

Article

The Effect of Leadership Style on Firefighters Well-Being during an Emergency

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Abstract: Leaders are crucial to ensuring the well-being of their subordinates. This study aims to understand the effects of two leadership styles (empowering vs. directive) on subordinates' well-being in an emergency situation (i.e., rural fire). A simulation study was conducted with two experimental conditions (empowering vs. directive leadership), and the subordinates' stress levels were measured before and after the simulated episode. Contrary to expectations, empowering leadership had no significant effect on subordinates' stress levels, while directive leadership contributed to reducing them. As expected, this effect was stronger for the subordinates with higher levels of stress prior to the simulated episode.

Keywords: leadership; firefighters; emergency; stress; well-being

1. Introduction

Firefighting is one of the most widely acknowledged dangerous and stressful occupations [1], as it places professionals in high-risk environments [2] in which they are often exposed to adverse situations characterized by constant danger and unpredictability [3,4]. Consequently, firefighters' well-being can be impacted [5] and result in psychopathologies such as PTSD [4] and/or burnout [6].

As it is not possible to intervene in the firefighters' work to reduce some of their stressors (i.e., intervention in rural fires), it is essential to provide these professionals with resources that enable them to cope with such adverse situations. Leaders take on a crucial role in providing many of the resources that ensure the well-being [7] of these professionals, thus protecting them from ill-being [8]. In fact, leadership behaviors have a positive impact on both subordinates (e.g., mental health, stress, organizational commitment, organizational citizenship behavior, performance, well-being, creativity, silence, voice behavior, and retention) and on the functioning of the organization (e.g., performance, innovation, creativity, efficiency, change, and knowledge) [9]. Several literature reviews have highlighted that a relationship-oriented leadership style (e.g., participative, empowering, supportive, and transformational) has a positive impact on subordinates' well-being [9–14].

Some studies have explored leadership in emergency professionals, suggesting that leadership increases flexibility [15] and helps to perceive and describe risky situations and feel more confident [16], which might help with facing stressful situations [17], and consequently, ensure well-being. Furthermore, Desmond [18] underlines the importance of leadership to promote well-being and states that an ethic of individualism can lead to a devaluation of leadership, making it less relevant, which consequently worsens well-being. Considering leadership style, some studies have shown that a style oriented toward people considerations and development promotes the well-being of the followers [19,20] and the adaptation of the team to wind changes in a firefighting situation [21]. In fact, firefighters value leaders who provide support, create mutually respectful environments,



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and possess the humility to admit mistakes, accepting failure within themselves and others [22], characteristics of empowering leadership.

Therefore, the aim of this study with firefighters was to ascertain the effect of leadership style (empowering vs. directive) on the psychological well-being of subordinates during their performance in a rural fire.

An experimental study was designed with two groups, one with empowering leadership and the other with directive leadership, who were requested to simulate a rural fire using an XVR simulator. Based on the Conservation of Resources theory [7], namely on the assumption that stress occurs when individuals lack the resources required to cope with stressors, the empowering leadership style was expected to provide subordinates with these resources, ensuring the maintenance of their well-being. The participants' stress and anxiety levels were measured before and at the end of the simulation exercise. This experimental design made it possible to assess the impact of leadership style on the well-being of the firefighters in an emergency situation identical to those experienced by these professionals in their daily work.

1.1. Importance of Leadership for the Well-Being of Firefighters

According to the Conservation of Resources theory (COR [7]), individuals seek to obtain, retain, and protect the resources (objects, personal characteristics, and physical, psychological, and social conditions) that enable them to achieve their goals. Stress occurs when individuals lose, risk losing, or invest too many resources compared to those that they manage to obtain. On the other hand, when individuals have access to the resources needed to deal with the loss or threat of loss of resources inherent to stressors, their well-being is not threatened [7]. Thus, according to the COR [7], leadership can be an organizational resource that enables subordinates to acquire resources, preventing the onset of disorders associated with ill-being (such as burnout and/or PTSD) in situations of loss or a threatened loss of resources. More specifically, empowering or participative leadership is a style in which the leader encourages subordinates to participate in decision-making, providing them with the information and support they need and promoting their responsibility to achieve the organization's goals [9]. In the specific context of firefighters, leaders have been found to promote subordinates' well-being and mitigate their ill-being through empowering or participative leadership by increasing their cognitive resources [23], increasing social support [24], increasing supervisor-subordinate guanxi (i.e., relationship) [25], and decreasing the sources of occupational stress [26]. In fact, even in periods of multiple occurrences (e.g., rural fires), transformational leadership is crucial in firefighter intervention teams, as it promotes the well-being of its members, namely their work engagement [27] and flourishing [28].

