspects of young worker safety behavior. The study was advertised in different ways to attract a diverse sample (e.g., notices and flyers distributed at a youth employment centre, a job training centre, to staff at a university who indicated they had an eligible child). Participants below the age of 18 years were asked to provide written parental consent.

We provided focus group participants with a definition for each EVPN construct and asked them to think about behaviors they or their co-workers have used that fit each definition. The definitions of each construct were informed by definitions from significant works (e.g., Hirschman, 1970; Rusbult et al., 1982; Leck and Saunders, 1992) and adapted in consultation with two researchers who have conducted extensive research in this area. With the exception of exit, we developed safety-specific definitions for the constructs. We defined exit generically because we assumed that exit acts do not differ based on one's motivation for leaving a job (e.g., abusive supervision versus deteriorating safety). Specifically, we defined *exit* as actions that workers use before they quit a job; *safety voice* as actions that workers take when they try to improve workplace safety; *safety patience* as actions that workers use when they wait for workplace safety to improve; and *safety neglect* as actions that workers use when they stop caring about workplace safety.

4.3. Results

The total number of nominated acts generated by participants was 67, 69, 25, and 51 for exit, voice, patience, and neglect, respectively. The process yielded four findings worth noting. First, the greatest numbers of items were suggested for exit and voice. Second, in terms of voice, young workers directed safety voice both upward to supervisors and owners, as well as horizontally to their co-workers. Many participants said they try to address concerns through co-workers and informal channels. Third, formal work refusals were not an everyday form of voice. Fourth, participants had difficulty suggesting safety patience behaviors but acknowledged that the category was meaningful to their everyday work experience and indeed their first response when they have safety concerns.

The next step involved eliminating redundant items and revising item wording to improve interpretation. First, we deleted items that were entirely overlapping with other items (e.g., “Get a group to address the problem” overlaps with “Talk to co-workers about

taking action together to fix safety problems”). Next, a research group consisting of six graduate students and a senior faculty member evaluated the surviving items and eliminated redundant and vaguely worded items. Finally, a research assistant helped us in reviewing the remaining items and, where necessary, we revised grammar and comprehension.

4.4. Discussion

In this study, participants generated and refined measurement items for general exit intentions, safety-related voice, patience, and neglect. The total number of unique acts was 43, 35, 18, and 27, respectively. These items served as the basis for winnowing the scales in Study 2.

5. Study 2: identifying representative items

The purpose of Study 2 was to identify exemplar EVPN acts from the lists of items generated in Study 1. We asked a separate sample to rate how descriptive each EVPN item was of the related focal construct. The 10 items for each construct with the highest average score (i.e., the most representative) formed preliminary scales.

5.1. Sample

Ninety-three teenagers participated in the study. Fourteen respondents aged 14 and 15 years who did not provide parental consent were removed from the data set. The remaining participants (*M* age = 17.12 years, *SD* = 1.06, 49% female) had had paid work in agriculture (45%), restaurants (32%), construction (30%), grocery or convenience store (23%), gas station/garage (21%), and other (e.g., retail).

5.2. Procedure

Participants completed an on-line survey. Approximately 40% of participants completed the survey in a high school class during regular school hours. The remaining participants were recruited in university and college cafeterias. The study incentive was a movie ticket (approximate value \$8 Canadian).

Participants were asked to read a definition of the focal construct (e.g., voice) and then rate how descriptive each of the related nominated acts was of the corresponding construct on a 5-point Likert scale ranging from 1 (*not descriptive*) to 5 (*very descriptive*). This exercise provided support for the content (face) validity of the items.

Two versions of the survey were created to minimize potential effects of participant fatigue. In one version, the sections were ordered as voice, patience, neglect, and exit. For the other survey, the categories were ordered neglect, voice, patience, and exit. Further, to rule out item-ordering effects within each section, the items were randomized. Last, and consistent with previous AFA-based studies (e.g., Mahaffey et al., 1991), we included one (non-sensical) dummy item in each section to assess whether participants understood the meaning of the related construct, and predicted that this item would receive a lower score than the others on the extent to which it corresponded with the focal construct.

5.2.1. Phase 1: descriptiveness of EVPN acts

Average scores were computed for each of the nominated EVPN acts and ranked from highest to lowest. These results are shown in Tables 1–4.

With the exception of the dummy act among the exit items (ranked 40th out of 44), all of these dummy acts ranked last in

Table 1
Exit rankings.

