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## Understanding compliance with safe work practices: The role of ‘can-do’ and ‘reason-to’ factors

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This study addresses the psychological mechanisms that lead to compliance with safe work practices among electrical workers. Compliance with safe work practices can be challenging as it involves substantive cognitive effort and often takes place in the presence of multiple competing demands and situational constraints. Guided by expectancy-value theory, we advance theorizing on compliance by conceptualizing it as a task choice. Our key proposition is that compliance is motivated by the unique and interactive effects of "can-do" (i.e., self-efficacy) and "reason-to" (i.e., perceived usefulness and perceived low cost) psychological states. Distal individual (i.e., safety knowledge and sensation seeking personality) and organizational (i.e., psychological safety climate) antecedents also were considered. Data from a sample of 386 Australian electrical workers in which the focal variables were assessed at Time 1 and compliance with safe work practices was assessed three months later at Time 2 confirmed the hypothesized relationships. A compensating interactive effect between self-efficacy and perceived usefulness also was found. When self-efficacy was high, perceived usefulness no longer had a significant positive relationship with compliance. Overall, this study demonstrates that expectancy-value theory provides a meaningful explanation for the underlying psychological mechanisms that lead to safety compliance. Managers and safety practitioners should focus on cultivating self-efficacy and utility perceptions when enforcing compliance with safe work practices.

### Practitioner points

- This research examined psychological states of a cognitive nature that encourage electricians' compliance with safe work practices.
- Self-efficacy was found to have the strongest positive association with compliance, and to a lesser extent, perceived usefulness.

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- When feelings of confidence in being compliant were high, perceived usefulness no longer had a significant positive relationship with compliance, suggesting a compensating effect.

Electrical workers operate in high-risk environments, undertaking complex and dangerous work (Austin, Kovacs, Thorne, & Moody, 2020; Liggett, 2006; Radman, Nilsagard, Jakobsson, Ek, & Gunnarsson, 2016). As documented by the UK Health and Safety Executive (2021), common risks electrical workers are exposed to include electric shocks and burns from contact with live parts (see Radman et al., 2016); injuries from exposure to arc flash (see Liggett, 2006); fire from faulty electrical equipment or installations; explosion caused by unsuitable electrical apparatus or static electricity igniting flammable vapours or dusts; and falls from ladders or scaffolds. Furthermore, electrical workers often are employed in a diverse range of high-risk industries, such as mining and construction.

Exposure to live power can lead to severe injuries or death (Albert & Hallowell, 2013). In the United States, there were 68 fatal injuries (U.S. Bureau of Labor Statistics, 2020a) and 7,400 occupational injuries and illnesses involving days off work among electricians in 2019 (U.S. Bureau of Labor Statistics, 2020b). In the Australian context, the highest number of fatalities in construction was for electricians (54 fatalities), with 2,525 serious workers' compensation claims (Safe Work Australia, 2015).

Given the hazardous nature of electrical work, electricians are required to operate in a regulated environment with various laws, regulations, policies and practices providing specific electrical safety guidelines. Despite these rules, electrical workers face safety dilemmas out in the field (Austin et al., 2020). Common safety dilemmas are those that arise when workers are required to compete with diverse priorities, such as production and customer service goals (see Hollnagel, 2020), and electrical workers are no exception. Electrical workers often work with tight work schedules and face pressure from clients who do not always appreciate the safety regulations that must be adhered to, such as the need to turn power off (Austin et al., 2020), which might not allow them the conditions needed to set up required safety controls.

Although it is impossible to devise a perfect set of rules and procedures to guarantee safety in all circumstances (Bieder & Bourrier, 2013), and deviation from established practice is in fact desirable at times (Dekker, 2003), it is largely accepted that compliance with safe work practices for electrical workers is important to preserve their safety and those of others (Durocher & Kay, 2018). This premise is evident in the recurring finding that violation of existing safety rules and procedures is one of the main leading causes of safety accidents and injuries (Hopkins, 2011; O'Dea & Flin, 2001).

### **Hypothesis development**

In the organizational psychology literature, workers' compliance with safe work practices is theorized as safety-specific task performance (Burke, Sarpy, Tesluk, & Smith-Crowe, 2002; Griffin & Neal, 2000), and thus can be understood using a number of theoretical frameworks, such as the personality framework (Beus, Dhanani, & McCord, 2015), organizational climate theory (Zohar, 2010), leadership (Barling, Loughlin, & Kelloway, 2002; Zohar, 2002), and the job-demands and resource model (Nahrgang, Morgeson, & Hofmann, 2011). Overall, most studies tend to focus on individual and contextual antecedents to safety compliance. What remains to be explored, however, are the psychological mechanisms that lead to workers' decisions to comply with safety requirements.

The performance perspective points to the role of safety knowledge, skills and motivation (Christian, Bradley, Wallace, & Burke, 2009; Griffin & Neal, 2000). In regard to

motivation, the extent to which values are internalized has been theorized to have high motivational potential (Gagne & Deci, 2005). When one internalizes the value, a behaviour is enacted because it is of personal importance, thus no external monitoring is required (Tyler & Blader, 2005). Recent studies have shown that safety motivation – the degree to which one values and places personal importance on safe work practices – is a powerful determinant of safety behaviour (Flatau-Harrison, Griffin, & Gagne, 2020; Sawhney & Ciglarov, 2019). Nevertheless, meta-analytic evidence presented by Clarke (2013) suggests that, although placing high personal importance on safe work predicts the more volitional forms of safety behaviour, it seems to be less important in driving safety compliance, and longitudinal research by Neal and Griffin (2006) did not detect a relationship between safety motivation and safety compliance.

Another line of research draws on regulatory focus theory and proposes that safety compliance is driven by a situational prevention focus, which focuses on fulfilling obligations and compliance with rules (Lanaj, Chang, & Johnson, 2012; Wallace & Chen, 2006). However, Kark, Katz-Navon, and Delegach (2015) showed that the relationship between prevention-focus and safety compliance was inconsistent at best. Specifically, while there was a weak positive relationship between prevention focus and safety compliance in a hypothetical experimental setting using a sample of undergraduate students, the relationship was insignificant in field studies with the working population. Taken together, the empirical evidence presented so far does not provide sufficient support for the work performance theory and regulatory focus theory in explaining safety compliance.

We argue that, in both cases, the theories were inadequate because they have not considered the complex reality of safety compliance. In the presence of multiple goals and priorities (i.e., safety and production), workers might rely on their knowledge and judgment about how safety can be achieved among competing priorities, which may not align with safe work practices (Hale & Borys, 2013). In other words, having the motivation to act safely and possessing the knowledge and skills to do so, do not mean the individual will comply with externally imposed safety practices. Similarly, while it is certainly reasonable to view safety compliance as a rule-following behaviour and thus can be promoted by a prevention focus, workers face other obligations and requirements such as meeting production schedules and saving production costs. Therefore, it is not surprising why an activated prevention focus might not necessarily lead to safety compliance, as found in the abovementioned study by Kark et al., 2015. As researchers have argued, organizational psychology scholarship should seek alternative psychological theories to better understand how safety behaviours can be motivated and sustained (Beus, McCord, & Zohar, 2016; Hofmann, Burke, & Zohar, 2017).

