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Hardiness Assessment and Training as Potential Management Tools in Firefighter Recruitment Programs

Abstract

Fire fighting is an unusually stressful profession. The ongoing stresses include not only threats to life and limb, but also uneventful, sometimes boring downtime. A special, related problem in some fire departments is the high dropout rate of recruits during the initial training period. This paper investigates the hypothesized role of personality hardiness in predicting the performance effectiveness of fire fighting personnel as they manage general life and training stresses. In previous research, hardiness has emerged as the courage and strategies to turn stresses from potential disasters into growth opportunities. The first study included here shows, among firefighters who have already completed the training period, the hypothesized relationship between hardiness (in the form of attitudes and skills) and improvement notification points (an index of poor performance). The second study shows that some aspects of hardiness, measured before the training period began, were also negatively related to ensuing improvement notification points, although the results were inconclusive--perhaps due to the small sample size. More research on this topic is needed in order to determine whether this paper's suggestion that hardiness may be an important factor in effective firefighter performance is conclusive.

Introduction

Being a firefighter is indisputably a stressful occupation. At the very least, these stresses involve being on call for long and often unusual hours, which can be disruptive to their and their families' lives. As if this were not enough, attempting to put out fires often involves threats to firefighters' own life and limbs. Further, because they are often the first responders in catastrophic circumstances, firefighters are witness to and must provide help for others who are undergoing threats to life and limbs. All these sources of stress accumulate into a characterization of the fire fighting profession as requiring not only the specific knowledge and skills, but also the courage to face stressful circumstances and perform the requisite tasks well. The two empirical studies reported here initiate the attempt to demonstrate the role of hardiness in facilitating the courage and strategies for effective performance in firefighters.

Hardiness: Defined and Studied

Indeed, hardiness has emerged in psychology through twenty-five years of theorizing, research, and practice (Maddi, 2002) as a pattern of attitudes and skills that provides the courage, motivation, and strategies to do the hard work of transforming stressful circumstances from potential disasters into advantages and growth opportunities instead.

Specifically, the attitudes of hardiness are the 3Cs of commitment, control, and challenge. If you are strong in commitment, you believe in the importance of staying involved with the people and events that are involved, no matter how much

pressure there is. Pulling back into isolation and alienation seems like a waste of time. If you are strong in control, you want to keep trying to influence the outcomes going on around you, however hard this may be. It seems useless to let yourself sink into powerlessness and passivity. If you are strong in challenge, you see stressful circumstances as normal, and an opportunity to try your capabilities and learn from the experience, whether it is positive or negative. You do not believe in easy comfort and security as a birthright.

If you possess the 3Cs, this motivates you to see stressful circumstances accurately, however painful this may be, and to try to transform them to advantage, however difficult this may be. With regard to coping, hardiness involves treating the stressful circumstances as problems to which you have to find solutions, rather than avoiding them or striking out. With regard to interactions with your team members, hardiness involves giving and getting assistance and encouragement (social support), rather than engaging in destructive competition or stultifying overprotection.

The initial demonstration of the importance of hardiness as facilitating resilience under stress was a twelve-year longitudinal study of Illinois Bell Telephone (IBT) employees, which began before and continued after the federal deregulation of the telephone industry that severely disrupted that company and the other subsidiaries of AT&T (Maddi & Kobasa, 1984). In each year of the study, the 450 employees in the sample were tested in various ways concerning their attitudes, coping efforts, and social interaction patterns. Six years into this natural

experiment (in 1981), the federal deregulation hit, in what is still regarded by many as the largest upheaval in corporate history. IBT went from 26,000 employees in 1981 to 14,000 in 1982. One male employee in the sample reported having 10 different supervisors in 12 months. Passing in and out the door, they (and he) had no idea what they were doing. To make a long story short, two-thirds of the employees in the sample fell apart, showing such signs as violence in the workplace, suicide, divorce, heart attacks, hopelessness, and mental disorders. In contrast, the other third not only survived, but actually thrived, feeling energized by the possibilities brought about by the stressful changes and finding ways to turn them to advantage. If they stayed at IBT or joined other competitor companies, they rose to the top of the heap. Some even used their accumulated experience to start their own companies in the new telecommunications industry.

The psychological differences observed before the deregulation upheaval between the one-third that thrived through it, and the two-thirds that collapsed, defined hardiness as the particular pattern of attitudes and skills described above, and indicated the predictive role of this hardiness on later functioning well under stress (Maddi & Kobasa, 1984). The hardy attitudes, or 3Cs of commitment, control, and challenge, defined the courage and motivation to thrive under stress. Specifically, the one-third that survived and thrived wanted to stay involved, kept trying to have an influence, and learned from the process, even when it involved failures. This courage and motivation led that third that thrived to cope and interact with significant others in particularly enhancing ways. In coping, they faced and deepened their understanding of the stressful circumstances, and thereby formulated and enacted plans that could transform them to advantage (Maddi & Kobasa, 1984). This is in contrast to the regressive coping of denial and avoidance, or catastrophizing and striking out that was characteristic of the two-thirds that collapsed. In social interaction, the third that thrived tried to resolve existing conflicts and replace them with a mutual pattern of giving and getting assistance and encouragement (Maddi & Kobasa, 1984). This is in contrast to the interactions of the floundering two-thirds, which involved festering conflicts, and patterns of competition or overprotection destructive to the overall goals of the team.

In the following years, hardiness studies have broadened in impact, with results consistent with those of the IBT study (Maddi, 2002). Currently, there are upwards of 400 empirical studies of hardiness done around the world in a variety of settings. As to hardiness assessment, the latest measure is the *HardiSurvey III-R*, a 65-item questionnaire that can be administered either in hard copy form or on the Internet, and has been shown to have adequate reliability and validity (Maddi & Khoshaba, 2001). It measures stress (subjectively experienced), strain (the body's reaction to stress), hardy attitudes (the 3Cs), hardy coping (problem solving), regressive coping (denying and avoiding), and hardy social support (giving and getting assistance and encouragement). The hardy attitude component has by now been translated into 17 Asian, European, and Middle Eastern languages.

There is only one study thus far on firefighters (Giatras, 2000) and it shows that the higher their hardiness level, the greater their job is satisfying, and the less its stressful nature undermines them. Also relevant are studies that have been done with military personnel. In particular, it has been shown that the higher the hardiness level, measured on army person-

nel just about to leave the country on combat or peace-keeping missions, the less likely were life-threatening stresses encountered on the mission to lead to posttraumatic stress or depressive disorders (Bartone, 1999, 2003). In a study of Israeli military, Westman (1990) measured hardiness levels just before the beginning of officer training school, and stress and performance levels during the training. The results showed that those high in hardiness experienced the training as stressful, but tended to graduate successfully. In comparison, those low in hardiness experienced the training as not particularly stressful, but tended to fail out. As the training was intentionally stressful (in order to be representative of the future life of officers), these results show that one important aspect of hardiness is having the courage to recognize the stressfulness of events, the better to understand them, and thereby figure out how to cope effectively. Consistent with these findings, it has also been shown with military personnel that the higher the hardiness level of cadets at West Point Military Academy, the more effective their leadership behavior shown over the four-year training period (Bartone, 2003).

Of less direct relevance, but nonetheless consistent with the results already summarized, are studies of hardiness involving other occupations and stressful circumstances. Accumulating results indicate that bus drivers (Bartone, 1989), lawyers (Kobasa, 1982), nurses (Keane, Ducette, & Adler, 1985), and athletes (Lancer, 2000; Maddi & Hess, 1992) also show better performance and health under stress if they are strong in hardiness. Hardiness also seems to protect performance and health under culture shock, as shown in American employees on work missions abroad (Atella, 1989), and immigrants to the U.S. (Kuo & Tsai, 1986). As to conduct, Maddi, Wadhwa, and Haier (1996) found that hardiness was negatively related to drug use in high school graduates about to enter college.

A technique for training hardiness has also been developed. Called *HardiTraining* (Khoshaba & Maddi, 2004), this technique is based on a workbook that contains inspirational examples, exercises, and checkpoints. As to format, the training typically takes place in a series of sessions for small groups of trainees, led by a qualified trainer. Accumulating results show that *HardiTraining* is effective in raising hardiness levels and enhancing performance and health under stress in working adults and college students. For example, among working adults, *HardiTraining* leads to greater satisfaction with and enhanced performance in the job, along with a decrease in stress-related physical symptoms (Maddi, 1987; Maddi, Kahn & Maddi, 1999). Further, among both high-risk and regular college students, *HardiTraining* leads over time to a greater likelihood of staying in school, rather than dropping out, and a higher grade point average (Maddi, Khoshaba, Jensen, Carter, Lu & Harvey, 2002).

Let us return now to the relevance of hardiness to the fire fighting context. Given the results summarized above, one expects that the higher the hardiness among firefighters, the better will be their performance and health on the job. Of particular relevance within this formulation is the problem of whether and how well firefighter recruits will make it through the training period, which is intentionally constructed to be stressful in order to prepare recruits for the ensuing job. It appears that in some departments' training programs there is a sufficiently high rate of recruits failing out of training that it might make sense to investigate whether their hardiness levels assessed on entry are predictive of their performance. Also, it may be worth con-

sidering whether HardiTraining could improve the performance level of recruits. Accordingly, the two studies reported here are **preliminary** attempts to address the relevance of hardiness in the performance of firefighter recruits.

Hardiness Studies

Hardiness Study One

In what appears to be the first study of hardiness among firefighters, Giatras (2000) found that this characteristic is positively related to job satisfaction and the ability to tolerate perceived job stress. But he did not have any standard performance index available. Fortunately, there is such a standard performance index applied to firefighters during their one-year probation period, which follows their successful completion of the training program. Thus, building on Giatras' finding, the general hypothesis of this study is that, among firefighters in their probation period, the higher the hardiness, the better the performance. Specifically, it is expected that hardy attitudes, hardy coping, hardy social support, stress, and strain will all be negatively related to improvement notification points for poor performance.

Sample: The 89 participants in this study were employees of the Long Beach Fire Department (LBFD) who had finished recruit training (four months) and were either just finishing or had just finished their probation period (one year). Thus, they were similar in the amount of time they had been employed in the LBFD. Demographically, the sample was primarily male ($N = 93$; 95%), and ranged in age from 24 to 44 (mean = 30 years), in education from 12 years (high school degree) to 20 years (Master's Degree) (mean = 16 years), and included Caucasians (60%), Hispanics (16%), African Americans (4%), Asians (10%), and others (10%).

Measures: The participants completed the HardiSurvey III-R (Maddi & Khoshaba, 2001), and their results were not shared with them until after the data analysis had been finished. They completed the test at the end of the probation period, following their recruit training. As indicated earlier, this 65-item test measures stress, strain, hardy attitudes, hardy coping, regressive coping, and hardy social support. In previous studies, this test has shown adequate reliability and validity (Maddi, 2002; Maddi & Khoshaba, 2001). In the present study, the internal consistency reliability obtained for the scales was .49 for stress, .72 for strain, .75 for hardy attitudes, .82 for hardy coping, .34 for regressive coping, and .65 for hardy social support. That the reliability estimate is relatively low for stress is understandable, as people may well differ in whether they experience few or many stressors and whether their stressors are major or minor. Indeed, stressful circumstances are idiosyncratic in occurrence, and hence need not show cross-person reliability in order to be valid experiences. In contrast, the regressive coping scale attempts to determine how common denial and avoidance of stressors is for a person, and hence, the low reliability estimate obtained is problematic. It is possible that in this sample, participants who indulge in a particular regressive behavior may not engage in other behaviors that are equally regressive. In any event, the regressive coping scale was eliminated from further analysis, as it is not sufficiently reliable in this sample. The reliability results obtained on the other scales with this sample are adequate and consistent with those of previous studies.

The measure of firefighter performance used in this study was the LBFD standard Improvement Point Notification System (IPN), which indicates the degree of improvement needed. IPN accumulates over the four-month training period. When recruits are dropped out during the training period, it is because their IPN scores reached the predetermined limit of 110. During the ensuing one-year probation period, firefighters' performance is also evaluated by a different system through which they can also be dropped out, although this is much less frequent.

The IPN score is based on a teaching-learning strategy that uses quantitative feedback measurement to indicate the appropriate level of improvement needed to achieve competency in the performance of job-related emergency tasks and operations (Kiesewetter, 2003). The foundation for the system is improved performance through an interactive teaching/learning process emphasizing specific expectations, counseling, and coaching in a context emphasizing fairness and consistency. A written performance evaluation record, developed by the trainers and signed by the recruit, is maintained for documentation and progress reviews.