Rank	Exit acts	Mean score
1	Give two weeks notice to the supervisor (e)	3.67
2	Think about how to tell the boss you're leaving the job (e)	3.57
3	Apply for other jobs (e)	3.54
4	Tell parents that you're thinking about quitting the job (e)	3.41
5	Tell co-workers that you're thinking about quitting the job (e)	3.37
6	Give resignation letter to the supervisor (e)	3.36
7	Say good-bye to co-workers (e)	3.35
8	Look for a new job in the newspaper or on a job posting website (e)	3.30
9	Tell girlfriend/boyfriend that you're going to quit (e)	3.29
10	Ask the boss for a letter of reference	3.28
11	Tell non-work friends that you're going to quit (e)	3.27
12	Train the co-worker who will replace you	3.26
13	Think about quitting the job	3.20
14	Threaten to leave if concerns aren't addressed	3.20
15	Speed up working to get out faster	3.11
16	Tell the boss what you really think of the job	3.03
17	Call in sick when you're not ill	3.00
18	Ask a co-worker to finish tasks you don't like doing	3.00
19	Look into workers rights and take legal action against the employer	2.99
20	Take time off to avoid hazardous working conditions	2.94
21	Stop caring about the job	2.93
22	Put in less effort on the job	2.90
23	Talk badly about the business to non-work friends	2.84
24	Not show up for shifts after giving notice	2.77
25	Be late for work	2.76
26	Start refusing to do some work tasks	2.76
27	Don't do the job right	2.75
28	Brag to co-workers about other jobs you're applying for	2.73
29	Stop going to work	2.71
30	Express a negative attitude towards co-workers	2.67
31	Make a mess at work	2.67
32	Leave work shifts early	2.64
33	Have a party before you leave the job	2.64
34	Swear at the supervisor	2.61
35	Come to work high on drugs	2.61
36	Ask the supervisor to fire you	2.59
37	Yell at people you don't like at work	2.59
38	Be rude to customers	2.58
39	Walk out during a shift	2.57
40	Stay at the job at all costs	2.55*
41	Come to work drunk	2.53
42	'Streaking' (taking clothes off) at work	2.47
43	Vandalize company property	2.46
44	Steal from the employer	2.40

Notes: (e) denotes exit items tested in Study 3.

* Dummy act.

their respective categories, as predicted. This suggests that participants were able to differentiate among the various behaviors and nonsensical items.

5.2.2. Phase 2: reviewing the items

The 10 most descriptive items for each category were reviewed for inclusion in a preliminary scale. We eliminated one neglect item that was not an example of employee safety neglect, but rather organizational safety neglect (“Don't keep proper first aid supplies on the job site”). We examined the voice items and it appeared that the category was comprised of both change-oriented behavior (i.e., safety voice) and, consistent with the definition of voice

Table 2
Safety voice rankings.

Rank	Safety voice acts	Mean score
1	Read instructions before using chemical substances (c)	3.96
2	Be careful when operating or maintaining potentially dangerous equipment (c)	3.85
3	Show co-workers how to do tasks safely (c)	3.82
4	Tell the supervisor about hazardous work (v)	3.76
5	Keep the work area clean (c)	3.76
6	Speak to co-workers at risk and encourage them to fix the safety problem (v)	3.73
7	Ask for assistance when unsure about how to do a task safely (v)	3.72
8	Wear protective clothing/equipment (c)	3.71
9	Check that equipment is working properly before using it (c)	3.68
10	Tell the co-worker with the most seniority about the safety problem	3.68
11	Tell the supervisor about the consequences of dangerous working conditions (v)	3.67
12	Ask the supervisor for protective wear/equipment (v)	3.66
13	Remind co-workers to take precautions (v)	3.65
14	Attend safety training sessions (c)	3.61
15	Call a government health or safety inspector about safety concerns (v)	3.56
16	Group together with co-workers and take safety concerns to the supervisor (v)	3.56
17	Talk to the owner about safety concerns (v)	3.55
18	Stop working until the safety problems are fixed	3.54
19	Talk to a union representative ("union steward") about the safety problem (v)	3.53
20	Write a letter/email to the supervisor about safety concerns	3.49
21	Talk to co-workers about taking action together to fix safety problems	3.49
22	Tell the supervisor that you will not do dangerous tasks	3.43
23	Remind co-workers about their unsafe behaviors	3.42
24	Participate in a "sit-in" (a work stoppage) with co-workers until the safety problems are fixed	3.39
25	Buy your own protective equipment	3.38
26	Tell a customer about safety concerns	3.37
27	Improve safety communication with the supervisor	3.37
28	Ask co-workers how long the safety problem has existed	3.35
29	Write a letter/email to the owner about safety concerns	3.33
30	Talk to a parent about safety concerns	3.30
31	Tell co-workers that you will not do dangerous tasks	3.27
32	Talk to co-workers about unionizing because of safety problems	3.27
33	Put a complaint about safety concerns in a suggestion box	3.22
34	Ask a co-worker or supervisor to do the task that you feel is dangerous	3.04
35	Ask someone else to take action to fix the safety problem	2.89
36	Stop going to work*	2.38*

Notes: (v) denotes voice items tested in Study 3. (c) denotes compliance items tested in Study 3.

