Article

"Firefighters Hate Two Things—Change and the Way Things Are" Exploring Firefighters' Perspectives Towards Change

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Abstract

This study focuses on firefighters' relationship with different types of change in their profession and what barriers and facilitators might contribute to how they respond. Informed by the Force Field analysis of change, interviews were conducted to better understand what specific barriers and facilitators contribute to their views on types of change and the level of influence they carried. Twenty-five interviews were conducted with firefighters from a variety of backgrounds, including different ages, genders, ranks, and experience levels for both career and volunteer firefighters. Thematic analysis identified different responses to four common rationales that helped to explain the acceptance or dismissal of changes. These were as follows: (1) openness or apprehension towards change; (2) the results of a cost–benefit analysis that considered financial and manpower limits, perceived legitimacy of the problem, and efficacy of the solution; (3) reference to past experiences with changes that had failed or succeeded; and (4) trusted messengers that respected the chain of command were preferred. These themes are applicable across multiple types of changes, including technological and cultural adaptation. However, they also reveal challenges that may emerge due to friction with firefighters' professional identities and traditional masculine norms. The patterns identified here can help to inform future efforts to implement changes and to anticipate likely points of friction or motivation that can be leveraged.

Keywords: firefighter; change; culture; force field; diffusion of innovations

1. Introduction

There is a common witticism that "firefighters hate two things—change and the way things are". This suggests a complicated relationship with change, namely, a struggle between innovation and keeping the status quo. Firefighting is a field that has undergone a wide array of changes since its inception, such as technological innovations, regulatory policies, cancer prevention procedures, funding allocations, and demographic shifts. However, the persistence of workplace injuries and cancer exposure suggests that there is substantial room for further change or that prior suggestions have not taken root. As illustrated by Campbell and Hall (2024), while injuries have declined considerably, the rate of improvement has slowed, and 63,174 firefighters were injured in 2023 alone [1]. Continued changes in procedure and protective equipment can mitigate these injuries further [2], but

cultural changes are also important to lasting prevention [3,4]. Furthermore, emergency services must frequently update their training and practices in light of new legislation and guidelines, such as restrictions on the dispensation of opioids. There is ample reason, then, for firefighting to continue to change and for leaders to want to introduce necessary changes smoothly and effectively.

It is important to understand why some changes have been met with pushback, whilst others have been embraced and incorporated. To explore this problem, 25 interviews were conducted with firefighters from different backgrounds from North America. By evaluating the qualitative data collected from these interviews, we were able to identify themes in their responses that may help guide efforts for implementing changes in the future. The themes collected showed positive or negative attitudes regarding the implementation of change. By identifying what rationales emerge for and against certain types of change, we help identify potential friction points future proposals might aim to overcome.

2. Background

The goal of this study is to explore the ways that firefighters respond to changes within their profession. To explicate the processes at play, this review first examines general theoretical paradigms for explaining organizational change. Then, we apply these ideas specifically to firefighters to establish expectations for points of friction and opportunity that need further examination in the study. These help to inform our investigation of this qualitative study's guiding questions, which are as follows: (1) what were the opinions firefighters had regarding different types of change? And (2) what are the specific factors that could affect their opinions?

The Force Field analysis framework, originated from Kurt Lewin's Field theory, provides a metaphorical representation of why certain changes are more likely to be accepted [5]. The theory suggests that the process of change can be represented by two opposing forces clashing together [5,6]. The Forces of Change want to move towards a Desired Position After Change; however, they are currently being opposed by Forces Against Change, which serve to limit how much change is implemented [7]. This results in both forces stalling at an equilibrium point [8]. A review by Buchanan and colleagues [9] emphasizes that sustaining organizational change requires a complex interplay of organizational, attitudinal, leadership, and political drivers and barriers to success. No single factor is guaranteed to always work across all contexts. The value of the Force Field framework is that it helps researchers identify specific factors that may be amenable to influence. By identifying points of resistance and leverage in advance, advocates for change can better persuade their audience or alter an unpopular proposal.

There is considerable research on potential drivers and barriers for change from this framework [9,10]. Drivers include input from customers, a realization of product problems, reacting to competition and trends, and regulations [10]. Other factors include the perception that changes are fair, well understood, and do not conflict with other organizational priorities. At the same time, there are numerous opposing forces: unclear goals, loss of funding, lack of leadership support, and the sense that concerns were left unheard. Employees' wariness towards change is often attitudinal, reflecting a lack of readiness, commitment, or outright cynicism towards change prior to any specifics being proposed [11]. Burnes [12] further illustrates that the success or failure of a change is not solely based on these factors but also contextual factors. Attitudes do not necessarily reflect an actual resistance to change, and even a desired change may be undercut by managerial fumbling or an organizational crisis. Perceived violations of existing values and expectations can be just as important as any managerial decisions in generating resistance. Some of the factors discussed by these studies resonate intuitively with firefighting work,

but it is likely that there is variation due to the high-risk nature of the work and the non-profit context, as opposed to businesses described in much of the research.