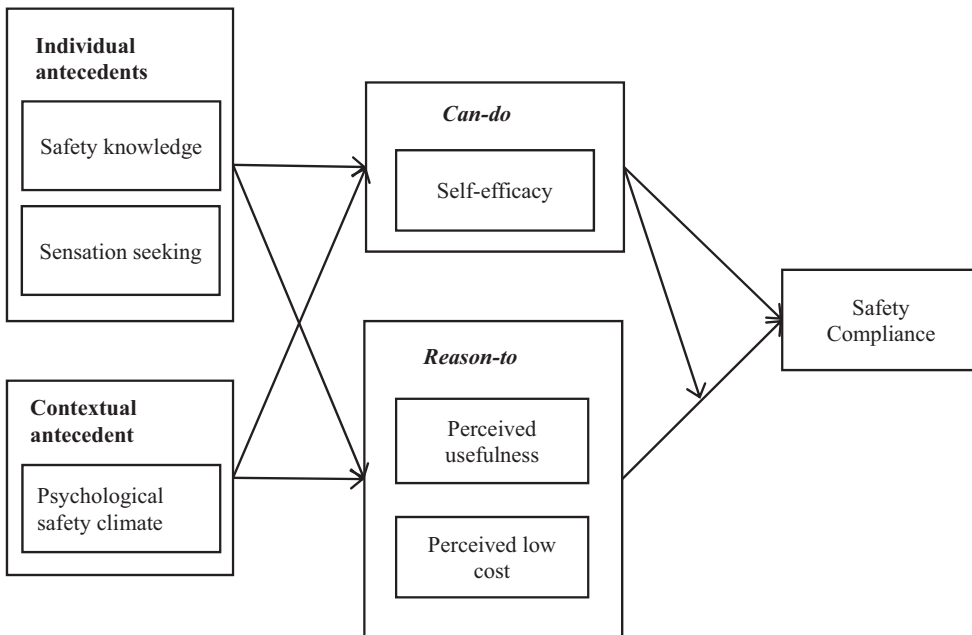
In this research, we address this critical gap by viewing it as a task choice made among the presence of competing priorities. This view allows us to apply expectancy-value theory (Eccles & Wigfield, 2020; Wigfield & Eccles, 2000) to investigate previously overlooked psychological mechanisms. Originating from the achievement context, expectancy-value theory suggests that individuals will proceed with a task choice if they believe that they will be successful (i.e., 'I can-do this') and the task holds high subjective value (i.e., 'I have reasons to do this'). The theory also highlights an additive effect between *can-do* and *reason-to* states in prompting task behavioural choice. Borrowing the term from Parker, Bindl, and Strauss (2010), we use the terms 'can-do' and 'reason-to' to describe these two categories of psychological states of a cognitive nature that prompt safety compliance. Integrating this model with existing safety compliance research, we also discuss how can-do and reason-to states translate the effects of more distal individual

and contextual antecedents of safety compliance. A set of hypothesized relationships is presented in Figure 1. We test the hypothesized relationships among a sample of 386 Australian electrical workers.

Our research aims to advance previous research. By considering safety compliance as a task choice through the lens of expectancy-value theory, we outline various can-do and reason-to states that prompt compliance with safe work practices. Our new conceptualization goes beyond the existing performance and rule-following perspective and allows us to explore the psychological mechanisms beyond the role of safety knowledge and safety motivation (Sawhney & Cigularov, 2019; Xia, Xie, Hu, Wang, & Meng, 2020). Our research also contributes to expectancy-value theory by examining both the independent and interactive effects of can-do and reason-to states. With regard to the latter, we test if can-do and reason-to states can strengthen or compensate each other's effect in a different context. Finally, in an acknowledgment of existing safety compliance research, we incorporate individual and contextual differences as distal antecedents of safety compliance via can-do and reason-to states. Overall, we believe an examination of these constructs and their relationships will help researchers and practitioners better understand and support this critically important behaviour.

**Can-do, reason-to and safety compliance**

Drawing on expectancy-value theory, the can-do state concerns the perception of self-efficacy, whereas reason-to states concern the perceived utility value and cost of task behaviour. Existing safety performance research points out three variables – self-efficacy (Chen & Chen, 2014; Hu et al., 2018), which reflects the can-do state; and perceived usefulness (Hu, Griffin, & Bertuleit, 2016; Hu et al., 2018) and perceived low cost (Hale &



**Figure 1.** The conceptual model.

Borys, 2013; Lawton, 1998), which both reflect the reason-to states. We develop the argument for each below, then move on to the interactive effects between the can-do and reason-to variables.

### **Self-efficacy**

Self-efficacy is defined as the extent to which individuals believe they can succeed in a particular domain. Originating from social cognitive theory, self-efficacy is a determinant of 'how people behave, their thought patterns, and emotional responses in taxing situations' (Bandura, 1982, p. 123). In particular, high self-efficacious individuals tend to set more challenging goals, exert more effort towards goal attainment and are more persistent when facing setbacks than their low self-efficacious counterparts (Bandura, Freeman, & Lightsey, 1999). Compliance with safety procedures can be practically challenging for frontline workers as they require workers to translate high-level safety principles to various local and dynamic task environments, often within tight work schedules. Therefore, workers need to feel confident that they can comply with the safety requirements, mitigate unexpected risks and be willing to overcome any constraints and obstacles. Several empirical studies have established the link between self-efficacy and safety compliance (Chen & Chen, 2014; Chughtai, 2015; Hu et al., 2018). However, when examined in detail, these researchers measured self-efficacy in one's job in general rather than self-efficacy in carrying out safe rules and procedures. This measurement approach creates a misalignment between self-efficacy and the task domain (see Sitzmann & Yeo, 2013). In the present research, we address this methodological limitation by using a self-efficacy measure developed for safety compliance.

### **Perceived usefulness**

A task can have high value when it facilitates the attainment of important goals, such as personal and workplace safety. Although safe rules and procedures are designed to help individuals carry out tasks safely, individuals might vary in their perceptions of these rules and perceived usefulness in achieving safety goals. For individuals to be motivated to comply with safety rules and procedures, there needs to be a strong perception that compliance is critical to maintaining safety. Consideration of the perceived usefulness or benefits of behavioural performance forms part of many behaviour prediction models, such as the theory of planned behaviour (Ajzen, 1991) and the health belief model (Rosenstock, 1974). This proposition also aligns with prior research that draws on the technology acceptance model (Lee, Kozar, & Larsen, 2003) and work engagement (Kahn, 1990) – both of which argue that perceived usefulness serves as a mechanism for individuals to internalize externally imposed safety practices (Hu et al., 2016, 2018). On the other hand, if employees perceive safe work practices to be unhelpful or unnecessary for their safety, they are less likely to follow the safety rule or procedure (Hale & Boyles, 2013). For example, in an ethnographic study, Borys (2009) found that employees completed a risk analysis procedure by merely ticking the boxes as they did not believe mentally going through the list was useful for their safety.