* Dummy act.

presented to the focus group participants, improvement-oriented actions that are usually related to following safety rules (i.e., safety compliance). Both authors independently coded the voice items as either safety voice or safety compliance (95% agreement between two raters). Any disagreements were resolved by discussion. Seven out of the list of 35 voice behaviors were classified as safety compliance.

Table 3
Safety patience rankings.

Rank	Safety patience acts	Mean score
1	Find a way to protect yourself from being hurt at work (p)	3.59
2	Avoid dangerous tasks (p)	3.45
3	Find a way to help co-workers protect themselves from being hurt at work (p)	3.32
4	Make a complaint about safety problems and hope the situation improves (p)	3.18
5	Wait to see if promised changes are actually made to improve safety (p)	3.16
6	Become indifferent to the dangerous working conditions (p)	3.12
7	Adapt to safety conditions until the situation improves (p)	3.11
8	Discuss the safety problems with co-workers and wait for things to change (p)	3.07
9	Talk to co-workers about safety problems while not communicating solutions to the supervisor (p)	2.96
10	Accept safety conditions the way they are	2.94
11	Wait for someone else to take action to fix safety problems	2.93
12	Keep comments about safety problems to yourself	2.92
13	Avoid talking about hazards that don't affect you	2.90
14	Get frustrated with safety conditions (p)	2.89
15	Hope that someone else raises the safety issue	2.86
16	Wait for someone else to notice safety problems	2.85
17	Wait to be asked for suggestions for how to fix safety problems	2.84
18	Fix the safety problems yourself	2.84
19	Quit the job	2.41*

Notes: (p) denotes patience items tested in Study 3.

* Dummy act.

5.3. Discussion

Overall, these results provide support for the face validity and representativeness of the measures. First, the non-sensical items were ranked lowest by participants. Second, young workers judged acts that were directly related to leaving a job (e.g., "Think about how to tell the boss you're leaving the job" – ranked 2nd) as more descriptive of turnover intentions compared to acts that are more likely related to organizational deviance ("Talk badly about the business to non-work friends" – ranked 23rd). Third, there was evidence of age-specific acts (e.g., "Tell parents that you're thinking about quitting the job"). In terms of voice, participants ranked informal and less risky forms of voice (e.g., "Remind co-workers to take precautions") as more descriptive than acts that may have been interpreted as escalating and therefore riskier action (e.g., "Tell co-workers that you will not do dangerous tasks").

This study also has limitations. To determine which items to include in the next study (Study 3), we selected the 10 top ranking items within each category based on data provided by all Study 2 participants. However, after the data collection for Study 3 was already in process, we realized that our Study 2 data included several participants for whom parental/guardian consent had not and could not be received post-hoc.⁴ As a result, we removed these cases from the analyses we report here (e.g., Tables 1–4). The removal of

⁴ In our instructions to high school teachers, we stated that only 16- to 19-year olds should be surveyed. Some classes had one, two, or three 15-year olds and some teachers were unaware of this. The nature of the high school survey (i.e., anonymous) made it impossible to obtain post-hoc parental consent.

Table 4
Safety neglect rankings.

Rank	Safety neglect items	Mean score
1	Ignore safety problems altogether (n)	3.60
2	Don't keep proper first aid supplies on the job site	3.53
3	Don't give new employees proper safety training (n)	3.51
4	Show new workers short cuts that could threaten their safety (n)	3.47
5	Don't warn co-workers of potential dangers (n)	3.47
6	Give new employees dangerous tasks (n)	3.45
7	Take short cuts that threaten personal safety (n)	3.43
8	Ignore warnings about hazards (n)	3.41
9	Get in the habit of not working safely (n)	3.41
10	Don't tell the supervisor about hazards (n)	3.38
11	Avoid wearing proper protective clothing/equipment	3.35
12	Stop following health and safety policies (n)	3.33
13	Leave unfinished tasks that could lead to injury	3.32
14	Compromise safety for the sake of production	3.28
15	Deny breaks to co-workers when they are tired	3.26
16	Wait for others to do something about safety problems	3.25
17	Don't listen to safety messages	3.25
18	Give working safely a low priority	3.23
19	Use work tools inappropriately	3.23
20	Stop adhering to quality control when in a rush	3.22
21	Avoid taking blame for safety problems	3.22
22	Get lazy and don't pick things up	3.19
23	Do a 'half-assed' job	3.18
24	Don't report injuries to the supervisor	3.13
25	Avoid cleaning up the work area	3.12
26	"Horse around" on the job	3.12
27	Make fun of safety rules	2.94
28	Make constructive suggestions to improve safety practices	2.63*

Notes: (n) denotes neglect items tested in Study 3.