In addition to barriers and facilitators, there is variation in the rate of uptake for changes. The Diffusions of Innovation (DOI) [13,14] framework suggests that most innovations fail, but those that succeed follow a pattern where a handful of early adopters successfully take initial risks and are then followed by others. These early adopters are characterized by their excitement towards the innovation, few perceived risks, high tolerance of potential losses, and the perception that benefits outweigh costs. On the other hand, there are also laggards who tend to delay adoption until the innovation has largely been picked up. These laggards may be resistant to social pressure, skeptical to change as a whole, or possess an abundance of time or resources that make change feel less urgent [13,14]. This differentiation is useful to this study because it helps to identify sources of variation amongst firefighters—in other words, it suggests that, despite the witticism, not all firefighters might hate change after all.

Change and Firefighters

When applying these ideas to firefighters, it is important to consider a few features that are common to much firefighting work. Firefighters have developed a work culture that places strength and endurance in high esteem [15]. This action-oriented mentality and reliance on their physical abilities often manifests in the expectation that firefighters are supposed to be tough and go towards danger. On the other hand, seeking help or admitting weakness runs counter to this pressure. Sometimes this mentality reflects an adherence to traditional hypermasculine norms, distancing themselves from perceived weakness or femininity [16]. The associated risk taking can be seen in the persistently high injury rates amongst firefighters [17], and the aversion to femininity is documented in the frequent hostility met to a particular change, i.e., the incorporation of women into the force [16,18,19]. While women firefighters have been increasing in numbers, they are still a small minority, making up 8.7% in the England [20], 4.43% in the US [21], and 22% of volunteers in Australia [22]. Desmond [4] further argues that this machismo also manifests itself in a rhetoric of self-blame, where firefighters who are injured or killed in the line of duty are presumed to have failed to "outsmart" the fire or follow specific policies. At the same time, this is not a given—the adherence to professionalism and community duty seems to counter the tendencies towards sexism or racism in some cases [23]. In sum, then, we would expect that adherence to traditionalism and manifestations of this machismo may correspond to a resistance to change in at least some scenarios.

Tradition has always been heavily valued by firefighters, not just in the US, but also in many countries around the world. Deviation from tradition is often viewed as risky or foolish. Desmond [4] describes the institutionalization of traditional firefighting wisdom into guidelines followed by wildland firefighters such as the "ten fire orders" and "The Eighteen Situations that Shout 'Watch Out!'" Adherence to this tradition allows firefighters to "make their own luck"—meanwhile, deviating from them becomes a rationale for injuries or fatalities. The high-risk nature of firefighting work means incorporating changes can generate enormous risks, so it is rational that changes are met with hesitance. This is demonstrated in studies that find that many firefighters in the UK are resistant to modernization [24]. In other cases, adherence to tradition may also be linked to adhering to certain aesthetics that symbolize firefighting and heroism in the minds of the public and firefighters. As one example, Wolffe and Colleagues [3] found that 16% of UK firefighters surveyed viewed contaminated personal protective equipment (PPE) as a "badge of honor". They were also more likely to take unnecessary risks, such as eating with sooty hands and not thoroughly cleaning their bodies and worksites of smoke smells. This illustrates the

clash between a culture of machismo and toughness with safety. Similarly, the favoring of certain aesthetics helps explain the hesitance of American firefighters towards adopting "European"-style helmets that lack a wide brim, despite research that suggests safety benefits. These cases lead us to expect that adherence to tradition may be a key driver for hesitance to adopt certain kinds of changes [25,26].

Financial strains also present barriers to potential change. Fire departments in the US have variable funding, depending on federal, state, and local grants, and donations to support volunteer or professional staff. Unfortunately, many of these funding streams have failed to match inflation or have faced cuts, such as 10% reductions to the Assistance to Firefighters Grant in 2024 [27]. Climate change globally has also increased operating costs for some departments, such as in the case of Canada's wildland firefighting budget that has risen $150 million per decade since 1970 [28]. The US Fire Administration has noted similar pressures, observing a 23% higher demand for fire and emergency medical services nationwide [29]. These financial exigencies are made all the more relevant in light of the need to periodically retire equipment due to wear and tear and the high risk of carcinogen exposure. Resource scarcity also applies to declining human capital, as indicated by declining rates of volunteering at fire departments [30]. These limitations mean that changes are unlikely to occur if they are financially or personally burdensome, if funding streams do not exist to cover them, and if expectations for upgrading or purchasing are not enforced.

This is not to say that firefighters are going to always be averse to change—as suggested by the DOI theory, there should be some who invite it. One likely factor in driving that willingness to change is that they view the proposed problem as serious, real, and preventable. Injury prevention has received substantial institutional backing and documentation in the US, as well as considerable training to address the 351,800 injuries documented between 2003 and 2014 [31]. More recently, cancer prevention has become a central goal of modern decontamination procedures, in part because firefighters have translated personal cancer experiences into advocacy for change [32]. In a different vein, Lee and colleagues [33] found that Japanese and Australian firefighters were quite interested in specific technological changes in their protective equipment, such as cooling systems and location monitoring. Other changes were viewed with more hesitance, however, such as integrated voice recording, reflecting a spectrum of perceived utility and risk. Lastly, the messenger is likely to matter. Firefighter organizations are predominantly hierarchical, using a top-down military-like structure [15,34]. This means that change may be more successful if it is driven by leadership, such as a commanding officer or a regulatory agency.