However, leaders' influence on their subordinates is shaped not only by who they are, what they do, and the context in which they operate, but above all by the subordinates' perceptions of their personal characteristics that contribute to their effectiveness, team, and/or organization. These perceptions and their effects correspond to self-schemes (knowledge structures integrating self-concepts or identities that shape perceptions, memories, and emotional and behavioral responses, often automatically), which are part of socio-cognitive processes, giving meaning to context and guiding activities [29,30]. The social identity theory [31], which postulates that people categorize themselves and others by groups, has an important implication for leadership. Groups are defined by a prototype that specifies what is common to members and distinct from other groups [32], which can be crucial in the evaluation of individuals as leaders and subordinates (individuals who match the prototype tend to be seen as leaders by subordinates who identify with the group) [33]. According to Implicit Leadership Theories (ILTs), these prototypes are cognitive structures that guide the processing of a leader's characteristics and facilitate inferences regarding behaviors and likely outcomes [34] through socialization and experiences with leaders. ILTs influence perceptions of actual leaders, the quality of leader-subordinate exchanges (LMX), and evaluations of leadership effectiveness [34]. Subordinates are more likely to recognize

leaders and be receptive to their influence if they are seen as prototypical figures who represent the group and its identity [35]. In other words, subordinates compare their ILTs and the leader's real characteristics and behaviors, and the closer the correspondence between the prototypical traits and the leader's behaviors, the better the evaluations regarding the leader and the quality of the leader–subordinates relationship. This, in turn, positively impacts job satisfaction, organizational commitment, and subordinates' well-being [36,37].

1.2. The Present Study

The aim of this study was to identify the leadership style that best contributes to subordinates' well-being in an emergency situation. Thus, the following hypotheses were formulated:

Hypothesis 1. *The empowering leadership style will be negatively associated with subordinates' levels of stress and anxiety during an intervention in a simulated rural fire.*

Hypothesis 2. *The directive leadership style will be positively associated with subordinates' stress and anxiety levels during an intervention in a simulated rural fire.*

Hypothesis 3. *The effect of the empowering style (3a) and directive style (3b) will be stronger in relation to firefighters with higher stress and anxiety levels at the beginning of the intervention when compared to those with lower stress and anxiety levels at the beginning of the intervention.*

2. Materials and Methods

2.1. Sample and Procedure

In order to conduct the simulation study, the Centro de Simulação e Realidade Virtual da Escola Nacional de Bombeiros (Centre for Simulation and Virtual Reality of the National Firefighting School) was used. The use of simulations based on crisis management competencies offers a powerful approach to selecting and preparing leaders to handle crises [38]. Twenty teams were created, each consisting of five participants, including the team leader. Half of the teams (10) were characterized by directive leadership (i.e., more authoritarian, task-focused) and the other half (10) by empowering leadership (i.e., more participative, relationship-focused). Each firefighting team had an established leader corresponding to a participant with a leading position in the fire brigade. In order to manipulate leadership behavior, the leaders of each team completed a questionnaire to measure their style as leaders (empowering or directive). Each team was assigned to one of the two leadership style conditions based on the leader's higher score in either the empowering or directive style. To reinforce the preferred leadership style, each team leader received a script with the behaviors deemed most effective according to the condition to which they were assigned (empowering or directive). The sample was composed of 100 firefighters whose age ranged between 21 and 67 years, with an average of 41 years. The participants had an average of 16 years of service, ranging between 1 and 50 years. The sample consisted of 25 women and 75 men.

In the initial questionnaire, the participants indicated their stress and anxiety levels during the week prior to the simulation exercise. The simulation exercise, which lasted approximately 75 min, consisted of a virtual and dynamic scenario simulating a real fire, and the aim of the firefighting team was to fight the fire using the virtual means provided. These types of simulation exercises are used in firefighting training. The scenario contained risky moments requiring the team to make rapid and appropriate decisions (e.g., a farm with livestock and people whose lives were at risk, and a densely populated camping site without hydrants requiring the immediate evacuation of people). In the final questionnaire, after the simulation exercise, the participants' perceptions of the leader's conduct were measured, as well as the stress and anxiety experienced during the exercise.