* Dummy act.

these cases resulted in slight variation in the item ratings which led to changes in the item rankings around the cut-off that was used (i.e., top 10 items in each category). As a result, there are one or two items that are among the top 10 in each category in Tables 1–4 that were not included in Study 3 because they ranked just outside of the top 10 in our original analyses.

6. Study 3: scale refinement

In Study 3, we refined the preliminary scales by examining the relative frequency that young workers engage in the behaviors and conducting exploratory factor analysis. This process empirically assesses the dimensionality of the measures and ensures that each item reflects its intended construct. We also assessed the convergent validity of the safety voice measure, a key measure in Hirschman's (1970) typology of behaviors.

6.1. Sample

A total of 309 people participated, of which 266 (86%) indicated working in the previous year and were between 15 and 24 years of age (M age = 19.04 years, SD = 1.86 years, 49% female). Participants primarily worked in restaurants (18%), retail (16%), office or call centres (14%), and grocery or convenience stores (11%).

6.2. Procedure

The sample was comprised of three groups of participants. First, students from two high school classes were invited to participate in the study ($n = 40$). Second, the survey was advertised to students in college and university cafeterias and residences ($n = 130$). As an incentive, participants in these groups received a movie ticket. The third group was second-year university students in the required age range who completed the survey for course credit ($n = 139$).

Participants received an email with a link to an on-line survey. The survey asked how frequently they engaged in the 10 most representative EVPN behaviors at work in the previous year. Responses ranged from 1 (*almost never*) to 5 (*almost always*). To test the convergent validity of safety voice, we included Hofmann et al.'s (2003) four-item measure of safety voice developed with adult workers.

6.2.1. Phase 1: item selection process

First, we reviewed item means, item variances, and corrected inter-item total correlations. With the exception of neglect questions, items with means below 2.0, variances below 1.5, or item total correlations below .3 were discarded. Given that low occurrence and social desirability may depress self-reported neglect behaviors, a more liberal rule was used for these items. Neglect items with means and variances below 1.0 were eliminated. Overall, this process resulted in the elimination of two voice, two patience, four neglect, and four compliance items.

Next, communality was assessed. The average score was .56, meaning that 56% of variance is explained by the extracted factors. Individual communalities were also inspected (range was .22 to .79) and those below .3 were discarded. This resulted in one exit item being removed. Finally, the KMO statistic was calculated to determine if factor analysis was appropriate. The average score (.89) and range were acceptable (.74 to .96) (Hutcheson and Sofroniou, 1999).

6.2.2. Phase 2: exploratory factor analysis

Principal axis factor analysis was conducted with oblimin rotation using SPSS 16.0. This approach is recommended (over components analysis) when the purpose is to identify theoretically meaningful dimensions and there is an expectation that the rotated factors correlate (Fabrigar et al., 1999). To maximize the separation between the factors, a factor loading of .45 was established as a cut-off and cross-loading items with a difference of less than .20 were eliminated. The analysis revealed six factors with eigenvalues greater than 1.00. These six factors accounted for approximately 65% of variance in the unrotated solution and nearly 58% in the rotated solution (Table 5).

Most items mapped onto the expected factors. Ten items were eliminated due to cross-loadings or low factor scores. The sixth (one item) factor was deleted ("Looked for a new job in the newspaper or on a job posting website").

6.2.3. Phase 3: preliminary evidence of reliability and validity

The reliability of the provisional measures was assessed. Cronbach's alphas were: .92 (exit), .92 (voice), .53 (patience), .88 (neglect), and .73 (compliance). The score for patience must be treated with caution because scales with fewer items have lower alphas (Corina, 1993). Safety voice was highly correlated with Hofmann et al.'s (2003) measure of safety-related voice ($r = .91$, $p < .001$), thus providing evidence of convergence validity.

6.3. Discussion

This study provided initial confirmation of the factor structure of exit, voice, patience, neglect, and compliance (henceforth, EVPNC) scales with young workers. Exploratory factor analysis supported five main factors and correlation analysis supported convergent

Table 5
Principal axis factor analysis (oblimin rotation).