3. Materials and Methods

Twenty-five interviews with firefighters were conducted in order to collect data regarding common changes in fire departments and their opinions towards them. The interviewees were primarily structural firefighters from the East Coast of the United States and Canada. The interviewees consisted of both males and females from different ages and levels of experience; however, all racially identified as white. The interviews were coded to allow common and intertwining themes to be presented.

3.1. Data

In-depth, semi-structured qualitative interviews were conducted with firefighters as part of a study gauging firefighter's reactions to a preliminary design for an exoskeleton that was intended to be used in both interior and exterior firefighting scenarios. The study protocol was approved by the [REDACTED] IRB, case# 21–64. Recruitment for respondents was conducted via announcements and ads, posts on social media, newsletters,

and invitations delivered at a variety of fire organizations, such as local fire departments and fire chief associations. Emails were distributed via national and international firefighter associations and research centers (e.g., Women in Fire, Centre for Fire Rescue & EMS Health Research, and International Association of Fire Chiefs). Participants were eligible as long as they had served as either a volunteer or professional firefighter and were over 18 years old. All participants were offered a $25 gift card as a token of appreciation for their time. In total, 25 firefighters agreed to participate in the study. Interviewees varied in both physical and professional characteristics, which are summarized in Table 1. All names used in the manuscript are pseudonyms.

Table 1. Respondent demographics (*n* = 25).

	Percent (%)	**Number (#)**
Age		
<30	12%	3
30–50	72%	18
51+	16%	4
Experience Level		
<10 years	28%	7
10 to 20 years	40%	10
20+ years	32%	8
Sex		
Female	48%	12
Male	52%	13
Highest Degree		
Less than college	4%	1
College	72%	18
Masters/PHD	24%	6
Professional Status		
Career	20%	5
Volunteer	40%	10
Both career and volunteer	40%	10
Was in a leadership role	36%	9
Race		
White	100%	25

The interview guide, which is provided in Appendix A, focused on a variety of questions about firefighting culture, injury prevention, and attitudes towards change. The latter questions are most relevant to exploring how respondents reacted to the idea that "firefighters hate change," and eliciting stories of changes that they felt had worked, failed, or were needed. The second half of the interview involved a brief presentation on a proposed exoskeleton and the firefighter's feedback. This gave an opportunity to see firefighters' reactions to a more tangible technological change. Interviews typically lasted two hours. In all cases, the interviewers probed and asked follow-up questions to respondents in order to elicit more detailed responses or complex perspectives when relevant to the study's questions.

3.2. Analysis Process

We conducted a thematic analysis to identify the common ways the respondents talked about change. Deductive codes used existing theories that could then be identified within interview transcripts. For example, based on the Diffusion of Innovations Theory [13,14], we coded for indications of whether the respondents leaned towards being "innovators" or "laggards" towards a particular change. From a Force Field analysis, we coded for ideas or phrases that represented forces for or against organizational change. Some of

these themes were derived from past studies, such as Smith, that looked at factors that affected the success of change in organizations [10], and Van Scotter, that showed firefighter hesitance towards anything that does not adhere to tradition, machismo, and hierarchical thinking [15]. Codes were also inductively developed as they emerged throughout the analysis, such as when concerns about training emerged. These codes were then further reviewed to identify common themes across interviews that reflected common patterns in the data. For a theme to be taken into consideration, multiple interviewees needed to make reference to how it affected their views on change.

4. Results

During the interviews, firefighters gave various drivers and barriers for change that could be considered from the framework of the Force Field theory. Our analysis of the interviews resulted in four themes that encapsulate recurring patterns in how respondents talked about change. These tie together various narratives and rationales that occurred across interviews to create a cohesive pattern. These themes are as follows: (1) the individual's personal orientation towards the concept of change, (2) factors considered in the firefighter's cost–benefit analysis, (3) past experiences with change efforts, and (4) their perception of the changemaker. Readers are warned that this section includes uncensored quotes with firefighters, some of which contain harsh language.

4.1. Theme 1: Openness to Change

Interviewees often expressed either hesitance or eagerness towards changes, in part depending on the type of change, but also their wariness or openness to change as a whole. Without fully identifying any one firefighter as a laggard or innovator, there were numerous references that reflected a general orientation towards change. Laggard-esque behavior showed hesitance marked by the sense that change introduced new problems and could violate an idealized image of traditional firefighting. Innovator-esque rationales stemmed from a belief that change was an opportunity to improve and increase efficiency and that firefighting culture was too old-fashioned.

Hesitators drew on several lines of reasoning to justify their position. Change was presumed to be the source of new risks, new liabilities, new challenges, and new concerns than otherwise presented. In the case of technological change, body cameras were met with pushback when they were suggested, raising concerns that it would create a paper trail that lawyers, regulators, insurance companies, or disgruntled residents might exploit to sue or discipline firefighters. Nico, a 30-year-old career firefighter, expressed his skepticism over "anything video," articulating a feeling of walking on eggshells that was already apparent when "just thinking of the things we have to stop ourselves from saying or doing when police are around." Even hand tools could be met with skepticism. Gleeson, a 50-year-old veteran firefighter, described his department's new "TNT" tools as making the job harder than it already was:

> "So basically, it's a ceiling puller, so there's a hook on it that you can hook into a ceiling to pull down. . . . [the other end] is an axe and a sledgehammer. Yeah, everything's good. Well. If you're gonna take a pole to pull down a ceiling, do you wanna add a 15-pound weight to it on the bottom? Now you have to lift 15 more pounds or 10 pounds over your head. That doesn't make sense. Why would you want to do something like that?" (Gleeson, M, 50s)

A second strain of reasoning that emerged amongst laggards revolved around favoring traditional methods and images of firefighting. To the latter point, one change that was met with apprehension was the notion of switching from wide-brimmed helmets to "European" motorcycle-style helmets. Meg, a 20-year-old career firefighter, described an interaction

surrounding a man who was applying to be battalion chief whilst trying out a European-style helmet: "He walked in, said something to us at breakfast, and then walked out. My lieutenant looked at me, and he is like: 'There's certain times in your career where somebody is above you, and you realize it's time to test [apply] for their position'. ... He's like, I just couldn't imagine taking command from a guy in a European helmet, and I was just like, Oh, my gosh". Nico (M, 30s) argued that this aversion is mostly about the vanity of the firefighters as opposed to safety:

> "The Euro helmets that are proven to disperse the heat better and [have] ... better impact protection, but what do people use? Their grandfather's old leather helmet. Why? Because it looks cool. It's what they've used for generations. It's just that we hate change. ... They work. They're proven to work. But nobody wants to wear them because it's not a traditional American firefighting helmet." (Nico, M, 30s)

Hesitance to change could also manifest in the response to long-term tightened budgets. After years of learning to make do and stretch investments, Carter, a 30-year-old veteran carrier firefighter with more than 15 years on the job, emphasized that "we know in the [current] financial climate that more isn't better, so we're just trying to hold on to what we've got." To an extent, then, laggard behavior is not just a feature of the individual, it can reflect a cultural adaptation to austerity that spans entire departments.

In rare cases, appeals to tradition also drew on the historical male domination of firefighting's ranks and a culture of machismo that celebrates toughness and risk taking. Gleeson (M, 50s) described his views on injuries as "I'm a different breed ... I've been in the army ... my arm would probably have to be missing, or completely off for me to call an ambulance." He also emphasized the need for toughness as intrinsic to firefighting: "We're not grooming a bunch of pussies here, just, you know." Reflecting on this sort of rhetoric, Rachel, a 30-year-old firefighter and EMS staff member observed that "there was a lot of pushback, because I think that as firefighters, as men, it was very much about presenting as 'we're tough'." For respondents like Gleeson, changes around firefighting culture that might relax fitness requirements or encourage mental health outreach clashed with the image of stoic strength that they identified, generating resistance.

On the other hand, some interviewees described an openness and excitement towards new technologies, gadgets, and ideas. Just as hostility to change can be a feature of entire departments, openness is as well:

> "Our department is actually extremely progressive, and we've always got the latest and greatest and people are really open to that. We don't have the European helmets, but we got rid of the chicken helmets a long time ago." (Hazel, F, 40s)

For these respondents, adapting to change and incorporating it was simply part of the new territory. In response to a question about the qualities of a good firefighter, one interviewee said that "I think one of the things that's uniform is all of us want to make things better. Right?" (Silena, F, 40s). Here, technological change, in particular, was framed as an opportunity for greater safety, as evidenced by similar comments made by Jason, a 50-year-old firefighter with 34 years of experience:

> "...it's for the better of the firemen. There's less cancer now than there was back 40 years ago. ... [you] got hit with something and you had a plastic helmet type thing. Now they're a hard hat with a cushion inside of them." (Jason, M, 50s)

Jason's comment further evinces a sense of generational divide that was key to identifying an openness to innovation. This was partly age and generationally related, with Meg (F, 20s) being open to computers and digital records, noting that she "grew up with a phone

in hand and knew how to use all the technology". But this was further compounded by a sense that older generations were out of touch and had let tradition hold themselves back: "... [in] the fire services a lot of things have worked for a very long time, but I think, as things change in the world. It's something that firefighters have to adapt to" (Rachel, F, 30s). Leo, a 20-year-old firefighter, goes even further, chastising the dogmatism that prevented older fighters from opening their minds to newer battery-powered tools, interpreting it as negative knee-jerk reaction that does not take in consideration the presented facts: "It's just something that they have convinced themselves of, or heard somebody say to them, and they're parroting it back". However, some senior firefighters actually aligned with this position as well— Lester, a 60-year-old former fire chief with over 40 years of experience, did not shy away from expressing their understanding of the need for changes to how fire departments operate and to their decontamination practices in order to reduce the number of death tolls due to cancer and other health issues in firefighters caused by their hazardous work: "You say, well, why are we doing it this way? Because that's what we've always done. ... But we're killing people. So why is it that we're still doing the same thing and expecting a different outcome?"

Some interviewees were experienced in trying to navigate these hurdles after personally championing causes that they felt would help themselves and their peers. Amongst our interviewees were inventors, cancer advocates, and mental health advocates actively working to make change palatable to others. One example of this was Frank, a 40-year-old firefighter with 22 years of experience, who described his efforts to reframe safety initiatives in a way that would be more readily adopted by his peers, hoping to increase the perception of the solution as viable:

> "We care about each other. We care about our colleagues, and if our colleagues' safety is something we truly, care about, then we have to take those safer approaches. So it's not about changing our culture but embracing those aspects of our culture that we already value into a more safety conscious framework." (Frank, M, 40s)

These interviewees demonstrated skill in presenting changes in a way that was consistent with the values and needs of their audience as opposed to advocating for changes based on data or evidence.