2.2. Measures

Leadership style. Leadership style was reinforced by a combination of leadership selection and training based on previous studies (e.g., [39,40]). The aim was to maximize leadership effectiveness so that the leaders displayed the desired behaviors, whether directive or empowering. A 20-item self-assessment questionnaire was administered to all the participants to assess their natural tendency to act as a directive or empowering leader. The 10-item Directive Leader Scale designed by [41] was used to measure directive leadership; an example item is “I feel comfortable if I have to assign performance goals to team members”. Ten items were used from the Empowering Leadership Questionnaire [42] to assess the participants’ tendency toward empowering leadership. An example item from this scale is “I feel comfortable when I have to encourage other people to express their ideas”. The items were rated on a 5-point Likert-type scale ranging from “very uncomfortable” to “very comfortable”.

Stress and anxiety. Pre- and post-simulation stress and anxiety were measured with 6 and 5 items, respectively, from the Portuguese version (EADS-21, ref. [43]) of the Depression Anxiety Stress Scales [44]. An example item from the anxiety scale is “I found it difficult to work up the initiative to do things”. An example item from the stress scale is “I found it hard to wind down”. The items were rated on a 4-point Likert-type scale, ranging from “Did not apply to me at all” to “Applied to me very much, or most of the time”.

Control variables. A recent review [45] shows that most control variables relate weakly to leadership topics. Although, we used sex (man = 0; woman = 1) and tenure as a firefighter as control variables.

3. Results

Before proceeding with the hypothesis testing, the correlations and descriptive results are presented in Table 1.

Table 1. Descriptive and correlations.

Variable	M	SD	1	2	3	4	5
Empowering leadership	3.31	0.61	1				
Directive leadership	3.18	0.69	0.80 **	1			
Previous stress	1.58	0.47	−0.05	−0.03	1		
Previous anxiety	1.28	0.43	−0.05	−0.04	0.68 **	1	
Post-stress	1.27	0.43	−0.17	−0.25 *	0.26 **	0.32 **	1
Post-anxiety	1.19	0.47	−0.15	−0.24 *	0.33 **	0.42 **	0.59 **

* $p < 0.05$; ** $p < 0.01$.

Sex was not significantly correlated with a directive leader style ($r = -0.174$, n.s.), empowering leader style ($r = -0.049$, n.s.), stress ($r = 0.020$, n.s.), nor anxiety ($r = 0.049$, n.s.). Tenure as a firefighter ($M = 16.2$ years; $DP = 10.9$; minimum 1; maximum 50) was also not significantly correlated with a directive leader style ($r = 0.119$, n.s.), empowering leader style ($r = 0.049$, n.s.), stress ($r = 0.105$, n.s.), nor anxiety ($r = 0.049$, n.s.). Thus, these variables were not introduced into the regression analysis as control variables.

Regarding the analytical strategy, a regression analysis was conducted to test the hypotheses that directive and empowering leadership have a different impact on subordinates’ stress and anxiety levels in a firefighting situation. Furthermore, to test the hypothesis that the leader’s behavior is more impactful when the subordinate’s anxiety and stress levels prior to the situation are high, a moderated regression analysis was performed. PROCESS 4.0 was used for both analyses [46].

As may be observed in Table 2, the directive leadership style of the team leader had a significant, direct negative effect on the subordinates’ stress and anxiety levels during the simulated firefighting episode. A directive leadership style appears to be associated with reduced stress and anxiety in subordinates, measured immediately after involvement in simulated firefighting, thus refuting Hypothesis 2. Similarly, contrary to

our expectations, team leaders' empowering leadership style had no significant effect on the subordinates' stress and anxiety levels during the simulated firefighting episode, thus refuting Hypothesis 1.

Table 2. Direct and interaction effects of leadership style and previous stress and anxiety levels on stress and anxiety after the simulated firefighting episode.

Variable	Model 1 Stress as Outcome	Model 2 Anxiety as Outcome
Empowering leadership	0.278	0.394
Directive leadership	−0.494 *	−0.578 **
Previous stress	0.251 *	
Previous anxiety		0.417 **
Directive leader X Previous stress	−0.258 **	
Directive leader X Previous anxiety		−0.234 *
R2	0.170 **	0.277 **

* $p < 0.05$; ** $p < 0.01$.

Regarding the predicted interaction effect (i.e., moderation) between initial stress and anxiety levels and leadership style on stress and anxiety levels during the simulation, the results support the moderating effect of prior stress and anxiety levels on this relationship for directive leadership (H3b), but not for empowering leadership (H3a).