Item	Voice	Exit	Neglect	Compliance	Patience	Other
Safety voice						
Speak to co-workers at risk and encourage them to fix safety problems	.85	-.00	.09	-.00	.03	-.06
Tell the supervisor about hazardous work	.81	.08	-.05	-.01	.02	.00
Tell the supervisor about the consequences of dangerous working conditions	.81	.03	.04	.01	-.02	-.06
Group together with co-workers and take safety concerns to the supervisor	.80	.01	.06	.06	-.03	-.03
Talk to the owner about safety concerns	.76	-.02	.03	.04	-.09	.05
Remind co-workers to take precautions	.70	-.04	-.08	.08	.07	.00
Ask the supervisor for protective wear/equipment	.48	.05	.06	.35	.00	-.07
Ask for assistance when I'm unsure about how to do a task safely	.37	.06	-.22	.15	.22	-.01
Exit						
Told my parent(s) that I was thinking about quitting the job	.02	.85	-.02	-.02	-.02	.09
Told non-work friends that I was going to quit	-.03	.83	.07	-.07	.07	.02
Thought about how to tell my boss I was leaving the job	.02	.82	.05	.00	.02	.06
Gave two weeks notice to my supervisor	.01	.79	-.08	.11	-.06	-.16
Told co-workers that I was thinking about quitting the job	.06	.75	.11	-.11	.05	.13
Told a girlfriend/boyfriend that I was going to quit	-.10	.72	.03	-.05	.12	.12
Gave a resignation letter to my supervisor	.06	.72	-.06	.04	-.04	-.04
Applied for other jobs	-.02	.38	.13	.03	-.10	.43
Looked for a new job in the newspaper or on a job posting website	-.08	.12	.09	.05	-.06	.77
Safety neglect						
Take short cuts that threaten my personal safety	.11	.01	.84	.02	.00	.02
Get in the habit of not working safely	.09	.03	.83	-.03	-.07	-.03
Stop following health and safety policies	.13	-.01	.76	-.05	.01	.00
Ignore safety problems altogether	.00	.10	.69	-.15	.02	.02
Don't warn co-workers of potential dangers	-.10	.02	.62	.01	-.04	.06
Don't tell the supervisor about hazards	-.06	.01	.61	.10	.01	.14
Safety compliance						
Wear protective clothing/equipment	-.08	.04	.09	.83	.06	-.09
Read instructions before using chemical substances	.09	-.11	-.09	.61	.02	.17
Attend safety training sessions	.13	.05	-.06	.50	-.01	.03
Safety patience						
Adapt to safety conditions until the situation improves	.01	.09	.06	.14	.65	-.10
Find a way to protect myself from being hurt at work	.15	.02	-.25	.13	.52	.04
Discuss safety problems with co-workers and wait for things to change	.42	-.03	.09	-.13	.47	.11
Wait to see if promised changes are actually made to improve safety	.46	.01	-.05	-.06	.46	.08
Find a way to help co-workers protect themselves from being hurt at work	.36	-.04	-.05	.08	.44	-.00
Become indifferent to dangerous working conditions	-.04	-.06	.49	.00	.43	-.06
Make a complaint about safety problems and hope the situation improves	.50	.04	-.06	.02	.32	.14
Avoid dangerous tasks	.18	-.01	-.35	.02	.30	.11
Eigenvalue	8.69	6.46	3.91	1.82	1.30	1.08
% Variance explained (unrotated factors)	24.15	17.95	10.85	5.06	3.60	3.01
% Variance explained (rotated factors)	22.97	16.94	9.76	3.84	2.33	1.77

Note: $n = 272$. Item loadings in bold correspond to hypothesized factor.

validity of the safety voice scale. Patience was less clear-cut with only two items surviving this step of the scale development process.

7. Study 4: confirmatory factor analysis and validity testing

To further refine the scales and replicate the dimensionality we observed in Study 3, we performed confirmatory factor analysis using a separate sample of employed young workers. Participants and co-workers also responded to other theoretically related measures so that we could further assess the validity of the scales.

7.1. Sample

Three hundred and fifteen currently employed young people completed the survey. Those who indicated working their main job less than 1 month ($n = 20$), had no hours in the past month ($n = 12$), or were younger than 14 years of age ($n = 1$) were excluded from the sample. The age range was 15–24 years (M age = 17.61 years, $SD = 1.31$), 56% female. Those aged 15 years provided parental consent. Focal participants ($n = 282$) reported working an average of 21 h ($SD = 13$) per week at their main job in the previous month. Average tenure was 16 months ($SD = 14$). The most common work-

places were restaurants (36%), grocery store (17%), and retail (13%). Data were also collected from participant's co-workers ($n = 26$).⁵ Co-worker participants (M age = 18.56 years, $SD = 2.29$, 56% female) reported working an average of 24 h ($SD = 17$) per week in the previous month.

7.2. Procedure

Participant recruitment primarily targeted 15–19 year olds. Four approaches were used. First, participants were recruited at popular gathering places (e.g., movie theatres, cafeterias) (approximately 60% of sample). Second, an advertisement was placed in a union magazine and as posters on union bulletin boards in grocery stores where younger union members work (about 25% of the sample). Third, the study was advertised to senior high school students (about 10% of the sample). Teachers distributed a sign-up sheet in classes. Fourth, the study was advertised to staff at a mid-sized university in western Canada. Employees who indicated they had

⁵ Thirty-three co-workers completed the survey (41% response rate). Co-workers who reported working no hours with the focal participant ($n = 2$) or did not report on a focal participant in the main sample ($n = 5$) were removed.