IPNs are assigned on a sliding scale for job-related errors made following the performance of tasks or related activities during a major examination. Points are not assigned during the period when skills are being taught, studied, and practiced. But, once a skill has been taught, practiced, and officially evaluated, each recruit is held responsible for demonstrating ongoing competency when tested on it throughout the remainder of the Academy period.

The expectation of skill competency and the ability to multitask increases as the Academy training progresses. Hence, performance measurements and the IPN grading process are altered as the tasks change. Spontaneous performance under live fire conditions, or if the recruit is required to identify and prioritize, are not evaluated in the same manner as if a single task is given under the constraints of an earlier formal proficiency examination. More grading latitude and positive recognition of self-correcting behavior is given in the former.

The IPN scale ranges from one point for minor infractions to five points for more serious infractions with serious potential consequences. An example of a minor infraction would be the failure of a recruit to wear a helmet on the drill ground while performing routine, end-of-the-day cleanup. In contrast, dropping an axe through an opened roof vent-hole during a live fire would be an example of a serious infraction.

The heart of the training and feedback process is an eight-step coaching and counseling procedure (Resurreccion, 1996). Fire Academy instructors learn this procedure as an integral part of the LBFD's course, "Instructional Methods for Fire, Rescue, and Emergency Medical Services." This eight-step process is well institutionalized within the LBFD. Indeed, it is also used for permanent employees.

The Fire Academy staff goes to great lengths to ensure agreement among trainers. First, daily luncheon meetings are conducted where progress reports on recruits are discussed, including what are appropriate point levels, and the adaptation of the eight-step counseling and coaching procedure to each recruit's learning needs. At the end of each training day, additional staff meetings include a re-examination of each recruit's progress. Although recruits generally realize at the time of the

incident that their performance is sub-par, they are not usually notified of the IPN and its reasons until after the staff discussions mentioned above have occurred and consensus has been reached. This ongoing trainer dialogue and the associated delay is one of the key methods whereby the IPN system is consistent and helps the instructor in training and calibration. The official notification of IPN points and relevant discussion takes place on Days 12, 21, 29, 37, 45, 53 of the training period.

Secondly, daily IPN data are tabulated and assessed for each recruit and the recruit class as a whole. These data are compared to comparable data from previous classes to note any important deviations. When recruit classes are evaluated and compared as a whole, there has been identification of patterns in the rate and types of IPNs given. Identified areas of weakness are a basis for curriculum adjustments and extra emphases. The class comparisons have also prompted suggested changes in the recruit selection process.

Thirdly, manipulative skill grading sheets are used to rate recruits in the performance of straightforward tasks, such as donning a self-contained breathing apparatus, advancing a hoseline, or deploying a 35-foot extension ladder. For more complex operations involving multiple and less predictable variables (e.g., aboveground live fires and vehicle extrication problems), a rubric is used to guide the raters in their scoring of IPNs. This rubric is also used as a means to develop a consistent language and format for written counseling sessions.

In summary, the IPN system's purpose is to improve the job-related skills of recruits by (1) stressing the appropriate level of corrective action, (2) providing timely, accurate, and consequence-based feedback and remedial training (if needed), and (3) using a specific counseling and coaching system.

Despite that the weakest recruits would have already been weeded out in this sample of firefighters who had already successfully completed training and probation, there still remains the tendency for those highest in hardiness to perform the best. Of course, further studies should be done with samples of firefighters who have been on the job longer than just finishing probation. In this regard, other measures of performance could supplement the IPN points used here. Further, there is no way of being sure in this study about the direction of causality. Hardiness could be causing better performance, but it is just as conceivable that better performance is augmenting hardiness. Or, perhaps both are true. The second study addresses the question of causality.

Hardiness Study Two

The hypothesis influencing the design of this study is that it is hardiness that enhances performance, not the other way around. This hypothesis can be tested by measuring hardiness in recruits before they begin their training, and determining its relationship to the IPN performance index that is accumulated over the entire ensuing training period. At a more practical level, this study is also relevant to determining the value of using hardiness assessment as one of the selection devices in the decision as to which applicants should be accepted as recruits. It is hypothesized that the hardy attitudes, hardy coping, hardy social support, stress, and strain scores, measured before training begins will all show a negative relationship to INP points accumulated during training.

Sample: The 28 participants in this study were the recruits in a training program at the LBFD in 2005. Demographically, the sample was primarily male (N = 25; 81%), and ranged in age from 22 to 37 years (mean = 29 years), in education from 12 years (high school degree) to 16 years (Bachelor's or Associate

Table 1: Correlations between Hardiness Variables and Improvement Point Notification on Key Days in the Training Period of 89 Long Beach Firefighters

HardiSurvey Variables	Training Period				
	Day 21	Day 29	Day 37	Day 45	Day 53
Attitudes	-.38**	-.30**	-.38**	-.27**	-.19
Hardy Coping	-.41**	-.33**	-.37**	-.29**	-.19
Work Support	-.43**	-.38**	-.41**	-.32**	-.23*
Social Support	-.40**	-.35**	-.43**	-.33**	-.25*
Stress	-.37**	-.23*	-.32**	-.22*	-.16
Strain	-.41**	-.34**	-.42**	-.31**	-.21*

** p < .001 (2-tailed) * p < .05 (2-tailed)

Note: The correlations of Hardy Attitudes and Hardy Coping with INP points on Day 53 show a definite trend toward statistical significance.

Results and Discussion: A correlational procedure was used in determining the relationship between hardiness variables and the IPN performance index. Table 1 summarizes the results, showing that, as hypothesized, the scale scores for hardy attitudes, hardy coping, hardy social support, stress, and strain all show a negative relationship with INP points on the evaluation days of the training period. That the correlations decrease in size (though all still tend to remain statistically significant) suggests that there was ongoing improvement in this sample, all members completed training successfully and were already in or just done with the probation period when tested for hardiness.

Degree) (mean = 15 years), and included Caucasians (62%), Hispanics (14%), African Americans (3%), Asians (17%), and others (4%).

Measures: All participants completed the HardiSurvey III-R (Maddi & Khoshaba, 2001) in hard copy form at a group meeting that took place shortly before the beginning of training. As indicated earlier, the test scale scores utilized were for stress (subjectively experienced), strain (the bodily reaction to stress), hardy attitudes, hardy coping, and hardy social support. The test results were not shared with either the participants or their trainers throughout the training period.

The measure of performance effectiveness utilized was the LBFD standard IPN score accumulated by each participant throughout the four-month training period. As indicated earlier, IPN scores reflect the degree to which the recruit needs to improve in crucial fire fighting activities. The recruits are aware of the IPN points they obtain, as this feedback is considered an important part of the training.

Results and Discussion: The data analysis procedure used involved splitting the distribution of IPN points at the 75 percent level, and comparing the resulting high and low subgroups on the various hardiness scale scores. This procedure was appropriate to the small sample size in this study. Table 2 shows the results of these analyses. As hypothesized, there is a negative relationship with INP points for hardy attitudes, hardy coping, social support, work support, and stress. But, only the relationships involving hardy attitudes and social sup-

Conclusions

The results of many studies of working adults support the conclusion that hardiness has a causal influence on enhanced performance and health under stressful circumstances (cf., Maddi, 2002; Maddi & Kobasa, 1984). Of the two studies on firefighters reported here, one is consistent with the findings with other working adults, and the other is less conclusive with its very small sample. Additional studies on firefighters are currently under way. Needless to say, definite conclusions cannot be made until those additional studies are completed. We are currently inviting various interested fire departments to participate in the further studies.

Should these additional studies show clear evidence that hardiness measured before training begins is predictive of success, an important application would be to use hardiness

Table 2: Correlations of Hardiness Variables at the Beginning of Training with Improvement Notification Points during Subsequent Training in 28 Long Beach Firefighter Recruits

HardiSurvey Variables	Improvement Notification Points
Hardy Attitudes	-.43*
Hardy Coping	-.18
Social Support	-.40*
Work Support	-.03
Stress	-.04
Strain	.42*

* p < .05 (2-tailed)

port achieve statistical significance. Perhaps the hardy coping and work support scales did not yield results strong enough to be statistically significant because at the time the HardiSurvey was completed, the applicants were not yet working with each other and there were no training tasks to be performed. It is also possible that the small size of the sample diminished the size of the correlations. Clearly, a larger sample is necessary before any definite conclusions can be reached.

Interestingly, there is a significant positive relationship between strain and INP points. At first glance, this appears at variance with the negative relationship between strain and INP points obtained in Study One. But, in Study One, the recruits completed the HardiSurvey III-R (Maddi & Khoshaba, 2001) when they had just completed their training and probation, which programs commonly immerse them in stressful circumstances. In contrast, Study Two involved applicants in completing the HardiSurvey III-R before the training period began. Thus, the strain score in Study Two reflected the bodily arousal due to everyday life that recruits brought to the training, rather than what resulted from its obvious stressfulness. It would appear that if a recruit has a high level of strain prior to the training period, this may reflect an aspect of his/her vulnerability, rather than hardiness.

Further, the results of Study Two appear to show that at least hardy attitudes and social support may well have a causal effect on decreasing the likelihood of poor performance. Needless to say, it may well be the very small sample size of this study that resulted in only trends for the other relevant hardiness variables. Additional studies with larger samples are necessary before any definite conclusions can be reached.

assessment as part of the selection procedure regarding applicants. If this were to decrease the dropout rate during training of those applicants selected as recruits, that would be a significant advance both financially and socio-emotionally. The HardiSurvey III-R is not only short and easy to administer to applicants, it has sufficient validation on working adults to justify testing its value with firefighters. In addition, research has shown that this test is not easy to fake (Maddi, Harvey, Khoshaba, Lu, Persico, & Brow, 2005). Also, should the additional research called for show the validity of hardiness in the fire fighting context, then this test might even be worthwhile to administer to firefighters already on the job as a tool in selection of employees for particularly stressful areas of work. Examples of such areas include being a paramedic, dealing with hazardous materials, and being promoted to officer positions.

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Answering "Big Questions" in the Fire Service

Abstract

This article provides a critique of four studies used to support the adoption of fire service deployment standards. The studies were evaluated to see if they 1) employed original data; 2) provided a comparison to other systems; 3) provided sufficient information to replicate the study; and 4) if appropriate statistical analysis was used. Three of the four studies provided no original data. The fourth study suffered from methodological problems. Suggestions are made to improve the scope and quality of future fire service research.

Introduction

During the past few years, two newspapers ran a series of articles examining EMS system effectiveness (Davis, 2003) and fire department response times (Dedman, 2005). Not surprisingly, both series generated much discussion in the fire service - and not surprisingly, both series failed to provide an accurate picture of the fire service. However, these news articles raise a larger question: Why have news reporters become surrogates for fire service researchers? The answer is quite simple - we in the fire service have failed to define and answer the "big questions" in our field.

Many academic disciplines attempt to answer their respective "big questions." These issues gain status as "big questions" not based on specific criteria, but rather by continued interest and discourse within the field. Robert Behn (1995) raised this issue about "big questions" in public service when he stated that a discipline must first identify, then discuss and research the "big questions" in their field. In the fire service, it appears we have struggled with one set of questions for over three decades - what is the appropriate level of staffing necessary for effective emergency operations and how quickly do we need to deliver it? The National Fire Academy's Learning Resource Center card catalog lists over 1,000 entries on these topics. That appears to make one of our "big questions" fire service deployment. While we have certainly identified this question over the years, have we researched and answered it?

This paper provides an assessment on the state of research in the fire service. To do so, an evaluation of the research used to answer questions on staffing and response times in the development of the National Fire Protection Association Standard 1710: *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* (NFPA 1710) was conducted. Next the paper discusses current fire service research efforts from a national perspective, including a look at research funding. Finally, recommendations are made that may enhance future research in fire service management.

Research Used To Support NFPA 1710: A Critique

The development and subsequent adoption of NFPA 1710 was a contentious process. Various interest groups lobbied their respective positions either for or against the need for such a standard during its development. The International Association

of Fire Fighters (IAFF) advocated strongly for a standard they believed would provide increased staffing, and therefore safety, for career firefighters. The International City/ County Management Association (ICMA) opposed the standard based on what they claimed was limited research. And while NFPA 1710 was not the first attempt to develop a comprehensive deployment standard (the first efforts occurred at least ten years earlier), the ultimate adoption of 1710 was achieved only after major constituency groups argued that the standard was based on strong scientific evidence (International Association of Fire Fighters, 2001; Brown, 2001; International Association of Fire Chiefs, 2001). In the recently approved 2004 edition of the standard, no substantive changes were made to the staffing or response time requirements; neither was any additional scientific evidence provided. Therefore, to evaluate the original claim and determine if current research meets the needs of the fire service in deployment issues, a critique was performed on the major studies cited during the original adoption of NFPA 1710.