4.2. Theme 2: The Cost–Benefit Analysis

If the prior theme focused on gut inclinations towards change as a whole, this theme articulates a more calculated assessment of specific changes that were presented. Interviewees considered a variety of elements in determining the feasibility, necessity, and potential effectiveness of change, weighing them against potential monetary and human costs.

The first portion of the cost–benefit analysis reflects the perceived scope, difficulty, and cost of making the change. Some of this is straightforward: large, technical, and challenging changes were perceived with more caution than simpler ones that could be easily implemented. When presented with the hypothetical exoskeleton designs, one of the first questions we received was always about cost. This was a recurring message across a variety of changes discussed. Interviewees described tight budgets and increasing recurring costs of things like maintaining turnout gear and vehicles. In some cases, local governments were looking at cutting funding further, aiming to reduce the only paid staff on their crew—full-time truck drivers. The concern is summed up by recent recruit Tyson as "Money in the fire service, especially ... is already extremely tight" (Tyson, M, 20s). But even if the monetary cost hurdle was passed, other costs and complexities were considered. When presenting the exoskeleton, we were asked: would retraining be required? How hard is it to learn? How long before a beginner is deployable? How much space would it take up?

What would maintenance look like? Is it easy to fit into existing decontamination protocols? Would it require new charging equipment? Answers to questions such as these helped firefighters determine the feasibility of changes and if they were met with apprehension, polite rejection, or genuine enthusiasm.

Yet, the cost–benefit analysis was more complex than this. Two factors were particularly salient in our discussions: the problem's perceived "realness," and the perception that the proposed change will actually meaningfully fix the problem. Personal experiences were frequently drawn on to justify why a firefighter was eager to push for change. These experiences gave the problems new salience, justifying high costs or hardship that might be associated with the remedies. Lester (M, 60s) described his personal experiences with friends who had died of cancer, and his own personal near-death scare after falling into a hidden manure pit beneath a barn that was on fire. In his words: "I've seen the errors of our ways . . . I don't want people to make the same mistake"

The significance of experience as a motivator for change came up in conversations about addressing sexism amongst firefighters, with several citing firsthand experiences and a general pressure to overperform and exert themselves:

> "As a female. I feel like I'm being judged even more, and I have to prove myself even more, than a male would. I might be wanting to be like: 'Hell no, I ain't using that' [but] I gotta show them that I'm tough enough". (Clarisse, F, 30s)

The female firefighters we spoke to were sometimes eager to tackle this problem and to create a more inclusive environment. In one subtle example, Silena, a 40-year-old female firefighter with 29 years of experience, describes challenging the gender bias in language in her department, where awards were given to senior "firemen": "I was like, why doesn't [the plaque] say senior firefighter? What do we do the day that our senior employee is not a man? And they're like, oh, well, we'll change it when we get to it, and I'm like. No." These personal experiences and the vantage point held by female firefighters meant that the problem of sexism was much more real and urgent to address, rebalancing the entire cost–benefit analysis accordingly.

The second factor that impacted firefighters' cost–benefit analysis was their perception of the proposed solution. In sum: "Show them that it works and you'll get buy in from people" (Charles, M, 40s). Even if a problem was viewed as legitimate and resources were available to address it, the solution needed to be accepted as a valid solution. As illustrated before with the case of European-style helmets, this decision was not just made based on data, but also a web of experiences and assumptions that reflect cultural ideals about firefighting labor. Some firefighters we spoke to described a sense of distrust towards marketing and overpromising, again reflecting a preference for traditional methods as opposed to new approaches. Rather than any sort of messaging or marketing, the experience of a solution's effectiveness firsthand was the deciding factor for leaders who had to "make a believer out of them" (Nico, M, 30).

4.3. Theme 3: Relationship with Changes Past

Interviewees, especially ones with more time on the job, provided past reasons for why they were hesitant to implement changes. Firefighters who have had past failings with change appear to push away from change because of the negative connotations they have drawn from their past experiences. Throughout the interviews, many firefighters provided specific examples of why they did not adopt new changes because of past issues. Firefighters, like Leo (M, 20s), talked about how their department does not use certain types of batteries because they know from past experience that "these batteries die all the time". Other firefighters, like Clarisse (F, 30s), talked about procedural changes that required them to relearn how to operate in their work, such as implementing a lockbox for opioids with

strict requirements to obtain the medication. While the reason for the change might have merit, past challenges with its implementation may make firefighters more hesitant as they link future changes in their department with their past experiences.