Table 6
Alternative models.

Model	χ^2	df	RMSEA	CFI	TLI	SRMR	AIC
Model 1*	381.16	199	.06	.94	.93	.05	20927.93
Model 2	519.08	203	.08	.90	.88	.07	21057.84
Model 3	463.35	203	.07	.92	.90	.06	21002.11
Model 4	2071.14	209	.18	.39	.33	.19	22597.90

Note. $n = 282$. RMSEA = root-mean-square error of approximation. CFI = comparative fit index. TLI = Tucker–Lewis index. SRMR = average correlation residuals. AIC = Akaike's information criterion.

* Hypothesized model. Model 1 has five factors (exit, voice, patience, neglect, and compliance). Model 2 has four factors (exit, voice (with compliance), patience, and neglect). Model 3 has four factors (exit, voice (with patience), and neglect). Model 4 has one factor.

an eligible child who might be interested in participating received a letter of information (5% of the sample). Participants received \$20 for completing an on-line survey and those under 16 years provided parental consent. Participants were asked to provide the name and email address of a co-worker with whom they worked closely. Co-workers were sent an email invitation with a link to a short survey with questions about the focal participant's safety behaviors and turnover intentions. The co-worker incentive was a movie ticket.

7.3. Measures

7.3.1. EVPNC scales

Participants were asked to rate on a 7-point scale ranging from 1 (*almost never*) to 7 (*almost always*) how frequently they had engaged in the EVPNC behaviors at their "main job" (defined as the job they typically work the most hours at in a week). We omitted two of the exit items ("Gave 2 weeks notice to my supervisor" and "Gave a resignation letter to my supervisor") that were not congruent with the scale, re-worded all items in the present tense, and clarified the referent (e.g., "...ask *my* supervisor for protective wear/equipment" instead of "...ask *the* supervisor for protective wear/equipment").

We examined the relationship between the EVPNC measures and several theoretically relevant concepts. We expected Meyer and Allen's (1997) five-item measure of affective organizational commitment to be negatively related to exit (Meyer et al., 2002). Morrison and Phelps's (1999) measure of felt responsibility for change was adapted to a workplace safety context (e.g., "It's up to me to bring about safety improvement in my workplace"). We anticipated this measure to be positively related to voice (Stamper and Van Dyne, 2001). Consistent with prior research, we expected supervisor openness would also be positively related to voice (Mullen, 2005). We used Mullen's (2005) adapted version of House and Rizzo's (1972) four-item measure of management receptiveness to assess supervisor openness to safety suggestions and ideas. Finally, we adapted Burris et al.'s (2008) three-item scale of futility (e.g., "It would be useless for me to suggest new ways to improve safety conditions around here"). A central premise of the EVLN framework is that possibility of improvement in a deteriorated state influences constructive and destructive responses (Withey and Cooper, 1989). We predicted that safety-related futility would be negatively related to voice, compliance, and patience, and positively related to neglect and exit.

Finally, we assessed discriminant validity using a two-item measure of financial reasons for working (e.g., "I desperately need the money from this job"). With the exception of exit, we expected none of the EVPNC factors would be related to this concept. Turnover intentions may be negatively related to financial reasons for working because young workers who have important reasons for working would be reluctant to trade the certainty of a paycheck for the uncertainty for searching for a new job. The response scale for all of the above theoretically relevant measures ranged from 1 (*strongly disagree*) to 5 (*strongly agree*).

7.3.2. Co-worker measures

Co-workers reported on all items for each of the EVPNC measures with the exception of exit which was a single item (i.e., "This person tells co-workers that he/she is thinking about quitting the job."). Co-workers would be unable to report on the other exit items (e.g., "Tell a girlfriend/boyfriend that I'm going to quit"). They also completed a five-item measure to control for knowledge of the focal participant's work behaviors (e.g., "I work closely with this person"). The response scale ranged from 1 (*almost never*) to 7 (*almost always*).

7.4. Results

7.4.1. Phase 1: confirmatory factor analysis

We used MPlus 5.1 (Muthén and Muthén, 2008) to conduct confirmatory factor analysis. Specifically, we compared the fit of four models to the data. First, we tested the hypothesized five-factor model where the exit, voice, patience, neglect, and compliance are separate but correlated factors. Second, we tested a four-factor model in which compliance behaviors were nested within voice. Third, we tested a four-factor model in which patience behaviors were nested within voice. Finally, we tested a one-factor model.