### **Perceived low cost**

Costs are associated with negative aspects of tasks, including anxiety, fear of success or failure, or opportunity costs that result from doing a task (Wigfield & Eccles, 2000). A task

can be considered as high-value when the associated costs are low. The notion of perceived low cost is particularly relevant, given the competing demands a worker needs to deal with when carrying out safe work practices. As researchers have acknowledged, safety is never the only goal a worker needs to attain at the workplace at any given time (Beus et al., 2016). In fact, safety is often in conflict with productivity goals as compliance activities might cause significant delays in work schedules and increases in operational costs (Dekker, 2003). Thus, workers are often pressured to deviate from safe work practices when compliance becomes a significant barrier to achieving production schedules or is associated with high operational costs (Reason, Parker, & Lawton, 1998). Compliance activities can be labour-intensive and cognitively demanding or make the worker feel uncomfortable (such as wearing a harness at height; see Alper & Karsh, 2009, for a systematic review). Prior research using ethnographic studies suggests that various cost perceptions, such as time, physical effort and uncomfortableness, are common reasons for violations (Lawton, 1998). In a recent theoretical piece, Beus and Taylor (2018) also suggest that resource investment tends to shape safety-related behaviour. However, to our knowledge, there is a dearth of research that has examined how cost perceptions shape compliance to safe work practices, leading to the following hypotheses:

*Hypothesis 1:* Self-efficacy is positively associated with safety compliance.

*Hypothesis 2a:* Perceived usefulness is positively associated with safety compliance.

*Hypothesis 2b:* Perceived low cost is positively associated with safety compliance.

### ***Interaction between can-do and reason-to states***

A unique insight from expectancy-value theory is the potential interactive effect between expectancy and value perceptions on task choices. Earlier expectancy-value models focused explicitly on the interaction between expectancy and value, with the proposition that only a combination of high value and high expectancy leads to task choice (Atkinson, 1957). High–low combinations, on the other hand, will not lead to task choice. Specifically, when individuals do not have the confidence to achieve a successful result, even high-value beliefs will not motivate them to pursue the task. Likewise, when individuals do not see the task's value, they might still not engage despite feeling capable of doing so. This proposition is widely supported by laboratory-based empirical studies (Feather, 1982), as well as some recent field research evidence. For example, Guo, Marsh, Parker, Morin, and Dicke (2017) found that expectancy belief interacted with perceived usefulness to predict coursework aspirations; when perceived usefulness was low, confidence did not have a significant effect on coursework aspirations. Nevertheless, the most recent field studies suggest the interaction between expectancy and value tends to be additive. The expectancy and value perceptions have independent and positive synergistic effects on various achievement outcomes (Lauermaun, Tsai, & Eccles, 2017; Nagengast et al., 2011; Trautwein et al., 2012). Applying these findings to safety compliance, we hypothesize that can-do states will strengthen the effect of reason-to states:

*Hypothesis 3:* There is a positive synergistic effect between can-do and reason-to states in predicting safety compliance. Specifically, (1) self-efficacy strengthens the positive effect of perceived usefulness on safety compliance and (2) self-efficacy strengthens the positive effect of perceived low cost on safety compliance.

### ***Distal antecedents and safety compliance***

Now we move on to distal antecedents of safety compliance via can-do and reason-to states. Consistent with expectancy-value theory (Wigfield & Eccles, 2000) and the existing safety performance model (Christian et al., 2009), we consider the effect of both individual differences and contextual factors. We select our distal antecedents based on their well-established relationship with safety compliance. For personal antecedents, we focus on the role of safety knowledge (Griffin & Neal, 2000), which is the best-known personal characteristic that influences safety compliance (Christian et al., 2009), as well as sensation seeking, which is the most influential personality trait when predicting rule-following behaviour in high-risk contexts (Beus et al., 2015; Zuckerman, 2007). For the contextual factor, we focus on the role of psychological safety climate, defined as the extent to which senior management is committed to health and safety in the workplace. Psychological safety climate is the most widely recognized organizational antecedent of employee safety behaviour (Zohar & Polachek, 2014). In the sections below, we elaborate how our chosen distal antecedents influence can-do and reason-to states.

### ***Safety knowledge***

Drawing on the work performance literature (Campbell, McCloy, Oppler, & Sager, 1993), Griffin and Neal (2000) propose that safety knowledge is a determinant of safety compliance because individuals can only comply with organizational safety requirements when they possess 'how-to' knowledge. There is ample empirical evidence to support this claim, including Christian et al.'s (2009) meta-analysis. This line of research treats safety knowledge as a proximal personal antecedent that directly influences safety compliance. However, prior research has not considered the extent to which safety knowledge also indirectly influences safety compliance via its effect on psychological states. This study proposes that safety knowledge can prompt safety compliance behaviour via can-do and reason-to states. First, the acquisition of knowledge implies the experience of mastery, which is known as the primary source of self-efficacy (Bandura, 1982). Second, as individuals have a more in-depth understanding of risks, they are more likely to understand why certain safety practices are put in place and appreciate their usefulness. Finally, having how-to knowledge enables individuals to complete the safety compliance activities with relative ease compared to those without this knowledge (i.e. an instance of perceived low cost). Our proposition of the indirect effect of safety knowledge is in line with the expectancy-value framework and the proactive performance model (Parker et al., 2010), which treats individual capabilities, such as knowledge, as distal factors influencing performance via more proximal psychological states. This leads us to the following hypothesis:

*Hypothesis 4:* The positive effect of safety knowledge on safety compliance is mediated by can-do and reason-to states.



### **Sensation seeking**

Sensation seeking is a personality trait expressed in the generalized tendency to seek varied, novel, complex, and intense sensations and experiences, and the willingness to take risks for the sake of such experiences (Zuckerman, 2007). Conceptually, sensation seeking is a facet of extraversion and is one of the most studied personality facets concerning safety-compliance behaviour (Beus et al., 2015). Interestingly, existing theory and evidence suggest sensation seeking might have opposing effects on self-efficacy and subjective task value. On the one hand, sensation seeking might positively affect self-efficacy as high sensation seekers often have an unrealistic belief in their capability over the situation (Slanger & Rudestam, 1997). Thus, high sensation seekers might be oblivious to the potential obstacles and barriers associated with carrying out safe rules and procedures and have blind confidence in their ability to do so. On the other hand, sensation seeking might negatively affect the subjective task value the individual places on safe work practices. High sensation seekers often tend to value the rewards of activities over the associated risk. Thus, when it comes to completing risky work tasks, sensation seeking individuals might enjoy the fact that they are operating in a risky environment and can complete required tasks without the protection of safety controls. Furthermore, high sensation seekers have an 'optimistic bias' whereby they see themselves as less likely to experience a negative outcome of the risky activity. They have a higher acceptance of health risks (Zuckerman, Ball, & Black, 1990) and tend to take more physical, legal and social risks (Zuckerman, 1979). Thus, high sensation seekers might view the necessary safety protections and controls as an unnecessary burden and place a high cost on those compliance activities; as such, we hypothesize:

*Hypothesis 5: The negative effect of sensation seeking on safety compliance is mediated by can-do and reason-to states.*

### **Psychological safety climate**

Safety climate refers to employees' perceptions regarding safety policies, procedures and practices (Neal & Griffin, 2006; Zohar, 1980; Zohar & Luria, 2005), and has been shown to be lacking in the electrical profession, as reported by a sample of electricians in Sweden (Radman et al., 2016). It represents employees' cognitive interpretations of the safety aspects of their work environment (Clarke, 2006). Safety climate can be conceptualized at the individual, group and organizational levels, depending on whether the perception is held by the individual, shared within the group or shared within the organization as a whole. Given that electrical workers often work alone (Radman et al., 2016), we chose to focus on individual-level perceptions of safety climate, which is often referred to as psychological safety climate (e.g. Jimmieson et al., 2016; Morrow et al., 2010; Shen, Tuuli, Xia, Koh, & Rowlinson, 2015).