The opposite is also true, where positive experiences with change could result in firefighters viewing future change more favorably. One of the most prevalent examples of these throughout the interviews has been the integration of women in the department. As women began to enter fire departments and show they were capable of performing the same jobs as men, their presence began to be more accepted and less stigmatized. Jason (M, 50s), who has been a firefighter for a long time and saw the integration of women in his department, explained that they have "quite a few women in the fire service now compared to when I first started 30 something years ago. I mean our departments probably got I would say. 8–10 women in right now and some of them are interior firefighters". As women were seen as a positive change in fire departments, more changes started to be implemented in departments, as they were also viewed in a positive light. Sadie, a 30-year-old female firefighter, gave more details in regard to this, explaining how her department started to make more changes after women began to join: ". . . our training department didn't have women on for years. And they had a woman join them. And then, all of a sudden, just like that. They're just you know, just the simplest of things, of what brass to wear and how to wash all the carcinogens out of your hair, and how should I tie up my hair when we're wearing breathing apparatus?" While these may seem like minor changes to some, this example shows that prior successes with change can build a tolerance to future change as well.

4.4. Theme 4: Presence of Changemaker

During the interviews, it became clear that firefighters possessed strong bonds between each other. Leo (M, 20s) talked about the trust he needed to build when he first joined his department and the benefits of being accepted by his peers. He explained that it was necessary for him to form strong relationships with his counterparts in order for them to trust him, rather than think of him as an outsider. And when this trust is gained, firefighters are able to be more reticent of your opinions and be more willing to adopt any suggestion you may present.

> "There's like a social sense of belonging. And so, if someone comes in, you know who's friends with a whole bunch of other people in the room, and expresses an opinion that opinion might rapidly be adopted without any, you know, questioning". (Leo, M, 20s)

A changemaker is someone in an organization that is able to push for change, becoming the catalyst for others to be more comfortable with adopting the change and following their example [35]. When conducting the interviews, it was determined that changemakers in fire departments were the commanding officers who were able to use their influence to convince the firefighters under them to adopt a change. Firefighting is a hierarchical organization, where it is expected that the orders you are given must be followed. When a firefighter in a leadership position pushes for a change, it is expected that everyone else must follow. Bianca (F, 40s) explained this best when she talked about how her department was able to implement new technology thanks to her lieutenant. "I think the reason this went through easier, and that change was made is because the Lieutenant. It's the crew commander that has to buy in and has to decide. They're going to do it and makes it happen". This also applies when firefighter regulatory boards try to implement changes. Tyson (M, 20s), a less senior firefighter, explained that his state's fire board was able to push for more technological changes because of the influence they have ". . . because they run all of our training". Influence is the reason why leadership in fire departments are

able to implement changes, because firefighters trust them to make the right decisions for the department.

5. Discussion

This study aimed to answer two research questions regarding the relationship firefighters have with change: (i) what were the opinions firefighters had regarding different types of change? And (ii) what are the specific factors that could affect their opinions?

While we found ample support for the idea that firefighters are often hesitant towards change, our interviews revealed that this is not a wholly irrational aversion. Instead, consistent with the Force Field theory's framing, there are numerous pressures on both institutional and individual levels that drive change forward or push against it. These include the individual's openness to change as a whole, a cost–benefit analysis of the potential proposed changes, consideration of prior similar changes, and trust in the source of the proposal. While none of these factors are enough to determine if a change will be supported, together they can tip the scale.

These forces for and against change are, in many ways, similar to prior studies in other fields [9,36,37]. Like Safaghat [37], we found that the lack of organizational commitment and support for a change was a likely clue for its rejection. In one case, this was reflected in a firefighter's concerns about funding, but it also showed in the wariness of changes that were not endorsed by leaders or trusted organizations that were assumed to have their best interests at heart. We found that changes needed to be perceived as consistent with the values of the institution and the labor being performed [10]. This friction against change was rooted in traditional stereotypes of firefighting or specifically those around firemen, reflecting concerns about changes to beliefs and practices that were thought to keep people alive in a high-risk environment.

The high stakes for firefighting help to explain its conservatism towards certain changes, which aligns with prior research [4,18]. However, there is also an indication that firefighters are not united by a singular set of values. It is true that a minority of interviewees seemed threatened by the loss of firefighting's rugged machismo, but many were also eager to invite changes and innovations. Part of this appears to have been a generational divide in the willingness to try new things but also the ongoing presence of successful changes, such as the incorporation of women into the force.

Studies have shown that young people, between the ages of 15 and 25, tend to be more open to accept change [38]. They can often appear to possess personality traits that encourage the exploration and envisioning of new ideas [39], leading to a desire for change. During the study, three firefighters under the age of 30 were interviewed, all of them expressing views that would classify them as innovators in the Diffusion of Innovations Theory. Unlike their senior counterparts, they were less concerned with maintaining tradition in comparison to finding ways of modernizing their respective departments. While this was a small pool of data collected from the interviews, other firefighters also talked about how younger firefighters seemed to be more open to change. Unlike their senior officers, these younger firefighters appeared to be both more tech-savvy and physically fit, allowing them to be better suited to adapt to the types of changes explained previously. Moreover, these firefighters usually possessed lower ranks in comparison to their counterparts, meaning that when considering a new change, they had fewer responsibilities, rather than a more senior officer having to consider how the change would impact the individuals under them. While these young firefighters still valued the traditions in firefighting, they seemed to believe change does not necessarily contradict these values but rather feel it could help fire departments adapt to the current world.