We used five measures to compare the fit of different models with the baseline model (Hu and Bentler, 1999). Comparative fit index (CFI) and the Tucker–Lewis Index (TLI) values should be equal to or greater than .95. Standardized root mean square residual (SRMR) measures average correlation residuals and should be less than .06. Root-mean-square error of approximation (RMSEA) values of .05 or less indicate close fit between the model and the sample data. Finally, Akaike's Information Criterion (AIC) values measure the parsimony of the model with relative lower scores indicating a more parsimonious model.

Table 6 shows the results of the analysis. The five-factor model (Model 1) provided a good overall fit to the data, χ^2 (199) = 381.16, $p < .001$, CFI = .94, TLI = .93, RMSEA = .06, and SRMR = .05. The four-factor model with safety compliance collapsed into voice had a poorer fit, χ^2 (203) = 519.08, $p < .001$, CFI = .90, TLI = .88, RMSEA = .08, and SRMR = .07; $\Delta\chi^2$ (4) = 137.92, $p < .001$. The four-factor model with patience collapsed into voice had a slightly better, χ^2 (203) = 463.35, $p < .001$, CFI = .92, TLI = .90, RMSEA = .07, and SRMR = .06; $\Delta\chi^2$ (4) = 82.19, $p < .001$. Finally, a one-factor model showed a poor fit, χ^2 (209) = 2071.13, $p < .001$, CFI = .39, TLI = .33, RMSEA = .18, and SRMR = .19. Parameters for the hypothesized model were significant ($p < .001$) and accounted for a substantial amount of item variance (R^2 ranged from .40 to .80). Overall, the hypothesized model provided the best fit to the data.

7.4.2. Phase 2: assessing validity and reliability

To assess the correspondence between participant and co-worker reports, we assessed the agreement between co-worker reports ($n = 26$) of the focal participant's EVPNC behaviors with the focal participant's self-reports of these behaviors, controlling for co-worker reported closeness to the focal participant. Exit ($r_p = .51$, $p < .01$) and voice ($r_p = .40$, $p = .05$) showed moderate to strong

Table 7
Means, standard deviations, and zero-order correlations ($N = 276$ – 282).

	M	SD	1	2	3	4	5	6	7	8	9	10
1. Exit	2.69	1.76	(.92)									
2. Voice	2.44	1.60	.03	(.92)								
3. Patience	3.97	1.88	-.01	.38	(.69)							
4. Neglect	1.90	1.19	.16	-.04	.11	(.88)						
5. Compliance	3.92	1.93	-.03	.39	.38	-.10	(.73)					
6. Organizational loyalty	2.81	.79	-.29	.14	.12	-.20	.12	(.69)				
7. Supervisor openness	3.70	.85	-.23	.19	.21	-.33	.27	.34	(.94)			
8. Felt responsibility	2.53	1.02	-.02	.27	.13	-.11	.33	.31	.15	(.91)		
9. Futility	2.37	1.01	.30	-.21	-.14	.37	-.28	-.30	-.45	-.13	(.93)	
10. Financial reasons for working	3.28	1.00	.04	.13	.09	.00	.04	-.05	.07	-.04	.09	(.73)

Notes: $.12 < r < .16$, $p < .05$; $r > .17$, $p < .01$. Alphas are listed on the diagonal.

agreement, whereas patience ($r_p = .27$, $p > .10$), neglect ($r_p = .17$, $p > .10$), and compliance ($r_p = -.17$, $p > .10$) were not related.

Next, we tested the relationships among the focal participant's self-reported EVPNC factors and theoretically related variables (Table 7). As expected, voice was positively related to openness ($r = .19$, $p < .01$) and felt responsibility for change ($r = .25$, $p < .001$). Exit was negatively related to organizational commitment ($r = -.29$, $p < .001$). In contrast, as predicted, futility was positively related to exit and neglect ($r = .30$, $p < .001$, $r = .37$, $p < .001$, respectively) and negatively related to voice, patience, and compliance ($r = -.21$, $p < .001$, $r = -.14$, $p < .05$, and $r = -.28$, $p < .001$, respectively).

Further, there was mostly supportive evidence of discriminant validity (Table 7). Financial reasons for working were not related to exit, patience, neglect, and compliance ($r = .04$, ns , $r = .09$, ns , and $r = .00$, ns , and $r = .01$, ns , respectively), and it was moderately related to voice ($r = .13$, $p < .05$).

The EVPNC measures in this sample also demonstrated acceptable reliability. Cronbach's alphas were: .92 (exit), .92 (voice), .69 (patience), .88 (neglect), and .73 (compliance).