The International Association of Fire Chiefs (IAFC) encouraged its members to review major studies used to support NFPA 1710. Citing 30 years of study, research testing and validation, the IAFC encouraged members to "read for themselves and draw their own conclusions" (IAFC, 2001, p. 66). Accordingly, this paper reviewed the available appendix material obtained from the IAFC website, focusing on that which was purported to be research appropriate for use in supporting adoption of the standard. A total of 10 items were provided as appendices to the *IAFC Decision Guide*. Several of the documents were quickly identified as excerpts from organizational tools. Two documents from the *Fire and Emergency Service Self Assessment Manual* by the Commission on Fire Accreditation International (1997) provided detailed information on strategic planning and data needs for accreditation, but no actual research. Two further documents available from the federal government describe the process of conducting risk analysis (U.S. Federal Emergency Management Administration, 2001a; U.S. Federal Emergency Management Association, 1984). Two other items document the effort of the Oregon Fire Chiefs Association to develop an alternative to the (then) proposed NFPA 1710 and the effort of an Oregon fire district to implement that alternative (Oregon Fire Chiefs Association, 2001; Klamath County Fire District No. 1, 2001). Of these first six documents, none claimed to employ original data in the research of deployment issues. However, after reviewing the remaining appendix materials, four documents were identified as potential original studies on the

deployment issue. The four documents examined in this article are (1) *Safe Fire Fighting Staffing: Critical Considerations* by the International Association of Fire Fighters (1993); (2) *Shaping the Future of Fire Ground Staffing and Delivery Systems within a Comprehensive Fire Safety Effectiveness Model* by the Ontario Fire Marshal (1993); (3) *Phoenix Fire Department FIREMAP Program* (1992); and (4) *Dallas Fire Department Staffing Level Study* (McManis, 1984).

To perform an evaluation of these four studies, a critique derived from a systematic review on priority dispatching systems is used. Wilson, et al. (2002) use an approach where studies are evaluated to see if they (1) employ original data; (2) provide a comparison to other systems; (3) provide sufficient information to replicate the study; and (4) if appropriate statistical analysis is used. This review uses similar criteria to evaluate a study's appropriateness in justification of the NFPA 1710 standards. Employing this approach, the four studies identified above are reviewed.

Evaluation of Four NFPA 1710 Studies Based on Four "Adequacy" Criteria

IAFF's Safe Fire Fighter Staffing

This 1993 document's stated purpose was to provide "the most up-to-date and comprehensive review of the facts, statistics, and issues surrounding fire fighter staffing" (IAFF, 1993, p. i). In doing so, Chapter 2 of the report does provide a literature review of other works, most related to the issue of firefighter staffing. There is a brief synopsis of various reports and studies and industry recommendations are presented, but not in a systematic manner, such as found in a meta-analysis or critical review.

The document was apparently developed to provide IAFF members a position paper on the topic of firefighter staffing. As such, one could argue that it appears to be more a lobbying tool rather than an objective review of scientific studies. Most important, the IAFF study contains no original data on staffing or other deployment issues. Accordingly, it provides no primary evidence to support any position, for or against, with regard to fire service staffing and deployment.

Ontario Fire Marshal's Fire Ground Staffing Project

The Ontario project was undertaken to identify and quantify various factors that impact fire safety effectiveness. Seen as a holistic approach, the project included a fire ground effectiveness submodel that was comprised of eleven factors, including fire ground staffing and response times.

The project, begun in 1991, sought to first develop a theoretical construct and then validate the variables identified. As such, this document stated that the findings reported in the 1993 report were preliminary. The report clearly stated "final conclusions and recommendations on the issue of staffing, for the targeted fire, will follow a thorough validation process" (Office of the Fire Marshal of Ontario, 1993, p. i). The project paper identified both the preliminary nature of the recommendations and what additional actions were contemplated to validate the earlier theoretical constructs. Future actions were to include a detailed design document, data collection through field studies, and data analysis.

Similar to the IAFF report, the Ontario study offered no original data by which to judge its contributions to the subject. However, because the report indicated that further validation was to have been done, a follow-up with the Ontario Fire Marshal's Office was undertaken. Unfortunately, since its release in 1993, no further work has been taken on the fire ground effectiveness submodel, including no additional work on staffing levels or response times (Josh Kallungal, personal communication, January 17, 2002). As the project appears abandoned, or at least on hold since 1993, the argument presented here is that this document also fails to provide any original data related to issues of fire service deployment.

Phoenix Fire Department Evaluation System (FIREMAP)

With its origins tied to the 1991 Urban Fire Forum project to evaluate the effectiveness of fire services, the Phoenix FIREMAP project was expected to achieve many of the goals stated by the Ontario Fire Marshal's Office. However, the initial phases, as summarized in the 1992 FIREMAP report cited by the IAFC, fall short of providing any substantive data.

The initial FIREMAP report stated as its goals the development and validation of a task analysis for a single-family structure fire. After defining appropriate tasks for units and personnel, the project was intended to design and build props that could simulate critical tasks (Phoenix Fire Department, 1992). The initial work did provide some original data. Of the three evolutions where any original data were reported, only the final evolution reported all the data associated with fire ground actions. The other two evolutions provided only limited data on certain aspects. Therefore, the usefulness of data from only a single evolution does not lend itself to any meaningful conclusions (Hair, Anderson, Tatham, & Black, 1995). However, the report did indicate the intent to finalize the task analysis components and then experiment with variations in staffing, response variables, etc. Similar to the Ontario Fire Marshal's project, an attempt was made to determine if any further substantive progress was made beyond that found in the documents cited to support NFPA 1710.

A 1998 article updating the status of the FIREMAP project indicated future efforts of the project would seek to assess the impact that "varying response times, staffing, and other components" would have on service delivery (Compton, 1998). The article also stated that a partnership with the Industrial Engineering Department at Oklahoma State University would provide an engineering perspective to the questions of staffing and response times. Unfortunately, similar to the Ontario study, further work on the FIREMAP project has not yet materialized. Inquiries in 2001 to Oklahoma State University indicated that no funding existed, and therefore no additional work had been undertaken on FIREMAP (Dr. David Mandeville, personal communication, July 26, 2001).

Dallas Fire Department Staffing Level Study

The Dallas Fire Department study, completed in 1984, is likely the most comprehensive related to fire service staffing conducted to date. Its conclusions state that a minimum of four firefighters should be assigned to each engine company, and that a minimum of five firefighters is justified for ladder companies when assigned to handle an apartment building fire (McManis, 1984, p. I-2). Unlike studies discussed earlier, the Dallas study

employed the use of external consultants to design the study, supervise the collection of data, and perform the data analysis. While fire department staff was closely involved, the study's authors sought to conduct a methodologically sound study. For example, precautions were taken to have the study evolutions performed by a representative cross-section of the department, thereby limiting bias (McManis, 1984).

The Dallas study provided a significant amount of original data on the subject of company staffing levels. Utilizing three scenarios and one full-scale fire test, the study authors provided a strong accounting of the tasks conducted by each firefighter, included original data, and provided in the study's appendix their statistical analysis of the results. Accordingly, this study met three of the four criteria outlined earlier. First, appendix material provides over 25 pages of raw data from the test evolutions, thereby meeting the criteria for use of original data. Second, additional appendices describe in detail the specific tasks utilized in each evolution, thereby allowing for replication of the study. Third, the study presents, both in the text and in appendices, numerous tables of statistical analysis that appear to be methodologically appropriate for the research question at hand. The study only falls short by not meeting the fourth research adequacy criteria, providing a comparison between the Dallas Fire Department and comparable fire agencies. Thus, the ability to generalize the findings from this case study is limited (Hamel, Dufour, & Fortin, 1993).

However, there were also several interesting issues identified when reviewing original data from one of the evolutions -- the private residence evolution. The first issue involved the first due engine's critical task of a "straight lay 5-inch hose to provide a permanent water supply" (McManis, 1984, p. VI-3). At a staffing level of three personnel, the average time for task completion was 62 seconds. For the four-person evolution, the average hydrant connection time and arrival at the front of the house was 48 seconds. Finally, for the five-person staffing level the evolution only took an average of 38 seconds (McManis, 1984, p. F-1). At first glance, this may seem logical. However, the report also indicates that irrespective of the staffing level involved, this task only required two individuals -- the hydrant firefighter and the pump operator. Yet, with only two personnel completing the task on all evolutions, the data showed that when more firefighters were riding on the engine, the task was performed more quickly. Management theorists have described unusual findings such as this before. Where no other obvious explanation exists, one may wish to consider what Juran (1992, p. 133) has called conscious errors. "This is a deliberate distortion of the sensed data, for a variety of (usually) self-serving human purposes: reduction of workload, avoidance of unpleasant tasks, self-aggrandizement, fear of being punished as the bearer of bad news." The finding in this study may be indicative of other factors at work - perhaps some type of bias in performance and/or data collection. Such bias would not be unprecedented. Gould (1996) argues that even the most seemingly objective science is not free from political and social influence.

A second problem identified was in the analysis of data, specifically the statistical significance between various levels of staffing. As reported in Appendix G of the Dallas report, the statistical significance between staffing levels was, in many instances, not significant. The data for the single-family evolutions only had three of 10 comparisons with sufficient statistical significance to support the conclusions. For example, the executive summary highlights that a three-person crew

was unable to complete a search during the private residential evolution while the four-person staffing level performed satisfactorily. Yet, the data in Appendix F and Appendix G of the Dallas study indicates that such differences were not statistically significant. The calculated significance was only at a 70 percent confidence level, well below the 95 percent typically required. This is important because the confidence level provides an estimate of how often you will be wrong. According to the analysis done in the Dallas study, there is only a 70 percent chance that any real differences between four-person and three-person search crews exist. This also means that a 30 percent probability exists that the results occurred by chance. For this reason, researchers usually require statistical significance to reach at least the 95 percent confidence level (Meier & Brudney, 1987).

There was an additional methodological problem identified in the Dallas study -- a concern with the so-called "Hawthorne Effect." While the study authors took precautions to minimize selection bias in fire companies chosen for conducting the various evolutions, there is no discussion within the report suggesting that the purpose of the study was shielded from study participants. Discussion of this study in a series of articles published in *Fire Command* magazine suggests that department personnel were involved in the development of the study and in the direct data collection phase (O'Hagen, 1984). One could assume that participating firefighters knew the intended purpose of the study as well as the implications their relative performance would have on the conclusions.

Summary of Research Used to Justify NFPA 1710

The preceding review of four major studies used to justify NFPA 1710 reflects a paucity of rigorous information that could be used to support proponents' assertions. Three of the four studies provided no original data. The remaining Dallas study appeared to meet most of the adequacy criteria. However, the study was limited in its ability to be generalized, provided no discussion of the statistical significance in its data analysis, and may have suffered from a Hawthorne Effect where fire personnel were influenced by the scope and nature of the study. Notwithstanding this critique, the Dallas Study would be well suited for replication in other jurisdictions, assuming of course, if the concerns raised in this article are addressed. There was no data offered to support the response time requirements outlined in NFPA 1710.

Current Research Efforts

If the current research to answer "big questions" in the fire service is lacking, what can be done to improve the scope and quality of fire-related research? What has been done so far, and what additional efforts are underway? Two federal efforts are noteworthy.

USFA's Fire Research Agenda

The U.S. Fire Administration is the nation's leading proponent of fire service research. While the task is distributed among multiple federal agencies, the glue underlying our research efforts comes from the U.S. Fire Administration. This concept was outlined in a 2001 report submitted to Congress by the U.S. Fire Administration on the National Fire Research Agenda (FEMA, 2001b). The research agenda was developed through several methods, including workshops designed to define

the needs of the fire service, needs identified by consensus standards-making committees, and other "constituent research needs as those are made known to the USFA" (p. 2).

Working in concert with the National Institute of Standards and Technology (NIST), the U.S. Fire Administration held several workshops designed to gather input on the needs of the fire service and the research needs in the fire community. In October 1999, the USFA and NIST held two workshops. The first, held in San Antonio, sought to identify needs of the fire service. Areas addressed included fire fighting operations, health and safety, large fire incidents, fire mitigation, and communications and information technology (NIST, 1999). The second workshop, intended to specifically discuss fire research needs, was held in Emmitsburg, Maryland. In this second workshop, participants acknowledged the difficulty in applying current research to operational needs of fire departments. In particular, these workshops concluded that it was not possible to correlate response times to impacts on loss of life and property. Response time requirements, it is argued, "are based on 'rules of thumb' for fire growth and not based on research" (p. 10).