While senior ranking firefighters may be seen as more hesitant towards change in comparison to their younger counterparts, the interviews supported the notion that if senior firefighters, specifically those in leadership positions, accepted the change, they would be more likely to successfully drive change in their fire department. This encapsulates the idea of firefighter hierarchy [15,34], where leadership can be seen as changemakers when they are willing to embrace the change [35]. This aligns with prior research on organizational change that emphasizes the buy-in of leadership in driving changes in business and healthcare contexts [11,12]. Many studies on change have focused on organizations with a hierarchical context similar to what firefighters describe, such as business and medicine. However, a further parallel that could be explored is found in the military, which features an even more rigid hierarchical structure. Do the themes observed here apply to this context still, or are they no longer applicable?

Another group from the interviews that seemed to be pushing for change were female firefighters. As time progresses, representation and equality become driving factors for several groups to demand change. This is especially true for women, who are moving towards less traditional jobs [40]. As explained previously, firefighting has been considered a macho job for hundreds of years, with more women entering the profession only recently [19]. By simply entering into the profession, women symbolized and instigated change. The women that were interviewed talked about events, either small or big, where the department needed to change so as to accommodate them. The women being interviewed explained the struggles they had to go through to prove to the people around them that they were as capable as men to do the job. For the most part, they seem to support change in firefighting, citing that they themselves were a necessary change in the system.

Smith's [10] differentiation between cultural change, technological change, and process change is useful in identifying the nuances in the uptake of change. In all cases, we could find instances of uptake and rejection, and the four factors we identified, therefore, cut across specific types of changes. Like Lee [33], we found that firefighters were quite interested in specific changes around technology. Many firefighters seemed excited to test and implement new technologies, such as exoskeletons, as they both supported the firefighter mission and culture as well as potentially support the firefighter hero mentality. But European-style helmets were rejected because of the aforementioned conflict with stereotypical values. Procedural changes around cancer prevention were frequently cited as a positive change that addressed real problems that personally impacted firefighters. Decontamination procedures introduced significant new work and equipment investments, but they were readily adopted in light of the salience of the issue and the perceived credibility of solutions. But other procedural changes, like the lockbox storage for opiates, were viewed as an extra hoop to jump through that merely inconvenienced good actors. Other research has suggested that cultural changes are very challenging to implement [10]. Our results suggest that this is only true when the problem is not viewed as legitimate. Attempts to open discussions around mental health and "toxic masculinity" within firefighters provide one clear example of this—some firefighters spearheaded efforts for education and support groups, while others thought it was a reflection of the weakening of the force as a whole. Again, the tension between values, tradition, and perceived costs of change emerged.

As indicated by our analysis, there are four actions that can be taken for fire departments to be more likely to accept change: 1. the change must be introduced in a way that supports firefighters' values instead of going against the department's culture; 2. present the advantages of the change and reflect how they outweigh the potential issues of its introduction, whether monetary or learning challenges; 3. changes might be most successful in departments that have already adopted other changes, opening up the opportunity for future innovations; however, if a fire department has had a bad experience with change, it is

important to gain their trust by listening to them and steering away from the mistakes that were performed in the past; and 4. having a senior member of the fire department vouch for the change will allow others to feel more comfortable/accepting of its implementation. It is important not to antagonize firefighters or their values when introducing a change. Instead of presenting the change as something that could destroy their department's culture, show how it could be integrated into the department and potentially contribute to the department's values. Firefighters may like the change but still believe it is too costly to implement. By acknowledging the firefighters' concerns and then explaining how the change could be beneficial in other ways, the firefighter will feel heard and be more willing to rethink how they calculated the cost–benefit analysis for the change. If a change introduced to a fire department is successful, future changes may be more readily adopted, as it could be seen as a positive rather than a hinderance to their work. This aligns with the broader point of the Diffusion of Innovations Theory that many changes are approached with enthusiasm by innovators and skepticism via laggards. However, a firefighter who has previously had a bad experience with change may reject what is being presented to them. In this case, it is necessary to find ways to build trust with them. Acknowledge how they feel and find ways to show how the change being presented will not fail in comparison to their past experiences. The most important factor for change to be adopted into a fire department is that leadership must push for it. Firefighters follow a chain of command where the actions of leadership must be accepted. If you are able to convince leadership to vouch for the change, the firefighters under them will follow. With this in mind, it is important to consider at what level you would want the change to be implemented so as to find an appropriately ranked official to endorse it, whether it be a station chief or a firefighting governing body.

Limitations

The results of this study should be viewed in light of numerous limitations. As an exploratory qualitative project, it is not possible to statistically generalize from this data. A sample of only 25 interviewees cannot cover all the potential sources of variability. Though our sample is diverse in terms of gender, rank, and experience levels, it is also racially homogenous and largely represents municipal structural firefighters serving on the East Coast of the US. It also focuses on American firefighters serving local municipalities that mostly respond to vehicular and structural fires, meaning other fire professionals, like wildlands and military firefighters, are not adequately considered. There are likely to be meaningful differences in these groups that may impact their openness to change, including differences in budget, organizational culture, the nature of the change itself, and operational complexity. Our hope is that the narratives and themes identified here will help to explain future patterns, but a larger sample in a different policy landscape could provide a useful contrast.