8. General discussion

Across four studies, we developed and provided initial validation for ecologically appropriate measures of safety-related voice, patience, neglect, compliance, and general exit intentions for young workers. Specifically, initial support was marshaled for content validity (Studies 1 and 2), face validity (Study 2), and discriminant validity (Study 4) of the measures. The measures were also associated with theoretically related variables. Further, we found support for the convergent validity of the safety voice measure (Study 3). Appendix A shows the final measures.

Whereas existing typologies of safety behavior tend to categorize such behavior as either safety compliance or safety participation, the EVPNC model enabled sampling the breadth of safety-related work behaviors and turnover intentions. Further, the current measures were designed for and by young workers. Indeed, some of the items are age-appropriate (e.g., "tell my parents that I am going to quit"), while others reflect strategies that young people may be more likely to use in frontline jobs (e.g., "Group together with co-workers and take safety concerns to the supervisor").

This set of studies has several strengths. First, we sampled representative EVPNC acts and this resulted in reliable measures, especially for voice. Previous measures of general employee voice are plagued by low reliability (Van Dyne et al., 2003). The average alpha for safety voice across Studies 3 and 4 was .92. Second, while safety patience was more challenging to define and had the lowest reliability across the study samples (mean alpha = .61), it is an important and conceptual distinct category of safety behavior. The surviving two-item measure seems to represent adaptive or self-protective safety behavior rather than merely patience. The patience construct may have been difficult to define because it cap-

tures a relatively stable behavioral pattern rather than discrete acts. As a stable self-protective form of safety behavior, patience may be more difficult to define and measure than, for example, voice or exit, which are distinct acts that target a co-worker, supervisor, or other (e.g., a parent). Finally, we compared co-worker and participants report of EVPNC behaviors. While these results were mixed, there was moderate to strong agreement for exit and voice reports. Van Dyne and LePine (1998) reported an average correlation of $r = .40$, $p < .001$ ($n = 597$) between co-worker and focal participant reported general voice behavior. In our much smaller sample ($n = 26$), we found a moderate level of agreement between co-worker and participant reported safety voice ($r = .40$, $p = .05$).

An unexpected result of the scale development process was the emergence of a fifth response category, namely safety compliance. The items for this scale originated from the initial pool of safety voice items, in which safety voice was defined as "as actions that workers take when they try to improve workplace safety." In terms of face validity, the compliance items are consistent with this definition. Through a three step process involving (1) independently rating the voice items as either voice or compliance; (2) verifying the factor structure using exploratory factor analysis; and (3) confirmatory factor analysis, the safety compliance measure emerged as distinct from the other responses. Overall, the EVPNC measures capture the breadth of safety behaviors used by young workers.

9. Limitations and implications

These short measures should be of practical use for managers, researchers, and program evaluators for understanding how young workers respond to hazardous working conditions. Government-sponsored young worker safety education initiatives, which are now widely adopted in North America, seek to increase young worker knowledge of their health and safety rights (Breslin et al., 2007b), promote proactive safety behavior, and ultimately prevent injuries. Proponents of these interventions claim positive results in reducing injuries (e.g., Linker et al., 2005), however the programs have yet to be systematically evaluated in terms of fostering lasting behavioral change. These measures could make a contribution in this regard.

In terms of limitations, the EVPNC scales require further validation on different samples and across time. In particular, 20–24 year olds were under-represented across our studies. Further, the EVPNC scales may be useful for adult populations. Future research is needed to compare the variance in prototypical safety behaviors between young and adult workers.

In conclusion, the development of short and ecologically valid measures for young worker safety behavior should be useful for research and evaluating the efficacy of existing safety interventions and improving such interventions that aim to bring about meaningful and long-lasting change in work-related safety behaviors.

Appendix A. Appendix A

Final scale items

Exit

Tell my parent(s) that I'm thinking about quitting the job
 Think about how to tell my boss I'm leaving the job
 Tell my non-work friends that I'm going to quit
 Tell my co-workers that I'm thinking about quitting the job
 Tell a girlfriend/boyfriend that I'm going to quit

Safety voice

Speak to co-workers at risk and encourage them to fix safety problems
 Tell my supervisor about the consequences of dangerous working conditions
 Group together with co-workers and take safety concerns to the supervisor
 Tell my supervisor about hazardous work
 Talk to the owner about safety concerns
 Remind co-workers to take precautions

Safety compliance

Wear protective clothing/equipment
 Read instructions before using chemical substances
 Attend safety training sessions

Safety patience

Adapt to safety conditions until the situation improves
 Find a way to protect myself from being hurt at work

Safety neglect

Take short cuts that threaten my personal safety
 Get in the habit of not working safely
 Stop following health and safety policies
 Ignore safety problems altogether
 Don't tell the supervisor about hazards
 Don't warn co-workers of potential dangers

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