Overall, workshop participants believed that the fire service does not have input into selecting fire research areas. They recommended the development of a mechanism that allows the selection, awarding, and tracking of fire-related research (NISTIR 6539, 1999). Importantly, participants recognized that better research was needed to develop and support policy positions taken by the nation's fire service. The USFA's Fire Research Agenda provides a glimpse into the types of research currently being supported from a national perspective. These efforts are reflected in the work of the Building and Fire Research Laboratory (BFRL) at the National Institute of Standards and Technology. Three of the four main research areas at the laboratory focus on the quality of building construction and their constituent materials. Only one research area, Fire Loss Reduction, seeks to directly enhance firefighter effectiveness (BFRL, 2005).

Considering the significant costs associated with the provision of fire rescue services, current funding levels are extremely small. According to the USFA report, funding for fire research in 1999 was \$500,000 and expanded in FY2000 to \$2 million. For FY2001, this figure was expected to reach a total of \$3.1 million and increased further yet to \$3.25 million in FY2002.

In 2003, the 108th Congress did provide authorization of approximately \$2.2 million designed to improve fire fighting technology and standards development. These dollars were intended to cover such diverse topics as personal protection equipment; devices to locate victims, firefighters, and other rescue personnel; and evaluation of compatibility between new equipment and technology with existing fire fighting technology (Firefighting Research and Coordination Act, 2003). The level of federal funding currently allocated is trivial considering the \$26 billion spent each year on career fire agencies alone (Hall, 2004).

EMS Research Agenda

In December of 2001, the National Highway Traffic Safety Administration published their *National EMS Research Agenda* (NHTSA, 2001). This report cited several issues of concern in

EMS research, including an insufficient number of researchers to explore EMS issues, not enough collaboration in conducting research, and inadequate funding. While some of these same failures can be seen in the fire research efforts, there are significant differences in the scope and quality of research between fire operations and pre-hospital emergency care.

The development of pre-hospital emergency care and the creation of EMS systems in the United States are rooted deeply in the efforts to reduce mortality from out-of-hospital cardiac arrest. Therefore, studies used to justify the creation of EMS systems have been nurtured by mainstream medicine and fostered by the stringent standards applied to scientific medical research. There is an ever-growing collection of studies using appropriate research methods, and these continue to be published in peer-reviewed journals. Such a process has not been in place for fire-related research. The *EMS Research Agenda* report further concludes that federal support for EMS research is extremely lacking. The report found that only 3.8 percent of studies on EMS received some support from the United States Public Health Service.

Future Directions for Fire Research

Recognizing the status of fire-related research, considering the recommendations derived from the USFA workshops, and drawing from the recommendations of the *EMS Research Agenda*, there are steps that may well improve fire service research. Three such steps include greater funding for research, the creation of a national fire research board, and a peer review forum.

Funding

It is really quite simple. To research the "big questions" in the fire service, research funding is required. What, then, would be an appropriate level of funding for research? The *EMS Research Agenda* recommendations call for funding at a level equal to one percent of the annual expenditures for EMS – that translates to funding for EMS research at \$50 million per year, a level well above that being spent on fire-related research. It could be argued that a similar level in the fire service may also be reasonable. If one were to limit the analysis to only those costs associated with funding career fire departments, one percent research funding would represent \$260 million for fire research (NFPA, 2001). However, it is unlikely that support for that level of funding could be obtained.

National Fire Research Board

To enhance the effectiveness of an increased federal funding effort, the U.S. Fire Administration should work with constituency groups to create a national fire research board. Originally proposed at the Fire Research Needs Workshop in 1999, this group would afford a sharper linkage between "big questions" in the field and those research projects funded. The board would need to articulate the "big questions" and then seek researchers interested in answering those questions. To define "big questions," the board would need representation from major constituency groups, but with an emphasis on individual members who could bring a relevant research perspective to the discussion. Membership should include public officials (non-fire service), chief fire officers, labor officials and existing researchers.

Current fire service research efforts are limited, and therefore so are current facilities conducting this research. Efforts should be made to seek and fund existing academic institutions with interest in a wide range of research areas, including the fire service, public administration, operations research, ergonomics and others. As was noted above, several earlier attempts to examine fire service issues died for a lack of funding. There is little doubt that if research funding is made available, there will be no problem in identifying existing institutions to perform the work.

Peer-Review Forum

Assuming the fire service can identify funding, define the questions, and have the research conducted, what would we do with it? A major problem in the fire service has been the lack of a well-structured process for wide dissemination of research. Efforts by the Institution of Fire Engineers have provided one forum for discussion of important questions in the fire service. Coupled with the Fire Department Instructors Conference over the past several years, the Institution of Fire Engineers has sponsored a conference on various fire service topics. This has included two events focusing specifically on fire service deployment.

This journal, in its inaugural state, has the potential to fill the void of a peer-reviewed journal. Yet, there must be support for continued publication through readership and ongoing debate of issues – something that the fire service community itself must provide.

Conclusion

There are several conclusions that can be drawn from this review on fire service research. First, there is no current data, one way or the other, to support any position on precise staffing or response time requirements. This is not a criticism of NFPA 1710 as much as it is a criticism of past research efforts. Second, the major conclusion of this study is that we have failed to identify or answer the “big questions” in our field. In the vacuum that remains, pseudo-science has been used to justify many of our practices.

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Editor's Note: The two articles that follow are from scholars in the United Kingdom. The article by Vivienne Brunsden, Steve Wilson, and Louise Woodward went through the regular peer review process employed by the *International Fire Service Journal of Leadership and Management (IFSJLM)*. As such, it follows the same American Psychological Association (APA) style requirements as other articles published in the journal.

The second article co-authored by Ferhana Hashem and Jacqueline Lilly, is reprinted as it appeared in our sister journal in the United Kingdom, *Fire, Safety, Technology, & Management (FST&M)*, published in association with The Fire Service College, Moreton-in-Marsh, England, and the Institution of Fire Engineers. *FST&M* uses the Harvard reference style, not the APA style.

In each issue of *IFSJLM* one article from a recent issue of *FST&M* will be reprinted. In turn, an article from each issue of *IFSJLM* will appear in *FST&M*. We wish to thank Ms. Rosie Bennett, Managing Editor of *FST&M*, for her help in establishing this research cross-fertilization practice and her support and advice in the establishment of *IFSJLM*.

IFSJLM actively solicits articles on fire leadership and management from academicians and practitioners globally. We hope this section of the journal, aptly called "Global Connections," expands over the years as we build theory that impacts fire service leadership and management worldwide.

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Stress in Union Officials: An Issue for Managerial Concern?

Abstract

This study examines stress levels in, and a range of stressors experienced by, officials from a trade union within the fire and rescue service (n = 85). Findings indicate dissatisfaction with aspects of the work of union officials. Additionally, respondents exhibited excessive levels of stress resulting from the service's organisational structure and their role within it. The benefits of the union role to the service are noted; and it is suggested that consideration be given to effecting change in organisational structure, climate, and practice in the fire and rescue service, and to improving support for union officials.

Introduction

The stress, both physiological and psychological, to which firefighters are subject in their everyday role is well documented and has generated a vast literature (e.g. Brunsden et al., 2003; Regehr et al., 2000; Baker & Williams, 2001; Wagner et al., 1998). Stress among firefighters can be generated by a diverse range of sources including sleep disturbance (Murphy et al., 1999), environmental conditions such as heat (Brenner et al., 1998), exposure to chemical and biological hazards (Markowitz, 1989; Malek et al., 2003), and organisational factors (Brunsden et al., 2003). Firefighters further face the additional stress resultant from attending traumatic events, and again this has received much attention in the academic literature (see Hill & Brunsden, 2003; Brown et al., 2002; Beaton et al., 1999; Fullerton et al., 1992). Studies related to stress in fire organisations, and the wider emergency services, have tended to focus on 'front end' operational staff with scant attention being paid to other roles within these organisations. For example, there is only a very limited literature on control room staff (for exceptions see Brunsden et al., 2003; Wastell & Newman, 1996), and on officials in trade unions and other staff representation organisations. The latter is surprising given that many union officials remain operational and are therefore not only subject

to stressors arising from their additional union-related workload but also to the same stressors as other fire service personnel. This dual role places officials in a position of increased vulnerability to stress related problems.

The adverse impact of stress on physical health is well established; stressed workers typically display a range of health and behaviour problems including headaches, insomnia and exhaustion (Kalimo et al., 1987; McLean, 1980). In addition, the associated physiological impact can exacerbate certain conditions such as hypertension (Vrijkotte et al., 2000) and increase the risk of developing cardiovascular disease (Bosma et al., 1998; Rosch & Theorell, 1996). Stress also has been shown to increase susceptibility to infectious disease (Cohen et al., 1991; Cohen & Williamson, 1991). The psychological distress arising from stress can also precipitate levels of anxiety that result in mental impairment or clinical depression (Sperry, 1993). There is also a danger that some individuals may use maladaptive coping strategies in an attempt to alleviate their job-related distress, such as alcohol (Boxer & Wold, 1993) and substance abuse (Schuster, 1993). Stress in operational staff not only has health implications for the individuals concerned, it may also affect public safety. Stress has been shown to result in

impairments in performance of complex tasks (Berkun, 2000), job performance (Srivastava & Krishna, 1991) and may also detrimentally affect risk assessment judgements (Quartermain, Stone, & Charbonneau, 1996).

Methods

Questionnaires

In this survey, a range of questionnaires were used. They included The Maslach Burnout Inventory (MBI; Maslach & Jackson, 1986) designed to measure the risk of burn-out for those with demanding occupations; and The General Health Questionnaire-28 (GHQ-28; Goldberg & Williams, 1988) which is a measure of general health functioning. Finally, the Occupational Stress Indicator (OSI; Cooper, Sloan & Williams, 1989) was used to measure individual levels of non-traumatic stress specifically related to work. The OSI is designed to be used across a wide range of occupations with published norms available for groups as diverse as psychologists, factory workers, company directors and nurses. This means that comparisons can be made in scores across a general population. There are a number of sub-scales within the OSI. For this study, the subscales of Sources of Stress, Job Satisfaction, Coping Strategies and Effects of Stress on health were used. All measures used were established as having sound psychometric properties. Additionally, questions were devised to gather information about general demographic and biographical information. Respondents also were asked questions relating to their recent health history.

The questionnaire also included a free response section in which respondents were given the opportunity to comment upon anything that they felt was significant to the research. This section of the questionnaire was analysed using thematic analysis. The questionnaire was distributed to all officials within the participating trade union.¹ A total of 200 questionnaires were distributed and 85 were returned (43% response rate).

Sample Characteristics

The occupational split of the sample was 91 percent fire fighters and 9 percent control room staff. The gender split was 88 percent male and 12 percent female. The mean number of years respondents had been serving in the service was 21 (range = 6 to 32 years); and the mean number of years spent as union officials was 14 (range = 2 to 27 years).

Findings

General Health of the Sample

The number of days absent from work in the previous year ranged from zero (30%) to 180 (1%). The mean number of days off due to illness was four. Despite physical health being a well-recognised aspect of fire service roles, 36 percent of the sample reported being a smoker, with 1 percent reporting they smoke forty cigarettes per day. The average number of units of alcohol² drunk per week was 25, which is above the national average range between zero (5%) and 84 units (1%). In terms of physical health, 54 percent of the sample reported above average levels of physical symptomatology of stress (compared to levels found in the general population), such as headaches, insomnia and exhaustion.

A maximum score of 28 can be obtained within the GHQ. Scores over six can be taken as indicating higher than normal levels of psychological morbidity. The average score of respondents was seven, ranging from a minimum score of zero to a maximum of 28. In total, 49 percent of the sample were scoring seven and above, which indicates evidence of adverse psychological health.

Evidence of Stress and Pressure

Respondents were asked if they experienced additional stress due to their role as a union representative. Ninety-four per cent reported that they believed this to be the case. It is unclear, however, whether this was the result of their increased workload, the effect of the additional responsibility, or other issues. Hours spent on union business at work varied considerably, with 4 percent reporting their role added no further hours to their load but one percent reporting it added as many as 60 hours (mean = 18). The number of hours spent on union related matters at home (i.e. in their own personal time) ranged from one percent reporting they spent none of their personal time on union related work and one percent reporting they spent up to 72 hours of personal time (mean = 18). Given that 91 percent of respondents reported they were allowed time during work for union business, there still remains a high percentage of personal time spent on union work. Indeed, the most stressful part of being a staff representative was reported to be the lack of time available to do the work (54%). Other notable aspects of the work considered to be "very stressful" by respondents were the handling of discipline cases (28%) and over-tiredness (21%).