Figure 1 represents the interaction between the directive leadership style of the team leader and the stress levels of the subordinates measured before the simulated firefighting episode. As may be observed, the subordinates under a directive leader exhibited lower stress levels during their performance than previously reported. Moreover, this stress-reducing effect was stronger for subordinates with higher stress levels at the beginning, thus supporting Hypothesis 3b.

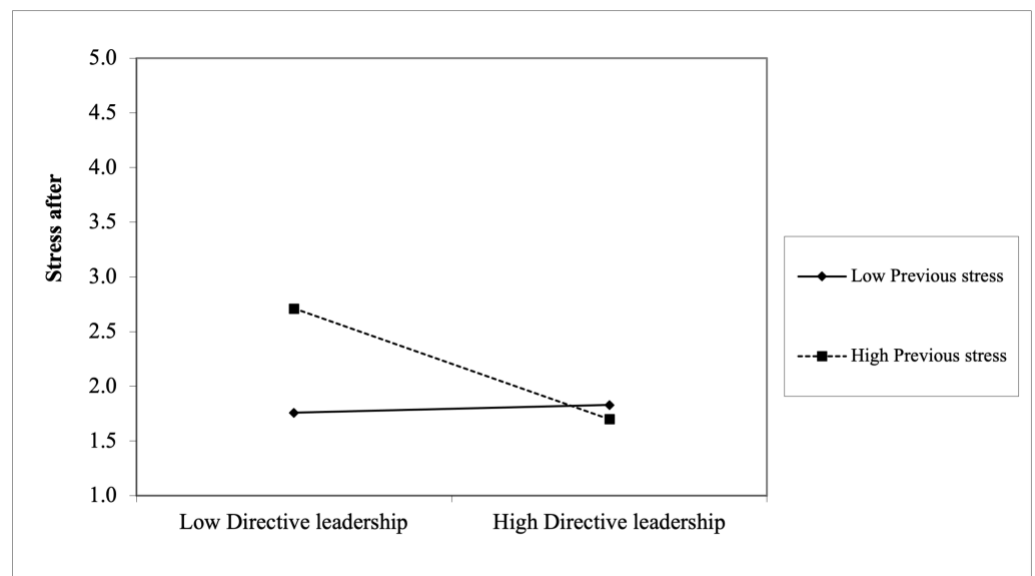


Figure 1. Interactive influence of previous stress and directive leadership style on stress after the fire.

It is also possible to observe in Figure 2 that the individuals under a directive leader exhibited lower levels of anxiety during their performance than previously reported. Moreover, the anxiety-reducing effect was stronger for the subordinates with higher levels of anxiety at the beginning, also supporting Hypothesis 3b.

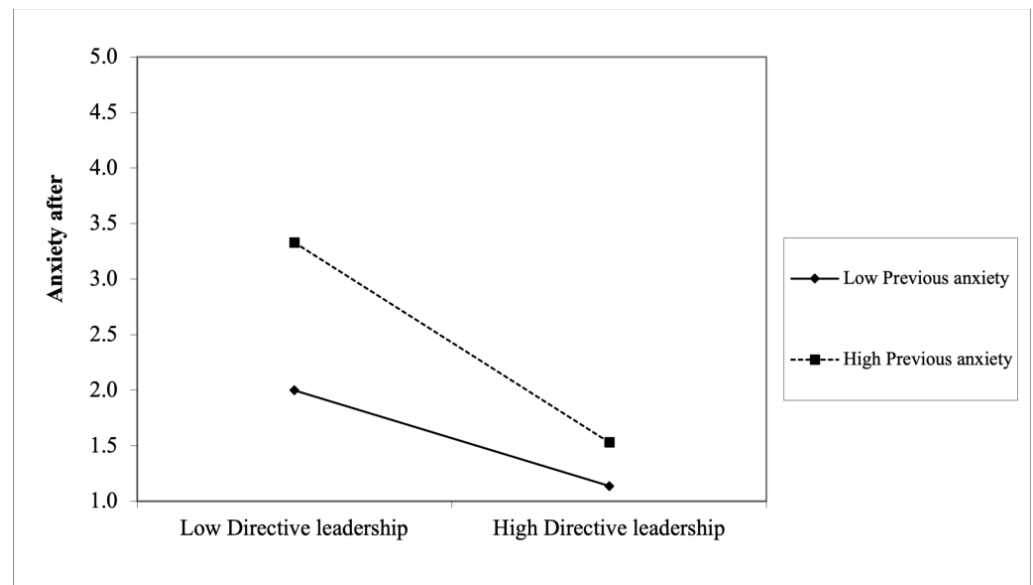


Figure 2. Interactive influence of previous anxiety and directive leadership style on anxiety after the firefighting episode.