According to Zohar (2010), psychological safety climate usually manifests in employees' perception of their senior management attitudes and behaviour towards safety. Senior management can support safety in various ways, including advocating for the importance of safety, providing safety training, ensuring the provision of necessary equipment and tools, and prioritizing their responses to safety issues and problems (Fruhen, Griffin, & Andrei, 2019). In doing so, employees can build their self-efficacy to carry out the required safety practices as they become energized to achieve organizational safety goals and master the necessary skills (Hu, Yan, Casey, & Wu, 2021). As leaders

explain why safety practices are essential, employees begin to appreciate their usefulness (Hu et al., 2016). Furthermore, by proactively responding to and addressing safety issues and ensuring sufficient time and resources for employees to undertake safety tasks, leaders will reduce perceived costs associated with compliance activities (Dahl, 2013; Hu et al., 2018). Thus, we hypothesize:

*Hypothesis 6:* The positive effect of psychological safety climate on safety compliance is mediated by can-do and reason-to states.

Taken together, Hypothesis 3, which concerns the interaction between can-do and reason-to states, and hypotheses 4–6, which concern the mediating effect of can-do and reason-to states, we propose the moderated mediation hypothesis that:

*Hypothesis 7:* The effect of distal antecedents on safety compliance is mediated by the interaction between can-do and reason-to states. Specifically, (1) self-efficacy strengthens the indirect effect of distal antecedents on safety compliance via perceived usefulness and (2) self-efficacy strengthens the indirect effect of distal antecedents on safety compliance via perceived low cost.

## **Method**

### ***The Australian context***

In the Australian context for Queensland, electrical work is governed by multiple complex Acts, Regulations, and Code of Practices (e.g. The Electrical Safety Act 2002; Review of the Electrical safety Act 2002; Electrical Safety Regulation 2013) that undergo regular updates. Based on these legal frameworks, the electrical safety code of practice was developed to provide guidelines for managing various electrical risks in ways that meet the legal requirements. It contains dozens and hundreds of risk mitigation and management strategies and safety controls for a variety of operational environments (e.g. rural, underground and overhead). Electrical workers also are required to attend training and to be prepared for external audits to keep abreast of these complex risk mitigation practices. As such, we examined electrical workers' compliance with a series of high-level risk-management strategies – considered by the Queensland regulator to be a legal requirement of licensed electrical workers – when conducting their work in the field.

### ***Research design***

We tested our model in a Time 1–Time 2 sample of licensed Australian electrical workers in which the predictors and mediators were assessed at Time 1 and safety compliance was assessed at Time 2, three months later. A 2-time-point research design was considered critical for the premise of the theoretical question, one that is predicting future behaviour. We chose a time-lag of 3 months to ensure a reasonable period of time for electrical workers to encounter a range of circumstances on the job in which they could demonstrate compliance with safe work practices.

### **Sampling frame and procedure**

Multiple recruitment methods were used. The state-based electrical safety regulator – which seeks to make Queensland industries, homes and communities safe from the risk of electrical harm by offering compliance and support services – provided the research team with access to the electronic mailing list for their e-alert newsletter. As such, a potential readership of 29,541 electrical workers were contacted. In addition, the Queensland Chapter of the National Electrical and Communications Association – an employer association offering professional services to assist electrical contractors in their business operations – distributed the questionnaire invitation to 2,000 of its members. The Queensland branch of the Electrical Trades Union also sent the survey link to 200 of its members. A government-owned power provider agreed to publicize the research to 600 employees in its workforce, and, 305 employees across five organizations known to the researchers were also contacted. In sum, the questionnaire was distributed to a potential total of 32,846 licensed electrical workers throughout Queensland.

The questionnaire was administered online using the Qualtrics platform. At the beginning of the questionnaire, participants were informed that the study focused on understanding compliance with electrical safe work practice, and examples of these specific behaviours were provided. Potential participants were sent an email outlining the aims and objectives of the research and inviting them to take part by clicking on a link embedded within the email. As reimbursement for completing both time points, participants were informed that they would be eligible to go into the draw to win a television valued at A\$800 or one of four runner-up prizes comprising a A\$50 petrol voucher (prizes were donated by the Queensland Chapter of the National Electrical and Communications Association).

We encouraged participants to complete the questionnaire as honestly as possible. To ensure anonymity and confidentiality, we ensured that all individual responses would be anonymous and access to individual responses were restricted to the research team, and never their employer, or the regulator who commissioned the research. Feedback to the organization was restricted to averaged responses across a large number of employees so that individual employees could not be identified. The personal information collected for the prize draw was recorded in a separate data file and was deleted once the research was completed.

### **Sample size**

While the number of individuals who received the email containing the link to the questionnaire cannot be determined, the following trends were recorded. A total of 2,261 individuals opened the link to the Time 1 questionnaire. Of these, 815 did not go on to attempt the questionnaire, and 382 discontinued it and were thus deleted due to excessive missing data. Six individuals completed the questionnaire twice and their second response was deleted. In total, 1,058 responses were received, representing a response rate of 46.79% (out of the 2,261 who opened the link to the Time 1 questionnaire). From these initial responses, 540 completed the Time 2 survey.

Because the theoretical model included psychological safety climate as provided by the senior management team, the sample was further refined to remove those who were self-employed or independent operators and thus did not report to a senior management team. The usable sample size for this research was 386 participants. To rule out the possibility that our results were influenced by the removal of this sub-set of electricians, we divided Time 2 participants ( $N = 540$ ) into two groups, based on whether they had a

senior management team ( $n = 386$ ) or not ( $n = 140$ ), and conducted an independent group  $t$ -test to compare the mean scores on all focal variables. No significant statistical differences between these two subgroups were found, except for the outcome variable of safety compliance. Notably, those who reported having senior management also reported a higher level of compliance ( $M = 5.98$ ) than independent operators ( $M = 5.37, p < .01$ ). We performed a post-hoc analysis in the larger sample and the results for the hypothesized relationship remained the same across the two samples.

### **Sample characteristics**

The usable sample of 386 comprised 381 males and five females, reflecting the typical gender composition of this workforce, which is typically 2% female (Australian Government, n.d.). The average age was 46.16 years ( $SD = 10.39$ ) and ranged from 24 to 71 years. Among the respondents, 93% were employed by large private or public power providers, 82.4% held low-voltage jobs and 17.1% held jobs that required high-voltage work. License types (people can hold multiple licenses) included electrical mechanics (89.9%), electrical fitters (74.9%), linespersons (7.5%), cable jointers (2.1%), those on a restricted electrical license (6.2%) and other (11.4%). Participants were employed in either private companies (58.5%), government-owned corporations (27.2%) or government departments (7%).