In relation to personal attitudes of union representatives, 58 percent claimed that they felt no frustration with work relating from their union role. For 13 percent, however, this was not the case and frustration did arise as a result of their role. When asked whether they had become 'more callous towards people' since becoming a union representative, 34 percent reported they felt that this was the case with over a fifth of the sample feeling this strongly. In addition, 75 percent reported they did not 'really care what happens to some union members.' Sixty-eight percent disagreed that they were 'positively influencing other people's lives' through working as a representative. This weariness and emotional numbing may be a form of psychological defence or coping strategy. Similar responses are frequently seen in those suffering from traumatic stress (Monson, Price, & Rodriguez, 2004; Feeny, Zoellner, Fitzgibbons, & Foa, 2000). It may also be the result of compassion fatigue, which has been seen in professions having a supportive and nurturing role (e.g., therapists and counsellors; see Cerney, 1995; Jacobson, 2004). This seems a plausible explanation given that aspects of the union official role have distinct similarities to other supportive and mentoring occupations. Responses such as these also indicate a degree of job dissatisfaction with the union role. When job satisfaction was measured directly, 75 percent of the sample scored below the mean score seen in the general population. This is notable as there is a direct relationship between levels of job satisfaction and stress. Those experiencing stress usually have negative attitudes towards their work (Cooper, Sloan and Williams, 1989).

Sources of Stress

Results indicate that the organisational management structure and processes were felt to be the principle contributors to occupational stress. A number of specific structural factors were identified as sources of stress.

Factors Intrinsic to the Job: Intrinsic stress factors, which originate from the fundamental nature of the job, include aspects such as the amount and scope of duties, hours, variety, and responsibility. Seventy-nine per cent of respondents reported stress related to the very nature of their work. A weak but significant relationship also existed between adverse psychological health and factors intrinsic to the job ($r=0.362$, $p=0.01$). This indicates that as pressure increased because of occupational factors, psychological health decreased.

Organisational Structure and Climate: Sources of organisational stress can emanate from structural design and process features, as these contribute to the psychological 'feel' of an organisation (Sperry, 1993). Respondents' data suggested that this was a significant source of perceived stress, with 80 percent scoring above normal. Detriments in physical health and the pressures derived from the organisational structure were found to correlate mildly but significantly ($r=0.308$, $p<0.05$). This suggests that as stress related to the organisational structure increased, there was a corresponding deterioration in physical health. A similar pattern is seen with respect to psychological health where a mild but significant correlation was found between adverse psychological health and the pressures experienced as a result of the organisational structure ($r=0.284$, $p<0.05$).

Work Based Relationships: Working within the fire service, particularly as a union official, demands a high degree of contact with colleagues and management. Relationships with superiors and especially peers can be a valuable source of support and coping (Regehr et al., 2000). However, relationships with peers and superiors in this instance were reported as a major source of stress by over 90 percent of respondents. A mild but significant correlation between psychological health functioning and the pressures felt from work-based relationships was found ($r=0.390$, $p<0.05$). This finding suggests that as pressure builds, psychological health begins to deteriorate. Stress resulting from work-based relationships was echoed in terms of a lack of satisfaction, as 64 percent of respondents reported dissatisfaction with working relationships. However, it should also be noted that 24 percent of the respondents reported levels of satisfaction above the norm. Trade union officials clearly have complex working relationships with colleagues. At times, they will be representing staff who hold senior ranks to themselves and will become privy to information not normally held at their own rank. At other times, they will have to negotiate on the behalf of others with these same staff.

Career and Achievement: The need to achieve personal and career success can be a great source of satisfaction or, if obstructed, a major source of stress. Within the sample, 93 percent of the survey participants scored below expected levels, relative to the general population, on their satisfaction with achievement, value, and growth. This suggests a strong sense of feeling undervalued in their work and of perceptions of having little opportunity for career advancement. Additionally, 52 percent of respondents reported above average levels

of stress related to career and achievement opportunities within the fire service. It was unclear whether this was felt to be related in any way to their union role.

Home-Work Interface: There is a complex relationship between stress experienced within the workplace and that experienced within personal life (McLean, 1980). It is a bi-directional relationship with sources of stress at work affecting home life and vice versa. The need to balance home and work in and of itself acts as a stressor (Kelloway, Gottlieb, & Barham, 1999). This appeared to be a major issue among the respondents, with 89 percent scoring at levels above the average score seen in the general population.

Sources of Coping

A range of coping styles were evident in the sample. Coping styles included both emotion-focused and problem-focused. Included were strategies such as the use of social support, logic, involvement and engagement with the problem, and task directed strategies such as reorganisation of workloads. The dominant coping strategy reported was the use of social support, with many individuals relying on social interaction and support from others as a means of coping with stress. This is unsurprising given the close proximity that fire service personnel work in and the strong personal relationships that develop as a function of organisational aspects of the service such as the watch culture (see Hill & Brunnsden, 2003). Regehr et al. (2000) found that perceived support is an important determinant of perceived distress. They also found that depression scores were negatively correlated with all types of perceived support: employer, union, family, spouse and friends. Social support can take many different forms with even the mere existence of supportive relationships acting to facilitate an individual's ability to cope with stress (Lazarus, 1966). There is good cause to improve the levels of support offered to union officials by both peers and service management.

Factors Relating to Burnout

Although the majority of the respondents reported that their work as a union official did not make them frustrated, 51 percent did report feelings of being 'worn out' by the work. This appeared to have an impact on the way that they were able to interact with union members. A large minority of respondents reported feeling that they treated some members as if they were impersonal objects, and that their attitudes were becoming hardened and callous. More reassuringly, there was still a strong sense of feeling energetic as reported by over half of the respondents.

Qualitative Analysis

The final section of the study offered respondents the chance to comment upon anything that they felt was significant to the research. When these comments were subjected to a thematic analysis, a number of themes emerged. The themes were the role of union official, impact on home life, Fire and Rescue Service management, diversity issues, and control room staff.³

The Role of Union Official: A number of respondents commented upon the positive aspects of an official's role. For example, it was reported that the role could be very rewarding and enjoyable, offering the opportunity to be an effective

team builder and player. However, a number of more negative themes, and their resultant impact, emerged from the data. Specifically, there was the perception of an expectation from fire service management for the union representative to be constantly available. Related to this, the magnitude of the workload shouldered by officials was viewed as overwhelming and their efforts were felt to be unappreciated by both management and members.

Respondents also reported a feeling of being 'caught' between management, the union management, and their members. This was perceived as difficult and frustrating, contributing to officials' psychological strain and overload. It was frequently stated that communication between the union and management was strained, with some respondents feeling penalised for undertaking the role of official. People also reported feeling trapped in the role because no other person was willing to take up the position of official. This created feelings of a lack of control. This has implications for health as high psychological demand coupled with low control is seen as a risk factor for ill health (Karasek & Theorell, 1990). Additionally there was a perception that peers within the service can underestimate union work, hold it in low esteem, and consequently offer little support. These factors all contributed to a feeling of isolation as a result of the role.

Impact on Home Life: There was a high level of reported tension between work and home life. The volume of union work and the way in which it impinged upon family time was an issue for many respondents. This extra work appeared to have two main aspects-- unfinished paperwork and a high volume of phone calls at inconvenient hours. A number of respondents commented upon a need for adequate working facilities, within both the union and the service, such as dedicated office facilities to reduce the need for working at home. Inadequate workspace has a considerable impact on individuals. Some respondents reported that performing union duties had led to a noticeable increase in their levels of stress, which was then exacerbated by a lack of available support. For some, the build up of stress and pressure became so severe that it necessitated the recourse to more formal support in the form of counselling. Feelings of anxiety and "tearfulness" were also reported in respondents' comments. Some respondents also expressed the worry that union officials were at risk of suffering from other stress related illnesses, including depression. However, it should be emphasised that this was not directly measured in this study.

FRS Management: A variety of issues were presented relating to management style and politics within the fire service. A strong sense of frustration with fire service management was expressed. Respondents related their frustrations to perceptions and accounts of aggressive styles of management.⁴ Respondents indicated that this aggressive management style prompted apathy and fear from the union's wider membership. Some respondents reported feeling that management often "ignored" the work undertaken by union officials by showing no interest in their work or role. This perceived lack of appreciation from both peers and management is likely to act as a stressor in and of itself. For example, Siegrist (1996, 2001) has suggested that such perceived imbalances in efforts and rewards can create a state of emotional distress leading to adverse health outcomes. Imbalances between efforts and rewards are commonly seen in public service occupations, and in occupations having a high degree of human interaction (Tsutsumi &

Kawakami, 2004); both of which describe the fire service. Tsutsumi & Kawakami (2004) suggest that this is an area in which organisational change and cooperative attitudes from management can result in genuine improvements in both stress-related symptoms of staff and amounts of sick leave taken.

Diversity Issues: Harassment cases were reported to be extremely stressful. Such cases span across all underrepresented groups, and include women, black and ethnic minorities, and gay and lesbian members. In addition to harassment generally being highlighted as a particularly pertinent issue, the service was perceived as being highly sexist in its structure and outlook. This has been reported elsewhere in the literature with negative attitudes towards female personnel being found in both fire service chiefs (Pantoga, 1977) and the wider service (Floren, 1980, 1981). It was felt that these attitudes could also spill over into the union itself where communication and emotions were being perceived as being male dominated. This has been found to be the case in unions in other occupations (Charles, 1983).

Control Room Staff: Some respondents reported a particular problem for control room staff, when acting as union representatives. Control room staff expressed difficulty in separating their staff role from their union representative role. This was less of an issue for firefighters due to the multifaceted nature of their work behaviours and also their shift patterns. Firefighters' shift-work patterns allow for large blocks of time away from the main role, which can then be dedicated to union work. These blocks of time were unavailable to control staff. Respondents also noted that it was difficult for control room staff to obtain promised trade union leave because of regularly encountered staff shortages.

Concluding Comments

The physical and psychological costs of elevated stress levels are known to be severe and can manifest themselves in a variety of other maladaptive responses (Monat & Lazarus, 1991). Responses from a survey of 85 union officials confirm that they not only suffer stress, but also exhibit physical and psychological difficulties as a result. Stress related problems affect the way they function with adverse consequences for their workplace interactions and in their personal and private relations. Recognition of the unique stress factors that confront union officials is especially relevant for management. Union officials play a vital role in establishing and maintaining positive relations with Fire and Rescue Service personnel. Union membership has been found to bring positive benefits to workers (Corneo, 1995). Management opposition to unions, including punitive treatment of officials and anti-union propaganda, have been found to be counter-productive and to result in increased union loyalty (Corneo, 1995). Conversely, positive relations with unions and management-union co-operation in strategic planning have been shown to yield benefits to the organisation (Mills, 1978). It is therefore in management's own best interest to address the issue of stress in union officials. Additionally, fire service managers have the opportunity and the legal responsibility (see Davies, 2003) to address the problem of stress among trade union officials since they are also FRS employees. If they are to be effective, management must find ways to improve the position of union officials and to help reduce the stress resultant from their multi-faceted roles. The results will not only benefit union officials, but also the wider service.

There is evidence for the efficacy of management interventions in stress reduction. The exact nature of interventions that have been found to be successful differs across occupations, work patterns, pay levels and even gender (see Tsutsumi & Kawakami, 2004). Specific interventions were outside the scope of the current study. However, regardless of the exact nature of interventions, a sustained level of commitment is needed from management to show any significant impact (Irie et al., 2003; Tsutsumi et al., 2003). Union commitment to health and safety issues has been found to positively impact on the protection of workers' occupational health and safety (Chen & Chan, 2004), and on workforce implementation of related statutory regulations (Walters, 1995a, 1995b). It is ironic that fire service union officials appear to be suffering so greatly themselves.

Notes

¹In order to protect the confidentiality of the sample, the name of the trade union is not identified.

²A unit of alcohol is eight grams. This is the amount contained in a small glass of wine, half a pint of ordinary beer, or in a standard measure of spirits (Department of Health, 1995).

³All qualitative responses reported here have been paraphrased to ensure anonymity and confidentiality. All paraphrasing remains true to original responses in intention and content.

⁴See Corneo (1995) for acknowledgement of such behaviours as deliberate strategies of opposition to unions.