4. Discussion

The aim of this study was to identify the leadership style that best contributes to subordinates' well-being in an emergency situation. Contrary to expectations, the empowering leadership style was found to have no significant effect on the subordinates' stress and anxiety levels during the simulated firefighting episode. On the contrary, the directive leadership style revealed a significant effect, contributing to reducing the subordinates' stress and anxiety levels during this simulation.

Although several reviews have pointed to a positive effect of a relationship-centered leadership style on promoting subordinates' well-being (e.g., [9–14]), this was not observed in the present study. In fact, to our knowledge, there are no previous studies that assess the direct effect of leadership style on well-being in an emergency situation. In this study, it was possible to test this effect by means of a simulation, whereby two conditions were created, one for each leadership style (empowering and directive), and stress was measured before and during the simulated firefighting episode. The absence of a significant effect of the empowering leadership style on the subordinates' well-being and, above all, the presence of a positive effect of the directive leadership style on the subordinates' well-being, may have occurred due to the emergency nature of the situation. In these situations, namely in firefighting, firefighters are required to execute decisions rapidly and accurately in order to control the situation and not put themselves, the participants, the population, or any material assets at risk.

Directive leadership, associated with the leader's positional power, facilitates subordinates' work in this type of situation since it provides clear guidelines and expectations regarding the fulfillment of instructions [47], while reducing task and role ambiguity and allowing for the execution of rapid decisions, which are essential in an emergency [39,48]. By making centralized decisions, directive leaders reduce the potential waste of time and effort involved in collective decision-making by helping subordinates adapt to challenging and dynamic tasks [40]. Thus, through a do-what-I-say approach, directive leaders are effective in emergencies [49] since, by providing subordinates with specific guidance, they facilitate task accomplishment [50] and, consequently, ensure their well-being [51]. In fact, not only are the leader's directive behaviors positively correlated with the satisfaction (a measure of well-being) and expectations of subordinates who are involved in ambiguous tasks [52], but also role clarification behaviors (one of the characteristics of directive leadership), since the reduction in uncertainty and ambiguity reduces subordinates' stress [53].

Thus, in light of the COR theory [7], directive leadership may be considered a leadership style that gives subordinates the necessary resources, namely, safety and predictability, so that they can cope with the stress that is inherent to an emergency. Additionally, in light of the social identity theory [30], directive leadership may emphasize group cohesion, shared identity, and the achievement of common goals, helping subordinates feel more secure and confident during an emergency. As previously mentioned, implicit leadership theories, as prototypes, are formed through socialization and experience with leaders. Therefore, the construction of an ILT regarding a leader, such as a directive leader, for example, will be greatly influenced by the resources that the leader helps develop in subordinates or makes available for action.

Furthermore, firefighters belong to a paramilitary institution [54], which presupposes a traditional and strongly hierarchical institution [55], where power is established by position in the hierarchy, and thus, the leadership prototype is closer to directive leadership [56].

Conversely, the findings suggest that empowering leadership in extreme situations, such as rural firefighting, which involves rapid, precise decisions, is not the most appropriate style to ensure that subordinates do not develop stress and anxiety. Indeed, while an empowering leader may be more appropriate for developing shared mental models and the coordination and learning routines needed to adapt to complex and changing environments, the subsequent team development and readiness require time [39]. Thus, subordinates confronted with emergencies, such as firefighters in a rural fire situation, require a directive style, as teams must be able to act immediately and cannot afford learning errors or the delays associated with an empowering leadership style [57,58].