### **Measures**

*Safety knowledge* was measured with three items that conformed to the safety knowledge scale developed by Neal and Griffin (2006). Items tapped a level of familiarity, understanding and awareness in regard to basic safety requirements for electrical work. An example item is 'I am familiar with the basic safety requirements for electrical work'. Items were rated on a 7-point scale ranging from (1) *strongly disagree* to (7) *strongly agree*. The Cronbach (1951) alpha was .87 for the current sample.

*Sensation seeking* was measured using the Brief Sensation Seeking Scale (BSSS-4, Stephenson, Hoyle, Palmgreen, & Slater, 2003). The items assess experience seeking ('I like to explore strange places'), disinhibition ('I like to do frightening things'), thrill and adventure-seeking ('I like new and exciting experiences, even if I have to break the rules') and boredom susceptibility ('I prefer friends who are exciting and unpredictable'). Items were rated on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The Cronbach (1951) alpha was .78 for the current sample.

*Psychological safety climate* was measured with the 16-item organization-level climate scale developed by Zohar and Luria (2005) that assesses top management's commitment to safety. Items reflected active (e.g. 'insists on thorough and regular safety audits and inspections'), proactive (e.g. 'uses any available information to improve existing safety rules') and declarative (e.g. 'regularly holds safety-awareness events, such as presentations, ceremonies') practices. Items were rated on a 7-point scale ranging from (1) *strongly disagree* to (7) *strongly agree*. Consistent with the original findings of Zohar and Luria (2015), an exploratory factor analysis (EFA) failed to identify meaningful subscales, so an overall index was considered appropriate. The Cronbach (1951) alpha was .98 for the current sample.

*Self-efficacy* was measured with two items using the established item 'stems' for this construct and adapted them for the specific behavioural context (Ajzen, 1991). Such an approach is in accord with past studies testing attitude-behaviour models (e.g. White et al.,

2015). The two items were: 'I am confident that I could carry out activities that comply with electrically safe work practices' and 'It would be easy for me to carry out activities that comply with electrically safe work practices'. Both items were rated on a 7-point scale ranging from (1) *strongly disagree* to (7) *strongly agree*. The Cronbach (1951) alpha was .78 for the current sample.

*Perceived usefulness* was measured with four positive beliefs, or perceived advantages, associated with electrical safety compliance. These were identified through telephone ( $n = 28$ ) and face-to-face ( $n = 4$ ) interviews, as well as three focus groups ( $n = 14$ ) with a pilot sample ( $N = 46$  in total) of licensed electrical workers randomly selected from the Queensland Electrical Licence Database (White et al., 2016). The items included (1) 'reducing the chance of injury to myself', (2) 'reducing the chance of injury to others', (3) 'being more prepared for potential risks and accidents' and (4) 'saving money by reducing the chance of downtime'. Each item was scored on a 1 (*extremely unlikely*) to 7 (*extremely likely*) rating scale. The Cronbach (1951) alpha was .86 for the current sample.

*Perceived low cost* was measured with four negative beliefs or perceived disadvantages associated with electrical safety compliance. These were identified through the pilot work described above and included (1) 'increased workload', (2) 'wasting time', (3) 'inconveniencing customers/clients' and (4) 'loss of customers/clients'. Each item was scored on a 1 (*extremely unlikely*) to 7 (*extremely likely*) rating scale. All items were reverse coded to reflect low perceived cost. The Cronbach (1951) alpha was .73 for the current sample.

*Safety compliance* in the last 3 months was assessed at Time 2 with five core electrical safety behaviours: (1) 'conducting risk assessments before commencing work', (2) 'using appropriate/suitable personal protective equipment', (3) 'using appropriate/suitable testing equipment', (4) 'ensuring the availability of and the deployment of rescue equipment' and (5) 'using the codes of practice and other guiding documents for electrical safety'. Items were rated on a 7-point scale ranging from (1) *a small extent* to (7) *a large extent*. The Cronbach (1951) alpha was .76 for the current sample.

### **Measurement models**

Before testing our hypotheses, we conducted a series of confirmatory factor analyses using Mplus 7.0 (Muthen & Muthen, 2017) to examine the discriminant validity of the focal variables. Following the recommendation for reducing the complexity of measurement models (Little, Cunningham, Shahar, & Widaman, 2002; Marsh, Hau, Balla, & Grayson, 1998), we constructed item parcels for the 16-item psychological safety climate scale. A total of three parcels were created (two parcels of 5 items and one parcel of 6 items). To achieve item-to-construct balance, we sorted and assigned the items to each parcel based on their factor loading from an initial EFA (Roger & Schmitt, 2004). The first three highest loading items are assigned to each one of the three parcels as the first item. Then, the three items with fourth, fifth and sixth highest loading were assigned to each parcel in reverse order (i.e. fourth item is assigned to parcel 3 and sixth item is assigned to parcel 1). We continued the process until all 16 items were sorted. Each parcel was computed as the mean score of its assigned items.

Model fit was assessed using the following indicators: the comparative fit index (CFI), Tucker Lewis Index (TLI), the root mean square error approximation (RMSEA) and the standard root mean residual (SRMR). For a good model fit, CFI and TLI should be greater than 0.9 (McDonald & Ho, 2002). SRMR and RMSEA should be less than 0.08 (MacCallum,

Browne, & Sugawara, 1996). Our hypothesized 7-factor model, in which all indicators loaded on their respective latent variables, demonstrated an acceptable model fit ( $\chi^2 = 657.80$ ,  $df = 254$ ,  $CFI = 0.94$ ,  $TLI = 0.93$ ,  $RMSEA = 0.06$ ,  $SRMR = 0.06$ ). In terms of discriminant validity, we want to demonstrate that (1) safety knowledge is distinct from self-efficacy, (2) self-efficacy is distinct from perceived usefulness, (3) self-efficacy is distinct from perceived low cost and (4) perceived usefulness is distinct from perceived low cost. Therefore, we also tested four alternative 6-factor models: combining safety knowledge with self-efficacy ( $\chi^2 = 1026.42$ ,  $df = 260$ ,  $CFI = 0.89$ ,  $TLI = 0.87$ ,  $RMSEA = 0.08$ ,  $SRMR = 0.10$ ); combining self-efficacy and perceived usefulness ( $\chi^2 = 1040.23$ ,  $df = 260$ ,  $CFI = 0.89$ ,  $TLI = 0.87$ ,  $RMSEA = 0.08$ ,  $SRMR = 0.10$ ), combining self-efficacy and perceived low cost ( $\chi^2 = 948.84$ ,  $df = 260$ ,  $CFI = 0.90$ ,  $TLI = 0.89$ ,  $RMSEA = 0.07$ ,  $SRMR = 0.07$ ), and combining perceived usefulness and perceived low cost ( $\chi^2 = 1088.42$ ,  $df = 260$ ,  $CFI = 0.88$ ,  $TLI = 0.86$ ,  $RMSEA = 0.08$ ,  $SRMR = 0.09$ ). All four alternative models demonstrated less than acceptable model fit. Thus, the results supported our hypothesized measurement model for the focal variables.