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Career Aspirations and Desirability: Minority Ethnic Young People and Their Perceptions of the Fire Service as a Career

Introduction

The FireWorks research project aims to bring greater equality to the fire service through identifying and addressing the barriers to the employment, retention and promotion of minority ethnic groups and women. Within this over-arching aim, the focus of this particular study investigates the attitudes of minority ethnic young people, young women and their parents towards a career in the fire service. This work aimed at providing a more holistic view of how minority ethnic young people and young women (ranging from 15 to 18 years of age) make career choices. The key questions focused upon investigating the influences upon young people in their decision-making about their future career ambitions taking into consideration factors such as subject choices, education and training pathways, parental opinions about their career choice and the level and availability of careers support (Hemsley-Brown & Foskett, 1999:1342-43). The data sets used will be drawn from the work undertaken with the young people.

The research presented here focuses upon areas of discussion that have been outlined in earlier studies, which reported on the perceptions of minority groups and women towards a career in the fire service. The paper will explore what attracts young people to firefighting, assesses the levels of work experiences and personal contact with the fire service and whether the themes of religion, culture and gender shape the career choices of minority ethnic young people and young women. Lastly, the factor of racism is addressed in order to explore what impact this issue may have on whether minority ethnic young people and young women could consider joining the fire service.

Background and Context

Our literature review on minority ethnic group attitudes towards a career in the fire service has shown some surprising findings, but has also revealed areas of research that require further investigation. Earlier research has shown that the Fire and Rescue Service (FRS) has a low-careers profile with minority ethnic communities, yet, the service's general image is still positive with such groups. The issue of racial discrimination does not appear to explicitly deter minority ethnic groups from applying (Bucke 1994:vii; London Fire & Emergency Planning Authority, 2000:32). However, the lack of knowledge about the role of a firefighter and information on the service as a whole evokes some suspicion and fear about racism in the organisation.

The issue of religion as a barrier for minority ethnic groups is a perplexing matter on which previous studies have shown some conflicting findings. For example, on the one hand, in one report it was suggested that religion would be a barrier to some

groups especially to Muslims (C3 Consulting, 2000:20; Clayton, 2002:11) and Sikhs (The Corporate Communications Company, 1999:19), however, on the other hand, in another report minority ethnic groups respondents said that the FRS was an organisation where religion would not pose a barrier to them (London Fire & Emergency Planning Authority, 2000:30). The level of generality used to explore the issue of religion and the lack of understanding regarding the differences in career aspirations between minority ethnic communities demonstrated that a much greater in-depth study was required regarding the perceptions of these groups. This literature review showed that there were far more in-depth areas of research that required further consideration.

Research Methods

The initial phase of research took place in spring 2005. This stage of work was undertaken in order to assist in the selection of the three target locations in England where the planned fieldwork would take place. Three regions in England were selected based upon a comparison of the representation of minority ethnic firefighters (both wholetime and retained) within fire services (based upon the 2003 figures) and minority ethnic populations within each region (drawing from the 2001 Census). We identified three locations – Manchester, Sheffield and Coventry – where some fire services appeared to be achieving far greater representation with certain minority ethnic groups in the region.

The targeted groups selected for the study were young people and parents who belonged to the same family. The focus on young people and parents was chosen in order to assess how individuals make career choices within their family environments. By gaining the involvement and participation of families, the idea was to gauge how influential families were in informing the career choices of young people (Rutherford, Wagner & Netto, 2003:21).

The final sample involved eighteen people who were interviewed in a one-to-one discussion. The overall number of young people interviewed was a relatively small sample – only ten in total from the three locations. The intention was initially to choose young people from specific minority ethnic groups. However, it was a challenge to find interested and willing young people from these particular ethnic backgrounds. Subsequently, the young people involved in the study were primarily those who were happy and willing to be interviewed. The following table shows their ethnic backgrounds:

Location	Abbreviation	Ethnic Background	Gender	Age
Coventry	COV YP 1	Pakistani (Asian or Asian British)	Female	16
Coventry	COV YP 2	Indian (Asian or Asian British)	Male	18
Manchester	MAN YP 1	White British	Female	15
Manchester	MAN YP 2	Mixed White & Black Caribbean	Male	18
Manchester	MAN YP 3	Black Caribbean	Male	17
Manchester	MAN YP 4	Pakistani (Asian or Asian British)	Female	16
Sheffield	SHE YP 1	Other - Syrian	Female	15
Sheffield	SHE YP 2	White British	Female	17
Sheffield	SHE YP 3	Mixed White & Black Caribbean	Male	16
Sheffield	SHE YP 4	Mixed White & Asian	Male	16

As shown in the above table, both genders were equally represented. Where willing, further interviews took place with the parents of some of the participants. Four Connexions advisers from the three regions were also interviewed who were drawn from the three chosen regions in England. The data generated from working with parents and Connexions advisers will not be discussed here, but feature in the final FireWorks report (Lilly, 2005).

One-to-one interviews were undertaken with each of the participants. The discussion undertaken with the young people focused upon their current ideas on their future career choice, why they aspired to this career and the reasons for their choice. There was also a discussion exploring the support that young people felt was available from their parents, teachers and Connexions advisers. There then followed an in-depth discussion on their thoughts of the FRS as an employer, whether they knew of anyone who worked for the organisation and whether they or their friends had undertaken work experience at their local FRS. Further discussions explored the employment opportunities they thought were available in the FRS, whether they were aware of the main duties of a firefighter and whether they could envisage themselves working in the organisation. The last set of questions investigated what they thought their parents would say if they were to work for the Fire and Rescue Service.

Reasons for Choosing Firefighting

Although only two out of the ten young people (20%) expressed an interest in firefighting, many other favourable comments were made by the other participants. In the interviews we asked whether they would consider working for the FRS even if they had named an alternative career. The main reasons given by the young people for wanting to become a firefighter was the variation in the daily duties, being able to help and rescue people, being 'inside all the action' and doing a rewarding and exciting job.

One young person, who had not specifically vocalised an interest in firefighting, nonetheless described how much excitement and appeal she had associated with the job. She stated that she would want to, *"go into the actual fire-fighting, I wouldn't want to stay behind, I'd want to be inside all the action. So I'd probably do the whole time thing... I'd actually want to be there doing something to help, something more hands-on"* SHE YP 1 – female of Syrian descent – 15 years old.

Another young person echoed these sentiments. He stated that he thought that, *"it would be a really rewarding job, it's ex-*

iting when you're not putting out cars and things like that...it feels like an exciting job". SHE YP 3 – male of mixed White and Black Caribbean descent – 16 years old.

Some other young people who had not mentioned a particular interest in firefighting, nonetheless noted that they would consider firefighting only if it formed part of their overall career ambitions. One young man underlined how much he valued the job and he could envisage himself undertaking the role of a retained firefighter, as it would enable him to continue to develop his other career ambitions. He stated that he would be interested in this specific role, because, *"I think it's quite a valuable thing to do something that I'd probably enjoy...I think it wouldn't be my main career, I think that's the main point in that decision"*. COV YP 2 – male of Indian Asian or Asian British descent – 18 years old.

Drawing from these comments, it seems promoting the role of a retained duty system firefighter could provide the experience and opportunity to attract young minority ethnic people and young women who would not otherwise consider working as a firefighter.

The two young people who were interested in becoming firefighters gave quite in-depth descriptions as reasons for their particular career choice. One young person explained how different the role of a firefighter was in comparison to other apparently mundane office jobs. He was attracted to the variation in the day-to-day duties of the job, *"But it's a good job because me personally I don't want a job where you go and sit in an office and do the same s*** every day, I don't want to do anything where you do the same thing every day and the Fire Service is different every day and that's why I want a job like that"*. MAN YP 2 – male of White and Black Caribbean descent – 18 years old.

Another young person discussed how she had always wanted to become a firefighter ever since she was a child, *"I've always wanted to be one even when I was a kid so... I've always wanted to be one, because I used to watch a programme called 'London's Burning', and it was just always [what I] wanted"*. MAN YP 1 – female of White British descent – 15 years old.

From the above statement, it would appear that for some young people, becoming a firefighter was a career choice they had made in childhood. These particular young people seemed to be suggesting that for them firefighting was a vocation as well as chosen profession. What was interesting was that the two young people who had chosen firefighting had family con-

nections to the organisation, *"My uncle's a fireman and he's done well in life... A good life, a nice wife, a big house, his lifestyle's different to all my other family's and he lives different. He doesn't smoke or drink or anything, he's got a good life"*. MAN YP 2 – male of White and Black Caribbean descent – 18 years old.

"...my...Auntie, auntie's husband works for them as well... I haven't spoken to him yet but I'm hoping to speak to him next time, when he comes down, next time". MAN YP 1 – female of White British descent – 15 years old.

Therefore, an important influence upon these two young people intending to go into firefighting was because members of their family had worked for the FRS. Interestingly the young man described how much he thought becoming a firefighter would bring a lifestyle change, stability to his home-life and an entirely different outlook on life. In addition, as mentioned by the young woman, she was aware that she could approach her relative (her aunt's husband) in the future for advice. The two young peoples' comments suggest that personal connections to professions such as the FRS may provide a ground for networking and generating interest from minority ethnic young people and young women.

Work Experience and Preliminary Courses Related to Firefighting

Some of the questions asked in the one-to-one discussions with all of the young people were aimed at assessing whether they had ever thought about the fire service as a future employer. The idea was to evaluate from personal experience, work-related experience or from college courses and training if they had had the opportunity to explore careers in the FRS. Only two of the young people had undertaken work experience or knew of friends who had undertaken work experience with the FRS. Although some of the young people mentioned that the FRS had visited their schools, none of these visits was related to careers or recruitment. When asked about work experience, one young person mentioned that, *"You're not allowed. You're not, because that's what I was going to do because all the teachers were saying, 'yeah, we'll get you a place for you' but then when they were going to get one, you've got to be eighteen to do it because in case anything was to happen in the fire station. So that's why they didn't do it in the fire station"*. MAN YP 1 – female of White British descent – 15 years old.

"I think about work experience in the Fire Service they told us at the beginning of the exchange, they said there's only two places or one place... You could only have one person inside Sheffield, it's only one or two people that can go... and it's the same with the Ambulance and Police, so everybody thought that they didn't stand a chance so with the work experience you'd have 20 people to contend with...The Bank took about 20 people but the Fire Service only took about two". SHE YP 1 – female of Syrian descent – 15 years old.

Thus, it would appear that the real or perceived limited opportunities to undertake work experience in the FRS could be affecting these young people's consideration of the FRS as a career choice.

Although work experience opportunities at the local fire service were limited, there was one young person who had a demonstrable interest in becoming a firefighter. He had attended

a 'Pre-Uniformed Course' at college that was aimed at training up young people in order to enable them to join some of the uniformed professions. He found that the course had fulfilled his expectations, *"at college it was good, it was a group of us and it was for the Fire Service, the Marines and Police and you went on mile runs and mountain climbing and map reading and all that, so I liked that. There was some really cool stuff"*. MAN YP 2 – male of White and Black Caribbean descent – 18 years old.

Thus the college course appeared to be well-suited to the needs of this young man. It seemed like he enjoyed the camaraderie and physical activity, which he thought were important skills for joining the FRS. The merits of the course were also well-known to the young women who also intended to enroll at college after she finished school. MAN YP 1 – female of White British descent – 15 years old. Therefore, it maybe that such college courses or preliminary training may provide useful opportunities for young people from both genders and all backgrounds to experience and assess their suitability for a future career within the FRS.

Religion

A number of questions were focused upon the issues of religion, culture and ethnicity. The young people were asked whether they thought such factors made a difference to the career choices of individuals. More often than not, the young people thought that religion made no difference whatsoever to such choices.

Religion – referring primarily to a doctrinal, textual and orthodox viewpoint – was not identified as an issue that would prevent individuals from applying to join the FRS. One young person noted that she did not believe that religion inhibited people from joining and stated that, *"I don't see anything wrong with firefighters especially if it's a religious matter that there isn't meant to be anything that religion can [say] against it... it's not like you have to do anything that's anything wrong... you're helping people"*. MAN YP 4 – female of Pakistani Asian or Asian British descent – 16 years old. This contradicts some of the earlier studies that suggested that religion would prevent an individual from joining the fire service (C3 Consulting, 2000:20; Clayton 2002: 11; The Corporate Communications Company, 1999:19).

Drawing from the responses of some of the other young people, they suggested that religion was only a factor in terms of ensuring safety and practical requirements. Yet, the young people did not perceive practical and safety requirements as a critical issue associated with religion, and thought it could be overcome by the organisation as they drew parallels with the police force (SHE YP 3 – male of mixed White and Black Caribbean descent – 16 years old). One young person stated that religion was not a significant factor and made no impact on the ability of a firefighter to carry out their duties, *"I think they'll always feel like a firefighter really, they won't think about it. Well, they might think about it but it won't stop them doing their job, they'll still commit themselves to being a firefighter whatever race, whatever religion anybody is they're still a person really and they're doing a job"*. SHE YP 3 – male of mixed White and Black Caribbean descent – 16 years old.