The interviews themselves are also subject to social desirability and self-selection biases, meaning interviewees may act differently in a real scenario or not be representative of firefighters as a whole. Firefighters who are wary of change may also be the most likely to avoid participating in research about new technologies, so these perspectives may be underrepresented. The methods of exploring attitudes towards change, which focused on open-ended discussions of experiences and the presentation of a specific technological change, may also have influenced the narratives we heard. Other studies have utilized vignettes or ratings of different descriptions of change in a survey [37], which allows for specific change proposals to be ranked against one another more directly than we can do here. The compromise offered by the current study's design, however, is that it provides a much clearer insight into the rationale for why someone would be skeptical of specific

changes. Future research could remedy this limitation by incorporating its results into a larger scale survey of firefighters.

6. Conclusions

While it is easy to accept the stereotype that firefighters are intrinsically hostile to change, we found a more complicated picture where changes are appraised through both emotional and rational lenses. This resonates with prior research on changes in other organizational contexts, but the specific context of changes within firefighting merits further exploration, specifically because of its unusually high stakes. Future research can advance the current project's findings in several ways. First, case studies of real-world attempts to implement a specific change amongst firefighters can be used to further evaluate and complicate the themes analyzed here. The successful uptake of cancer prevention protocols, for instance, can provide an instructional example of effective changemaking. On the other hand, not all change is good or worth embracing, and post-mortems of failed changes can provide perspective. Another research direction would focus on rhetoric and persuasion—given the importance of value concordance and conflict in our responses, it may be useful to identify if different messaging or communication strategies are more effective in promoting change itself. Analyses in settings with more demographically diverse samples may also yield interesting results, but equally important is a comparative analysis that explores the views of firefighters from other specializations (e.g., wildland, military, and airport), countries, and policy landscapes.

Appendix A

Interview guide

REMEMBER: This is just a guide-the structure is free to change during the interview if it facilitates the flow of a conversation, and phrasings may be adapted to better fit an audience or the context of ongoing conversations.

Backstory and firefighting work

(1) Can you tell me the story of how you got involved in firefighting?

    a. How does this compare to other people you might know?

(2) Thinking back to your training/first years, what did you think firefighting would be like? Was that assumption accurate?

(3) If you could "go career" would you? What's the draw of that vs. volunteering?

(4) When did you know you were "part of the group?" at your department?

    b. How does one "fit in" here?

    c. Social, professional, cultural, corporeal, familial, etc.

        1. Can you recall a specific time that made you feel like you didn't fit in or line up with your team?

Good and bad firefighters

(1) What are the qualities of a "good firefighter"? What about a person who you might not want to work alongside?

(2) Are there any firefighters you look up to or really respect?

    a. What is it about them that you value?

    b. How do you make a name for yourself?

(3) A lot of jobs have "giveaways" that someone is inexperienced-what are the signs of a green firefighter? That someone "isn't cut out for this"?

Firefighting work

(1) Can you tell me about the most difficult situation that you've faced as a firefighter?

    a. How did you get through it?

    b. Why keep coming back?

(2) Has anyone you know ever been hurt on the job? What happened? Who or what was at fault, do you think?

(3) Can you tell me about one of your favorite experiences that you've had as a firefighter?

    d. What was it about the encounter that made it so great?

"BS" and "legit" work

(1) Can you talk a bit about the most recent time you responded to a call?

    a. What was your role in the response?

    b. Did you feel like your skills were put to good use?

    c. Is this the kind of work that you "signed up for" as a firefighter? What's the appeal?

    d. Do people get hurt doing this kind of call? How? Can you share any specific examples? What actions do you take to minimize injury while handling these cases? Do you see people doing things in a way that might cause them injury in the long term?

Breather #1: Show them the data on injuries and trends
    (1) Rationalizing injury

a. So looking at these numbers- why do you think strains and sprains are so common?

b. Do you think these numbers might be inaccurate or out of context somehow? Are they missing relevant information or underreported?

c. How does a person getting this kind of injury impact their ability to work? Do others need to fil in the gaps?

d. Do firefighters have "war stories?" "Cautionary tales?" Can you tell me about one?

    Injury Prevention/fitness-

a. Can you tell me about the fitness standards in your program? Did the tests accurately correspond with what you actually do? What happens if someone is out of shape?

    i. Did you do the CPAT?

ii. Would most people in your department find it easy to pass the test again?

iii. CPAT recommends not just fitness but form-do you think the techniques described there are actually followed in the heat of the moment?

b. How important is physical fitness to you? Do you guys keep in shape? Eat carefully?

c. Tell me a bit about the fitness requirements in your program? Do you think these are adequate- how would you change them?

Change

a. One expression we've heard a few times is that "Firefighters hate two things- the way things are, and change." What do you think of that expression?

b. What kind of changes have firefighters made that are worthwhile? What do you think "sells" that change?

i. If possible- What was the process for making the change happen?

c. Are there changes you think are silly or a waste of time?

d. Do you know anyone that is eager to promote change? About what? Why are they so motivated?

e. Are you familiar with the budgetary constraints facing your program? Can you tell me about them?

Breather #2: Exosuit project- show it off, tell them about the ideas and applications.

a. Questions about the concept and its application?

b. What are your immediate concerns of hopes with seeing technology like this?

c. What kind of equipment do you think it should integrate with?

d. Would this present new liabilities or risks when responding to a call?

e. Can you envision ways that this technology can fit into your existing procedures or protocols?

f. Improve you or your team's effectiveness and/or safety?

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