## Results

### Data analysis overview

We tested our hypotheses using Hayes' (2018) PROCESS (Version 3.5) macro code for SPSS. Hypotheses 1, 2 and 4–6 were tested using simple mediation models (Model 4). Safety knowledge, sensation seeking and psychological safety climate at Time 1 were each entered as independent variables, with the other two independent variables entered as covariates. Self-efficacy, perceived usefulness and perceived low cost at Time 1 were treated as mediators and entered as a set. Safety compliance at Time 2 was entered as the dependent variable. A bootstrap procedure with 5,000 samples was used to test the indirect effects of the three independent variables. Hypotheses 3 and 7 were tested using the second-stage moderated mediation models (Model 14). The models were the same as the simple mediation models described above, except that self-efficacy was entered as the Stage-2 moderator instead. All variables were mean-centred. For all analyses, we report unstandardized *B* weights.

### Descriptive statistics

Table 1 displays the means, standard deviations and bivariate correlations, for all variables. The bivariate correlations were consistent with the hypothesized main effects. Interestingly, neither age nor experience were related to safety compliance. These results contrast with prior findings, which suggest that age and experience might influence safety compliance. For example, research indicates that younger workers are less compliant compared to their older counterparts (Laberge, MacEachen, & Calvet, 2014). On the other hand, ethnographic studies also suggest more experienced workers can be less compliant than new recruits (Hale & Borys, 2013). Given their null effects, we did not control for age or experience in the hypothesis testing.

### Hypothesis testing

Hypotheses 1 and 2 concern the direct effects of can-do and reason-to states on safety compliance. The results of the regressions are presented in Table 2. Supporting

**Table 1.** Descriptive statistics, scale reliabilities and correlations (N = 386)

Variable	M	SD	1	2	3	4	5	6	7	8
1. Age	46.89	10.43								
2. Experience	27.91	11.85	.889**							
3. Self-efficacy	6.02	1.07	.001	-.025						
4. Perceived usefulness	5.95	1.11	.056	.074	.453**					
5. Perceived low cost	3.81	1.37	-.120**	-.099*	-.304**	-.121**				
6. Safety knowledge	6.36	0.67	.047	.032	.410**	.268**	-.183**			
7. Sensation seeking	2.83	0.75	-.203**	-.188**	-.029	-.125**	.157**	.018		
8. Psychological safety climate	5.30	1.43	.175**	.143**	.471**	.313**	-.295**	.289**	-.071	
9. Safety compliance	5.61	1.44	-.004	-.019	.335**	.315**	.122**	.236**	-.115**	.315**

\*p < .05; \*\*p < .01.

Hypotheses 1 and 2a, self-efficacy and perceived usefulness were positively associated with safety compliance ( $B = .23$ ,  $SE = .07$ ,  $p < .01$ ;  $B = .17$ ,  $SE = .05$ ,  $p < .005$  respectively). Unexpectedly, perceived low cost was not significant in predicting safety compliance ( $B = .05$ ,  $SE = .04$ ,  $n.s.$ ); thus, Hypothesis 2b was not supported.

Hypotheses 4–6 concern the mediating effects of can-do and reason-to states. Safety knowledge was positively related to all can-do and reason-to variables ( $B = .56$ ,  $SE = .08$ ,  $p < .001$  for self-efficacy;  $B = .31$ ,  $SE = .09$ ,  $p < .01$  for perceived usefulness;  $B = .35$ ,  $SE = .12$ ,  $p < .001$  for perceived low cost). The results of the indirect effects are presented in Table 3. Partially supporting Hypothesis 4, self-efficacy and perceived usefulness mediated the relationship between safety knowledge and safety compliance ( $B = .13$ ,  $SE = .04$ , bootstrap confidence interval: [0.042, 0.214] for self-efficacy;  $B = .05$ ,  $SE = .03$ , bootstrap confidence interval: [0.005, 0.132] for utility judgment). The indirect effect via perceived low cost was not significant ( $B = .02$ ,  $SE = .01$ , bootstrap confidence interval: [-0.006, 0.047]). In addition, safety knowledge had a direct significant effect on safety compliance in the mediation model ( $B = .24$ ,  $SE = .10$ ,  $p < .05$ ).

Sensation seeking had a positive association with the reason-to states of perceived usefulness ( $B = -.18$ ,  $SE = .07$ ,  $p < .05$ ) and perceived low cost ( $B = -.25$ ,  $SE = .09$ ,  $p < .001$ ), but not self-efficacy ( $B = -.02$ ,  $SE = .05$ ,  $n.s.$ ). Perceived usefulness mediated the relationship between sensation seeking and safety compliance ( $B = -.03$ ,  $SE = .02$ , bootstrap confidence interval: [-.073, -.005]); thus, Hypothesis 5 was partially supported. The indirect effects via self-efficacy ( $B = -.00$ ,  $SE = .01$ , bootstrap confidence interval: [-0.031, 0.021]) and perceived low cost ( $B = -.01$ ,  $SE = .01$ , bootstrap confidence interval: [-0.035, 0.005]) were not significant. Sensation seeking did not have a remaining direct significant effect on safety compliance ( $B = -.11$ ,  $SE = .07$ ,  $n.s.$ ) in the mediation model.

Psychological safety climate was positively related to all can-do and reason-to states ( $B = .28$ ,  $SE = .03$ ,  $p < .001$  for self-efficacy;  $B = .24$ ,  $SE = .05$ ,  $p < .01$  for perceived low cost;  $B = .21$ ,  $SE = .04$ ,  $p < .01$  for perceived usefulness). Partially supporting Hypothesis 5, self-efficacy and perceived usefulness mediated the relationship between psychological safety climate and safety compliance ( $B = .06$ ,  $SE = .02$  bootstrap confidence interval: [0.022, 0.115] for self-efficacy;  $B = .04$ ,  $SE = .02$ , bootstrap confidence interval: [0.010, 0.069] for perceived usefulness). The mediating effect of perceived low cost was not significant ( $B = -.01$ ,  $SE = .01$ , bootstrap confidence

**Table 2.** Regression results for estimated coefficients of the mediation model

Predictor	Self-efficacy		Perceived usefulness		Perceived low cost		Safety compliance	
	B	SE	B	SE	B	SE	B	SE
Constant	1.42	.44	3.70	.56	6.25	.68	.53	.70
Safety knowledge	.56***	.08	.31**	.09	.35**	.12	.24**	.10
Sensation seeking	-.02	.06	-.18*	.07	-.25**	.09	-.11	.08
Psychological safety climate	.28***	.03	.21***	.04	.23***	.04	.12*	.05
Self-efficacy							.23**	.07
Perceived usefulness							.17*	.05
Perceived low cost							.05	.04

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .



**Table 3.** Indirect effects

	B	BootSE	BootLLCI	BootULCI
Safety knowledge to safety compliance via				
Self-efficacy	.13	.05	0.047	0.214
Perceived usefulness	.06	.03	0.005	0.132
Perceived low cost	-.02	.01	-0.006	0.047
Sensation seeking to safety compliance via				
Self-efficacy	-.00	.01	-0.031	0.021
Perceived usefulness	-.04	.02	-0.073	-0.005
Perceived low cost	.01	.01	-0.035	0.005
Psychological safety climate to safety compliance via				
Self-efficacy	.06	.02	0.022	0.115
Perceived usefulness	.04	.02	0.010	0.069
Perceived low cost	-.01	.01	-0.005	0.029

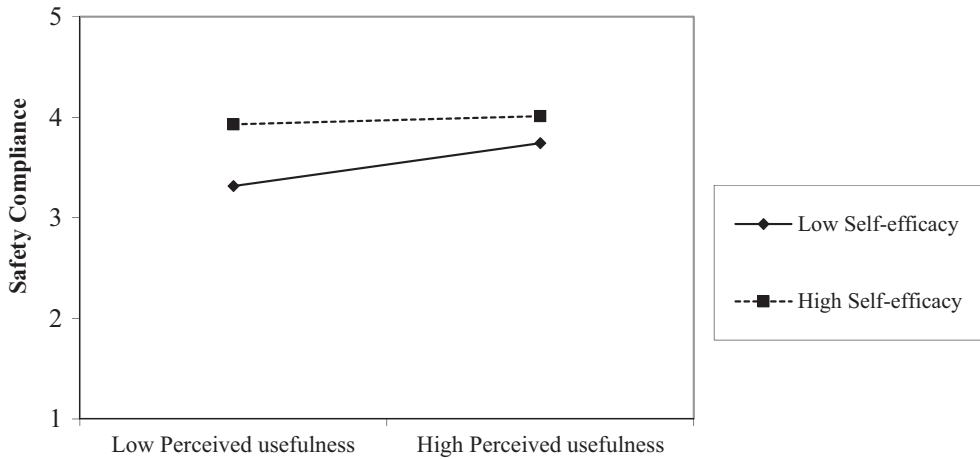
interval: [-0.005, 0.029]). In addition, psychological safety climate had a significant direct effect on safety compliance ( $B = .12$ ,  $SE = .04$ ,  $p < .01$ ).

Hypothesis 3 suggested that there is a positive synergistic effect between can-do and reason-to states. Partially supporting Hypothesis 3a, the interaction between self-efficacy and perceived usefulness was significant ( $B = -.08$ ,  $SE = .04$ ,  $p < .05$ ). However, in contrast to our hypothesized positive synergistic interaction, the simple slope test results suggested that the interaction is complementary. The relationship between perceived usefulness and safety compliance was significant when self-efficacy was at 1 *SD* below the mean and at the mean (see Table 4). When self-efficacy was at 1 *SD* above the mean, the effect of perceived usefulness on safety compliance was not significant. The interaction plot is shown in Figure 2. The results suggest that a can-do state can compensate for the lack of reason-to states. The interaction between self-efficacy and perceived low cost was not significant ( $B = .02$ ,  $SE = .03$ , *n.s.*); therefore, Hypothesis 3b was not supported.

Hypothesis 7 suggested that the interactions between can-do and reason-to states would mediate the effects of distal antecedents on safety compliance. When it comes to the interaction between self-efficacy and perceived usefulness, Hayes' (2015) index of moderated mediation was significant for all three distal antecedents (safety knowledge:  $B = -.03$ ,  $SE = .02$ , bootstrap confidence interval [-0.070, -0.001]; sensation seeking:  $B = -.02$ ,  $SE = .01$ , bootstrap confidence interval [-0.001, -0.042]; psychological safety climate:  $B = .02$ ,  $SE = .01$ , bootstrap confidence interval [-0.037, -0.001]). Table 5 shows the conditional indirect effects for both high (1 *SD* above the mean), mean and low levels (1 *SD* below the mean) of self-efficacy. The indirect effect of safety knowledge, sensation seeking and psychological safety climate on safety compliance via

**Table 4.** Conditional effect of perceived usefulness on safety compliance at the values of self-efficacy

Self-efficacy	b	BootSE	BootLLCI	BootULCI
-1 <i>SD</i>	.22	.06	0.103	0.335
Mean	.13	.05	0.027	0.240
+1 <i>SD</i>	.06	.07	-0.081	0.195



**Figure 2.** The interactive plot.

perceived usefulness was significant when self-efficacy was at 1 SD below the mean or at the mean level. The indirect relationship was not significant when self-efficacy was high. This partially supports Hypothesis 7a.

Given that the interaction between self-efficacy and perceived low cost was not significant, Hypothesis 7b, which concerns the conditional indirect effect of perceived low cost, was also not supported.

### Discussion

Drawing on the expectancy-value theory, we proposed that the decision to comply with safe work practices is underpinned by can-do (i.e. self-efficacy) and reason-to (i.e. perceived usefulness and perceived low cost) states, as well as their interactions. Distal contextual and individual antecedents were expected to influence safety compliance via

**Table 5.** Conditional indirect effects of distal antecedents via perceived usefulness at values of self-efficacy

Self-efficacy	<i>b</i>	BootSE	BootLLCI	BootULCI
<b>Safety knowledge–perceived usefulness–safety compliance</b>				
–1 SD	.07	.04	0.009	0.167
Mean	.04	.03	0.002	0.116
+1 SD	.02	.03	–0.024	0.087
<b>Sensation-seeking–perceived usefulness–safety compliance</b>				
–1 SD	–.04	.02	–0.090	–0.007
Mean	–.02	.01	–0.058	–0.003
+1 SD	–.01	.01	–0.040	0.015
<b>Psychological safety climate–perceived usefulness–safety compliance</b>				
–1 SD	.05	.02	0.016	0.084
Mean	.03	.01	0.007	0.058
+1 SD	.01	.01	–0.014	0.045

their impact on these states. Results of mediation models and moderated mediation models largely supported our hypotheses. Safety knowledge, sensation seeking and psychological safety climate indirectly predicted safety compliance at least partially via their effects on self-efficacy, perceived usefulness and their interaction. Perceived low cost did not have an independent effect on safety compliance. We also found a compensating interactive effect between self-efficacy and perceived usefulness, such that when self-efficacy is high, perceived usefulness no longer predicts safety compliance. Below, we discuss the theoretical and practical implications of our findings.

### **Theoretical implications**

By reconceptualizing safety compliance as a task choice, our study draws on expectancy-value theory to understand what motivates employees to voluntarily comply with organizational safety requirements. In a recent theoretical piece, Beus and Taylor (2018) used the expectancy-value framework to account for variances in employee safety-related behaviour, focusing primarily on reason-to states, such as instrumentality, resource investment and threat characteristics. Our study incorporates both can-do and reason-to states and distal antecedents, thereby building a bridge between expectancy-value theory and existing safety performance research.