Firefighting team leaders most likely have to be flexible to ensure the well-being of their subordinates. In emergencies, they should be directive, but in day-to-day situations, they should invest in an empowering leadership style, which fosters the sharing of power and information, and increases subordinates' autonomy, responsibility, and participation in decision-making [42,58]. Indeed, in the aftermath of an emergency, when the events are analyzed (debriefing), the resources deemed crucial to subordinates are of a different nature (e.g., effective communication, constructive feedback, flexibility, and empathy), and are ensured by the action of an empowering leader geared toward making team members feel at ease to share information and assess the situation openly and honestly [59]. Consequently, in this situation, empowering leadership is the style that ensures the well-being of subordinates. This is relevant since a relational approach to leadership is not widely used within the firefighting context, which is traditionally associated with the values of masculinity [60], with a "heroic male leader" as a self-contained, rational leader [22] and the salience of hierarchy to solve inter-group conflicts [61]. A promising path may be, as Eriksen et al. [62] suggested, if women start to assume leadership positions, they can make femininity values more salient, with benefits for relationship-oriented leadership.

In another vein, the results showed that the buffering effect of leadership on the subordinates' stress was stronger for those who had higher levels of stress prior to the simulated firefighting episode. This result can also be explained by the COR [7], which postulates that in an emergency situation, important resources (e.g., time, energy, etc.) are lost and individuals with fewer resources will become more vulnerable to losing even more resources and prone to experiencing higher levels of stress. On the other hand, these individuals become more attentive to the resources available to cope with this resource loss and are consequently even more responsive to the valuable resources provided by the leader, which can help them protect and increase their existing resources. Thus, resources gain prominence for the most stressed and anxious individuals, resulting in a positive response to the resources provided by the leader. In other words, more stressful situations with a consequent higher loss of resources are those in which the beneficial effect of resources (in this case, directive leadership) is more salient.

This result is also in line with the social identity theory [31], which suggests that when individuals are under stress, they may seek further identification with their group for emotional support and resilience. Thus, the directive leadership style may have been more

effective in reducing the stress of the subordinates, who were feeling more vulnerable prior to the simulation.

Limitations and Directions for Future Studies

This study has some limitations, which should be addressed in future research. One such limitation is the fact that this is a simulation study, which, despite seeking to place the participants in an emergency situation, may not reflect the complexity of the real world, as the simulation may be affected by the quality of the environment created for the study, the technology used for the simulation, and the participants' experience (since more experienced individuals may behave differently in a simulation than they would in a real situation) [63]. Another limitation is that this study contains data solely from self-reported questionnaires, which may contribute to social desirability. In future studies, data should be collected from various sources, such as obtaining saliva samples from subordinates prior to and following the simulated firefighting episode in order to measure stress (cortisol) levels. Furthermore, to obtain a clearer picture of what is going on during an emergency, future studies should include qualitative data collected with semi-structural interviews. Another limitation is that the leadership ability may have been a confounding variable and should be controlled in future studies, for example, by conducting repeated experiments with the leaders switching from one style of leadership to the other. Additionally, future studies could include an analysis of masculinity/femininity values for a better understanding of the effects of leadership style, both on the functioning of firefighter teams and on the well-being of the elements of these teams. Finally, the small sample size may be a limitation as it may have influenced the number of statistically significant relationships. In addition, the sample is not representative of Portuguese firefighters and does not allow for the generalization of the results.

5. Conclusions

5.1. Theoretical Implications

These results have important theoretical implications for understanding the relationship between leadership and subordinates' well-being in emergency situations. Firstly, the findings confirm the assumption of the COR theory that leadership (in this case, directive leadership) is a valuable organizational resource for maintaining subordinates' levels of well-being, providing them with indispensable resources (e.g., active work structure, role clarification, and clear guidelines and expectations, among others) to ensure optimal levels of well-being [7]. Secondly, these results point to the directive leadership style being more effective in reducing subordinates' stress during a stressful situation (i.e., an emergency) compared to the empowering leadership style, which suggests that in these situations, it may be more important to provide guidance and rapid decisions to help subordinates maintain safety and predictability. These results also contradict the assumption that an empowering leadership style is always the most effective in all contexts. Thirdly, the results show that the stress-reducing effect was stronger for the subordinates who demonstrated higher levels of stress prior to the simulated firefighting episode, which indicates that the COR theory may be applicable in understanding the relationship between leadership and well-being in emergency situations and that preserving subordinates' personal resources may be important in reducing stress in times of crisis.

5.2. Practical Implications

Our finding that the directive leadership style appears to be associated with subordinates' reduced levels of stress and anxiety in emergency situations highlights the need to consider leaders' actions and the need to adapt their leadership style to meet their subordinates' needs. Thus, conditions should be created for the development of leaders' skills (e.g., training programs and coaching) that enable them to be flexible and adapt their directive or empowering leadership style in accordance with the situation at hand.

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