For these young people, it appears that religion is not viewed as a barrier to joining or working in the FRS from either a doctrinal and orthodox context or a practical viewpoint.

Culture and Gender

Culture, although difficult to define and decipher, nonetheless appeared to affect the young people differently in their career choices and whether they would consider working for the FRS. One young man stated that culture would not be a problem to people from minority ethnic backgrounds. He stated that, *"I think if they're comfortable in the situation, I know that I go to a mainly predominantly white school and I get on fine, most of my friends are white and we have groups of mainly Asian kids, but I think that once you're in and you're comfortable...then you should be okay"*. COV YP 2 – male of Indian Asian or Asian British descent – 18 years old.

When referring to culture, this young person was constructing a definition based upon the issue of ethnicity, thus showing how these terms have been used interchangeably. Furthermore, he was providing an understanding of the term by drawing from his experience at school. Therefore, culture was not a factor that had troubled him. For him he felt integrated within his school, therefore, by gauging from his experience, he could not envisage that there would be problems for people from minority ethnic backgrounds wishing to join the FRS.

When speaking to two of the five female participants, the issue of culture had affected them rather differently. Using this term elicited a very different kind of response from them when talking about working as a firefighter. One of the young women stated that, *"Women it might be a bit...if you're from a strict family it would be a bit hard for women ...they look at it as a manly thing you know firefighting but now especially if your parents are from like back home and are last century people, I think yeah it could be a problem for some women, yeah it could be"*. MAN YP 4 – female of Pakistani Asian or Asian British descent – 16 years.

This participant was suggesting that young women – perhaps from a Pakistani family like her own – might encounter problems if their family was 'strict'. What is interesting is that the comments refer especially only to those parents and families who were from a particular generation such as "last century people" or parents who were from "back home." Thus, the participant was drawing a distinction between some parents who had the same background, but not necessarily all parents.

When speaking to another participant about culture and joining the FRS, she drew a distinction between what she perceived as culture – an issue which she saw as oppressive – and her religion – which she saw a factor that in fact gave her rules and beliefs by which to abide. *"I'd just say that culture doesn't play a role in anything, it's just the fact that I detest everything about culture, I just hate it...It interferes a lot in my beliefs and I think it's a load of unnecessary rules and you have to [do]this and that and it's not good to do that. I think I could change it, their opinion, it depends how determined I was to become a firewoman, but it's a definite no-no, I think"*. COV YP 1 – female of Pakistani Asian or British Asian descent – 16 years old.

Drawing from the statement above, culture was identified as a factor that had inhibited this young woman and interfered with her wishes. Thus, she was suggesting that culture could in fact constrain young women such as herself from pursuing their chosen career. What has been shown from these statements is that the issue of culture has developed a particular meaning according to the individual providing the definition and the way in which

they believe it has affected them. Thus, for this young woman, culture was an issue that she had to contend with, but was not a factor that was identified as a barrier by the young man.

Racism

"Yes, there's racism everywhere really, whatever job you go for. You could be working in an office and you can get someone say something racist to you, so yes, there could be problems." SHE YP 3 – male of mixed White and Black Caribbean descent – 16 years old.

Some of the earlier studies exploring whether minority ethnic groups perceived the FRS as racist found that there was no evidence to support this claim (Bucke 1994: vii; op; [London Fire & Emergency Planning Authority, 2000: 32]). However, the statement above (taken from one of the participants in Sheffield) was given in response to a question that asked whether he thought minority ethnic groups would face problems if they worked for the fire service. What was apparent from his statement was that the FRS was not identified explicitly as racist; he thought that elements of racism could exist in any organisation. This sentiment was echoed by another young person who commented that, *"you get some racist people...but then again it's in every job...if it's very friendly you'll settle in quickly and I think there won't be problems"*. MAN YP 4 – female of Pakistani Asian or Asian British descent – 16 years. Therefore, racism was seen as an issue that pervaded all jobs and acknowledged as a factor that they might have to face in all other areas of employment, but was not identified specifically with the FRS or other uniformed services.

Summary

The interim findings from this study took into consideration the opinions of minority ethnic young people and young women about what they thought of the FRS as an employer. Fire-fighting was identified as a profession that was exciting and rewarding, aimed at helping and rescuing people with a variation in different job duties. These opinions were held by many of the young people even if they had not considered firefighting as a future career. It was found that work experience opportunities were perceived to be limited in the FRS even with those young people who were interested in firefighting. Those young people who were interested would appreciate being given the opportunity to consolidate their chosen career by undertaking work experience.

Religion was not identified by the young people as a barrier to joining the FRS. This issue was identified in the literature as a factor that may have inhibited minority ethnic people from applying to the organisation. However, the themes of culture and gender were factors that two of the minority ethnic young women felt they had to take into consideration when choosing their future career paths. However, these two themes were not as important to the other male participants. Lastly, racism was not associated with the FRS specifically, which confirms the findings from some of the previous literature. Yet, this was a factor that many of the minority ethnic young people were conscious of and which could shape their decisions in the future.

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Dr. Ferhana Hashem is a Research Fellow in the Centre for Health Services Studies at the University of Kent. She currently works on a two-year ESRC research project, which explores the issue of the 'Ethnic Options of Mixed Race Identity' in Britain. She is also involved in research looking at teenage pregnancy and sexual health education. Ferhana completed her doctorate in political sociology in 2003. Her thesis examined Bengal Muslim identity in the Indian sub-continent. As part of her doctoral research she undertook fieldwork in India and Bangladesh and worked at the University of Calcutta and the University of Dhaka. Ferhana has a broad range of teaching experiences. She has taught in both further and higher education. She is qualified to teach in further education at post-compulsory level. Her teaching experience in higher education has been multi-disciplinary in particular in the disciplines of politics and criminology, which was gained while teaching across universities in the North East of England. Following the completion of her Ph.D. Ferhana commenced a two-year post-doctoral position and undertook research on equality and diversity in one of the UK uniformed services. As part of this research Ferhana worked with equality and diversity personnel and minority ethnic young people in order to gauge their opinions of working in the British fire service.

Dr. Jaki Lilly is an experienced researcher, a qualified teacher and has worked in commercial, educational and public service fields. As Research and Projects Lead in Anglia Ruskin University's Centre for Learning and Teaching (UCLT) in Cambridge, England, Jaki designs and manages externally funded research projects and contributes to activities to aid the development of teaching practice and learning opportunities within the University. UCLT's research focus is currently on the use of new and emerging technologies in the facilitation of widening participation in learning, and social and community development.

Jaki's personal research interests include the development of organisations to facilitate social inclusion through learning and employment. This paper is one of four reflecting the findings of a large European Social Fund/Anglia Ruskin University funded research project which Jaki directed. The project investigated the barriers to recruitment, retention and promotion of women and people from minority ethnic backgrounds in the English Fire and Rescue Service and evaluated the potential organisational development solutions. A copy of the project final report may be obtained through emailing Jaki at: jaki.lilly@anglia.ac.uk. Jaki serves as corresponding author.

Review of:

Frankl, V. (1992). *Man's search for meaning*. Boston, MA: Beacon Press, 1992. 154 pp. (\$20 hardcover).

Leadership comes in the forms of many venues. The seasoned leader can witness death, destruction, and structural failures as presenting positive alternatives for future and further motivation. On the other hand, the "rookie" leader or chief officer may tend to view such events as destructive, as decreasing feelings of worthiness, and/or as diminishing the hopes of crew members and families as they face life and death situations. The company officer has to be prepared to face adversities and manage crew members who may lose hope when surrounded by death. In the book *Man's Search for Meaning*, there is a positive correlation between leaders in the fire service and Frankl's personal experiences for survival in a concentration camp during World War II.

The initial reactions chief officers may have when responding to a fire scene or an automobile accident may be considered to be *dispositional optimism* or disillusionment. Dispositional optimism places the negative thoughts about how an event is occurring into a positive light. An example of this within the context of emergency response would be witnessing a victim who appears to be dying, but the chief officer assuring personnel and witnesses that the victim will survive because the fire department and paramedics are on scene. Thus did Frankl place positive thoughts of life before himself in order to survive the negativity stemming from the concentration camp. In order to survive the negativity, depression, and anxiety stemming from death and dismemberment on the highways, chief officers use this dispositional optimism to alleviate these possible outcomes.

Eventually, a seasoned officer may become "insensitive" to traumatic issues due to overexposure. A battalion chief who has 23 years in this position has witnessed such grotesque events that the average person will never be able to understand, let alone witness. In essence, the battalion chief may reach a stage of apathy where insensitivity to traumatic events has created a protective shell. Frankl describes this as a state of self-defense against the harsh realities of stress, strain, and high emotions. We can draw an analogy of witnessing human suffering to the inertia of gas. Frankl theorized that the amount of gas that fills a chamber will eventually occupy all the space within (p. 55). Thus, witnessing the pain and suffering of others will also fill the soul of the person regardless of minor injuries or death. The chief officer, whether seasoned or newly promoted, should realize the relativity of human suffering and how it relates to real life situations.

Once the fire has been extinguished, emergency crews have cleared the scene, and the chief officer

has a chance to gather thoughts, there is a feeling of "depersonalization." The surrealism of a firefighter being lost in the line of duty, an infant dying in the arms of a firefighter, or the death of a loved becomes part the depersonalization process after the event. It seemed the tragedies aforementioned were merely in the past, dream-like, and did not appear to have happened upon returning to the safety of the fire station. As officers, we have to remember this depersonalization is a mere deception of the actual incident psychologically draining the need for us to be set free from negativity. Thus, it is imperative for the chief officer to understand that the true effects of emotions will have a direct impact on psychological disposition. As Frankl stated, "Emotion, which is suffering, ceases to be suffering as soon as we form a clear and precise picture of it" (p. 82).

Frankl's book offers an in-depth analysis of men and women passing through three psychological states during horrific circumstances: (a) dispositional optimism, (b) overexposure and apathy, and (c) depersonalization -- all caused by illusions. As chief officers, are we not subjected to the same three psychological states upon arrival, during, and after the emergencies have taken place? One's ability to perform a good deed, encountering another person, and "the attitude we take toward unavoidable suffering" (p.115) will eventually lead us to the meaning of life. The fire service can fall under the auspices of what Frankl refers to as "tragic optimism." The triad consists of pain, guilt, and suffering. All these elements are present when we respond to emergencies. Chief officers and leaders, regardless of time on the job, will experience these feelings. Regardless of how we feel as officers, emergency responders, and fire fighting personnel we have to retain our abilities to keep a positive mental attitude toward life with all its twists and turns.

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Review of:

Mileti, D.S. (1999). *Disasters by design-A reassessment of natural hazards in the United States*. Washington, D.C.: Joseph Henry Press. 351 pp. (\$49.95).

In *Disasters by Design*, Dennis Mileti summarizes the last 25 years of disaster research. He argues that natural and technological hazards “are the consequence of narrow and shortsighted development patterns, cultural premises, and attitudes toward both the natural environment and even science and technology” (p.18). He suggests six goals as being necessary to reducing catastrophic losses. These include:

1. Maintain and enhance environmental quality.
2. Maintain and enhance people’s quality of life.
3. Foster local resiliency and responsibility.
4. Recognize that vibrant local economies are essential.
5. Ensure inter- and intra-generational equity.
6. Adopt local consensus building.

The author begins by detailing the origin of the current approach to disaster mitigation. He describes the human ecology school of thought first suggested by John Dewey and later Gilbert F. White. This school of thought maintains that human societies adjust to natural hazards by using such techniques as land-use controls, flood control projects, and building codes. Mileti then contrasts the human ecology theory with that of the disaster research school. This philosophy emphasizes the social response to disasters and has traditionally emphasized reducing disaster losses by improving preparedness and response capabilities.

The author provides additional historical context when he reviews the bounded rationality model of individual decision making, which holds that individuals make decisions based upon limited knowledge and within constraints set by society. Professor Mileti suggests that our current concepts of mitigation, preparedness, response, and recovery had their origins in this paradigm.

Having provided a historical context, Mileti next provides us with several hypothetical scenarios of sustainable hazards mitigation. He uses these scenarios to illustrate some of the social causes of disasters. The author also uses these scenarios to tie together the concepts of disaster resiliency, economic vitality, and quality of life.

Next, Mileti turns to a description of the losses, costs, and impacts of disasters upon American society. According to the author, natural hazards killed over 24,000 people in the two decades from 1975 to 1994. He goes on to report that during this same period dollar losses were between \$230 billion and \$1 trillion. These do not include indirect or intangible losses.