We extend the expectancy-value framework by demonstrating this framework's utility in understanding task-choice behaviour under competing demands beyond the achievement context. Our finding aligns with previous research, which suggests that expectancy and value are two distinct concepts, and each has a unique effect on task-behavioural choices (Wigfield & Eccles, 2000). Our unique contribution to the expectancy-value framework lies in our investigation of the role of perceived low cost, which has received the least empirical attention in the past (Flake, Barron, Hulleman, McCoach, & Welsh, 2015). It is interesting to note that we did not find a significant relationship between perceived low cost and safety compliance when other factors were considered. One explanation might be that cost perceptions indirectly influence task behaviour via other expectancy and value perceptions.

Although prior research points to the role of self-efficacy (Chen & Chen, 2014; Chughtai, 2015; Hu et al., 2018) and perceived usefulness (Hu et al., 2016, 2018), our study is the first to examine the independent as well as interactive effects of these two variables, revealing an interesting pattern of results. Prior research suggests a positive synergetic interaction (Nagengast et al., 2011) or a contingent relationship between expectancy and subjective task value (Feather, 1982). In contrast to existing research and our expectation, we found that when self-efficacy was high, the importance of perceived usefulness diminished. One reason might be, unlike in an achievement context where the individual has high autonomy to choose their behaviour (i.e. which subject to study or to put in more effort), safe work practices are externally imposed and legally bound. Therefore, either a high level of self-efficacy or perceived usefulness might be sufficient to drive task behaviour in this context.

### **Practical implications**

Compliance with safe work practices has critical consequences for the safety of people and the environment in high-risk industries. While it is reasonable to expect that employees who are motivated to act safely generally do so, it does not necessarily mean that they will always comply with externally imposed safe work practices. Our finding suggests that if

leaders want to promote compliance, they should focus on building workers' self-confidence by applying high-level safety principles in the local task environment. This goal can be achieved by ensuring workers have adequate information and resources, conducting demonstrations and providing hands-on opportunities for skill development and practice. Furthermore, leaders should explain the rationale of complying with safe work practices, highlighting how these help the worker manage and eliminate potential risks. In light of our finding that self-efficacy can compensate for the lack of perceived usefulness, leaders can overcome the disadvantage of employees viewing safe work practices as less useful by cultivating confidence in undertaking such tasks.

Our research also has implications for safety training and training transfer. Often, safety rules and procedures are developed based on the latest engineering knowledge and best practice principles. Thus, they might be different from and sometimes in conflict with the existing work practices/habits workers have learned and developed over prior experiences. As a result, it is not uncommon for experienced workers to resist new safety practices and continue with their old ways after completing new training. Our study suggests such barriers in training transfer might be overcome if the training course considers building workers' self-efficacy and making the value of the new safe practices more explicit and clearer. This can be achieved through workforce consultation, where local adaptations improve the alignment between the training and workplace, enabling workers to see and be actively involved in increasing the usefulness and relevance of training material. To improve self-efficacy, the use of high-fidelity simulations and created opportunities to apply the training will provide the mastery experiences needed for self-efficacy (Casey, Turner, Hu, & Bancroft, 2021).

### ***Limitations and future research***

We now discuss the limitations of our work and how they can be addressed by future research. We collected independent variables and mediators simultaneously, thus precluding causal inference and directionality of the relationship. Although we grounded our model in existing theory and evidence, the reversed relationship also might be equally true; for example, self-efficacy and perceived usefulness might motivate individuals to acquire more safety knowledge and be more proactive in sourcing and increased psychological safety climate. Therefore, future studies should adopt a longitudinal research design so as to examine how can-do and reason-to states influence one's safety knowledge and the safety support they obtain over time.

Our data were self-reported from a single source. Although self-report of one's own psychological states and behaviour is appropriate, mono-method bias remains a methodological threat. Furthermore, the use of self-reports for safety compliance is generally considered to be vulnerable to the effects of social desirability bias. However, given our research context, gauging compliance from other sources presents practical challenges and can in fact be inaccurate. Electrical workers in our sample were not under constant observation (from supervisors/coworkers), sometimes working alone or located some distance away from one another. Given these practical constraints, we aimed to reduce method variance and the influence of social desirability by ensuring participants of the procedures in place to ensure their anonymity and confidentiality. We also developed a concrete list of relevant compliance behaviours in relation to safe work practices (e.g. risk assessment and circuit lockout). As such, our measure is less value laden and less likely to trigger social desirability bias. Furthermore, we separated the measurement of psychological states and behaviour. Nevertheless, future studies should seek to replicate

and extend our results by conducting research with other methods of rating behaviour, where possible and appropriate.

We note that our findings based on a male-dominated sample might not generalize to mixed gender samples or female-dominated samples in other high-risk industries (e.g. healthcare). Furthermore, it is possible that all the hypothesized relationships could be stronger or weaker depending on gender and future research should consider gender as a moderator. A case in point is the influence of gender on self-efficacy. For one, we think the existing research would support mixed views on the relationship between gender and self-efficacy in following safety procedures. Traditionally, research has suggested that men rate themselves as more self-efficacious than women, aligning with men's social role as being more confident, ambitious (Ellemers, 2018). However, research also suggests that women are more rule-following oriented than men (Ellemers, 2018). Therefore, it would be of value to see how men and women compare when it comes to self-efficacy in safety compliance. Furthermore, our sample consisted of electrical workers who often do not work closely with others in a team environment and might not have a direct supervisor with them in the field. Therefore, we recommend our finding is best generalized to a similar context. For example, industries such as transportation and logistics, farming and agriculture, and security services have contexts in which employees work alone. In other safety-critical contexts, workers might work in a team environment, such as healthcare and nuclear facilities. Future research should adopt a multi-level lens to capture the collective psychological states and team processes and dynamics essential for compliance to safe work practices.

Finally, we investigated a particular form of safety behaviour: compliance with safe work practices. Not all industries will have legally bound, safe work practices. At a minimum, future studies should replicate and extend our findings in non-safety-critical industries. It is important to acknowledge that the value of our proposed model relates to safety compliance and does not extend to the prediction of other safety behaviours. For instance, there is a wide range of literature on the concept of *adaptations* (Dekker, 2003) and *workarounds* (Mansour & Tremblay, in press) which reflect adaptive responses from employees when rules and procedures are ill-devised. However, these behaviours are associated with a distinct set of antecedents and thus were not within the scope of our research, but future research should nonetheless continue to explore if our proposed model can inform these other forms of safety-related behaviours.

## **Conclusion**

Existing safety research indicates that even the most safety-cautious and well-trained worker might deviate from organizational safety requirements. We relied on expectancy-value theory to understand when electrical workers are voluntarily motivated to work in accordance with safe work practices. Our results revealed a joint relationship between self-efficacy and perceived usefulness and how self-efficacy can compensate for the lack of perceived usefulness. Our model also reinforces the importance of individual (safety knowledge and sensation seeking) and contextual (psychological safety climate) factors in shaping can-do and reason-to factors, as well as compliance with safe work practices.

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## Conflicts of interest

All authors declare no conflict of interest.

## Author contributions

**Katherine White** (Data curation; Project administration; Resources; Writing – review & editing) **Nerina Jimmieson** (Conceptualization; Data curation; Methodology; Writing – review & editing) **Xiaowen Hu**, Ph.D (Conceptualization; Formal analysis; Visualization; Writing – original draft; Writing – review & editing).

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