Having completed his historical analysis, the author

proposes a plan of action. Mileti calls for an approach that emphasizes the interaction between the ecological, social and built environments. He argues that our world is becoming increasingly complex and interconnected, and this increases disaster losses. It is here that the author describes how social organization (i.e. race, socioeconomic status and sex) influence the risk of injury from natural hazards. He also describes the myriad cultural, institutional, economic, and legal factors that tend to increase disaster losses. These include federally subsidized flood insurance, disaster assistance programs, and land-use regulations, among others.

Having provided a theoretical framework, Mileti next moves to a practical discussion of what can be done. The author suggests five categories of techniques that can be used to minimize social and economic disruption. These include land-use planning, building codes, insurance, engineering, and warnings.

Of these approaches, Mileti clearly favors effective land-use controls. He notes that there are, unfortunately, many barriers to effective land-use planning including a lack of political will.

Commenting on a survey of building code administrators, Mileti reports that half reported their departments were not adequately staffed to perform all necessary inspections. He notes that building codes emphasize life safety, not property protection.

Continuing his discussion of mitigation, the author discusses insurance as a mitigation tool noting that insurance is not available for all natural hazards and that homeowners frequently do not purchase earthquake and flood insurance. He also discusses the problem of adverse selection as it relates to flood hazards and describes the moral hazard that ensues when government relief efforts encourage people to locate their properties in hazardous locations. Finally, Mileti notes that some insurance companies have refused to write new policies in high-risk areas.

Turning from insurance to warning as a mitigation strategy, the author notes the difficulties inherent in predicting various types of hazards. His commentary also includes a discussion of the sociological factors that affect the public response to a warning.

The final mitigation strategy Mileti comments on is engineering. He suggests that while engineering may minimize damage to buildings, it may also increase the tendency to locate in hazardous areas.

The author notes that mitigation will not eliminate the need for preparedness, response, and recovery efforts. Mileti begins this section by defining preparedness. He includes planning, training, and public education activities in this definition. Mileti informs us that many people take no action at all to prepare. The writer also observes that police and fire departments do only minimal disaster planning. Mileti cautions us that disaster preparedness is low in most communities. He theorizes that this low priority occurs because of the infrequent nature of disasters in a given community.

In the section on disaster response, Mileti observes

that those with weak social networks are those most likely to use public shelters. He describes the notion of widespread panic as false. Instead, he reports, post-disaster behavior is almost always adaptive and altruistic. Commenting on organizational response, Mileti observes that we must overcome the natural tendency organizations have to maintain their autonomy. Specifically, he notes that both fire and police departments often tend to operate this way following a disaster.

Recovery consists of those activities necessary to put a disaster-stricken community back together. Here, the author reports research indicating that the poor have great difficulty recovering from disasters. Frequently, according to Mileti, the pressures to restore normalcy at the community level are so strong that mitigation efforts are abandoned.

Professor Mileti has authored a seminal work in the field of managing disasters. He offers the fire officer an insight into the problems and possible solutions that may confront them. *Disasters by Design* condenses into one volume much of the basic knowledge that has been gained in the last twenty years on the subject of natural hazards. This makes it a good initial text for fire service leaders interested in understanding how to manage disaster mitigation, preparedness, response, and recovery activities.

Lance Peeples

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Review Of:

Compton, D., & Granito, J. (Eds.). (2002). *Managing fire and rescue services*. Washington, D.C.: International City/County Management Association. 538 pp. (\$57.00 hardback).

It comes as little surprise to those in the profession that administration and management are important topics in fire studies. In just over a decade we have seen the publication of such works as Nancy Grant and David Hoover's *Fire Service Administration* (1994); Harry Carter's *Management in the Fire Service* (1999), and *Emergency Services Administration* (2006), authored by L. Charles Smeby, to mention just a few. Perhaps what is not well known is that the International City Management Association (ICMA) published its first book on fire service management back in 1935!

It was not until 1967, when the ICMA published the seventh edition of its fire management book that the "Green Books" series gained the popularity it currently possesses. That year *Municipal Fire Administration* made its initial appearance. A little over two decades later, *Managing Fire Services* (MFS) saw its way to book shelves. As stated in its introduction, the book was written, "to better serve the needs of fire service professionals, other managers in local government, and fire chiefs and managers in training."

Just a few years ago (2002) one of the original editors, John Granito, teamed up with Dennis Compton to produce a newly revised and updated edition by including rescue services, hence the title, *Managing Fire and Rescue Services* (MFRS). Granito and Coleman's 1988 edition consisted of four sections: context of fire service management, tools for management, managing special services, and managing for the future. Granito and Compton's latest work contains five segments: context of fire and rescue services, resource management, improving resources, prevention, and managing support services.

The purpose of MFRS is to help organizations adapt to change. The editors accurately note that every organization experiences change and they are straightforward in their observation that traditional attitudes in the fire service represent the greatest impediment to change (Preface). The fact that so little had been written about managing and administrating the fire service attests to this predicament. The solution to this problem is fostering good relationships between labor and management . . . something not exactly new and quite common in the business world. The editors have attempted to bridge this gap by producing a book that examines management roles by way of evaluating local risks within the community then creating leadership strategies by examining various management issues.

The first section, which appears in both editions, concerns the delivery of fire and rescue services and evaluating risk. Accordingly, leadership strategies are

created. This need was prompted by several developments, such as population increases and their respective movements into the suburbs from more urban areas. The result is a greater responsibility for smaller fire departments to develop strategies to meet the requirements of their local government. Fire service leaders now must better understand the "political dynamics of their communities." From this perspective comes a valuable maxim: "Think political, act apolitical."

Part Two looks at resource management. Here the editors have chosen to speak to several aspects of management, including human, fiscal, and capital. Human resource management scans such issues as laws pertaining to the work environment, promotion, and labor relations, to mention a few. The fiscal management chapter examines only two types of budgets: line-item and service based (unlike the previous edition where several types of budgets were presented), but places them within the greater context of performance, planning, and management. A chapter dedicated to capital resource management outlines three kinds of capital resources: emergency vehicles, emergency service and support facilities, and fire and EMS equipment.

The author attributes capital equipment to only the most expensive individual items of capital equipment as well as tools that collectively represent a significant cost. These are items that are individually inexpensive but tend to be replaced in large numbers, for example, hose. The remainder of the chapter addresses procurement of capital equipment and emergency vehicles, taking into consideration need, compliance standards, life cycle costs, and funding sources, most of which should be common knowledge to any competent administrator. Nevertheless, the subject has its place in a book of this subject matter.

In the third part of MFRS, several authors present sections on improving resources through effective leading, managing, and training. Beginning with an updated review of the differences between leading and managing, this section represents what may be the most engaging element of the book through its widespread appeal. Upper-level fire officials, civilians, and students will find these chapters helpful from the fire chief's understanding of management versus leadership concepts to training, which the author of the chapter correctly differentiates from education. Even those who wish a more basic understanding will find this chapter to their liking. Included are the "hows" of setting up effective training programs.

No training division, or fire department, for that matter, can efficiently function without some element of performance measurement; hence the value of the next chapter becomes apparent. The author identifies three ideas that departments require: have a clear picture of where it wants to go, set goals and objectives, and third, put the plan into practice. The author incorporates elements of successful training in addition to the training process itself. The chapter is all-inclusive.

The subject of performance measurement has and continues to be problematic. What is commonplace in the business community has historically been untested or neglected in the fire and rescue service. Evaluating the efficacy of a fire department was subjective in nature and content, at least until now. The author incorporates a template page from the *ICMA Center for Performance Measurement: Residential Structure Fire Incidents* for readers to examine. Based on several criteria -- input, output, output efficiency, outcome efficiency, outcome, and intermediate outcome -- a process was established to measure the effectiveness of a fire department. Not being familiar with the document, this reviewer cannot evaluate it, but the template is worthy of further investigation.

Another model for consideration is one commonly used by fire departments throughout the country, i.e., NFIRS. An oversight is that fire chiefs fail to use the data entered into these pages to help argue the vital role that the fire service provides today. For example, publicizing the fact that certain numbers of fires were contained to one room versus spreading to additional rooms, makes a strong argument as to the value of the fire department's effectiveness and competence. Decades ago, certain fire service leaders argued that fire departments should report not necessarily the amount of fire damage to a building, but the value of the property saved. NFIRS can allow for this. However it is used, performance measurement, as the author states, is the foundation for improvement and one way to improve performance is to measure it.

Performance is tied hand in hand with a healthy and fit firefighter. A brief but concise chapter covers health, wellness, and injury prevention. As one of the best chapters in the book, all aspects of fire personnel health, both inner and outer, are examined. Suggestions ranging from mental health checklists to the structure of a wellness program provide a considerable amount of useful information and a superb launching point for establishing a program in one's own department.

The section on prevention is pretty much straightforward and adds little to the abundant material already available. Remember the 2002 publication date. The chapter on comprehensive prevention programs discusses such issues as plans review, code enforcement, legal issues, public education, and fire investigation, all of which should be familiar to any fire service administrator.

Another chapter in the section is an introduction to OSHA, several CFRs, NIOSH, and NFPA standards. All are intertwined with issues of liability. The chapter serves as a reference source under one cover but like the chapter on prevention, reveals nothing new.

The final section, managing support services, ushers the reader into the world of technology, especially with respect to computers and fire-related software. Full of examples from various programs, the chapter outlines

the need for data; even NFIRS finds its way into the chapter.

Communication can be the bane of any fire and rescue service. Without a dependable communication system incidents can escalate. This need is so vital that one state, Massachusetts, has assembled a special team to assist with communications at large-scale incidents. The Incident Support Unit (ISU) is comprised of fire and non-fire related personnel who are activated upon call to respond with a vehicle containing over a million dollars worth of communication equipment to ensure clear communication lines among all the responders.

Obviously the most technical part of *MFRS*, the author of this chapter correctly assigns an important role in communication and attempts to define key terms related to communication, although not always in a clear way.¹ The chapter draws two conclusions: first, fire and rescue services must work with elected officials to acquire the best possible communication system and second, personnel must understand the present system's limitations (p.483). The last chapter of *MFRS* deals with intergovernmental cooperation. Its simplistic approach lists causes for cooperation as economic, resources limitations, social, socioeconomic, political, and even tactical. Types of cooperative efforts are the well-known mutual aid, automatic aid, functional consolidation and broad-scope multi-agency agreements. The intent of the author is to forward the idea that fire and rescue services do not exist in a vacuum. With severe competition for money, cooperation is a necessity.

Let it be known upfront that this book is not an easy read. The editors in the Preface announce that their aim is for the book to serve as a resource for experienced officials in the fire service, local government administrators and citizens, a college level textbook, and a study document for promotional examinations. As a veteran of several of those exams where *MFS* was one of the required readings, this reviewer can attest to the breadth and depth of the green book series. The rhetorical question here is whether a book such as *MFRS* can fulfill all those needs. Well, the short answer is yes, and that may in fact be the major shortcoming of *MFRS*.

Intending to appeal to an audience from beginners to experts may make a work of this magnitude range from too simple to too complex, a fact the authors acknowledge in the preface to the book. For example, the first chapter is essentially aimed at the non-fire/EMS public. Where a civilian may find it informative, it is superfluous reading for anyone in the fire/EMS service. At the other end of the argument, some chapters are specifically directed to fire chiefs in their comprehensiveness. This may be a satisfactory state of affairs, providing one is not using this book for a promotional examination where it could be compared to studying an encyclopedia. Other chapters are very technical in content. Of course, there is a positive side to such detail.

As a resource book, *MFRS* offers its readers a plethora of information. Each chapter serves a specific need in fire/EMS. The only task is to extrapolate the information and apply it to one's own department. It is abundant in its content.

One worthy addition to the book is the inclusion of a section suggesting further reading and resources. Listing various associations and organizations related to fire and emergency services provides the reader with quick descriptions of each, including their websites. This is an invaluable resource to anyone seeking additional information.

One final point to mention is Compton and Granito's relating the fire chief to that of a chief executive officer who must possess the necessary "technical knowledge" and "keen business sense" as well as leadership and management skills. The editors have set the bar to another level. They understand that the traditional fire chief's position is no longer simply that of a fire-ground commander. If fire departments and rescue services are to compete for their share of the budget, their officials must have the necessary administrative knowledge. Short of an academic degree, they must be able to find it somewhere. Dennis Compton and John Granito have made that undertaking easier for all.

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Notes

¹On page 451, the author, Timothy R. S. Campbell, discusses the difference between analog and digital. He states: "Analog is data processing on a continuous meter, like a clock. Digital is data processing by digits like a car radio, where you can get number 101.1, for example, but not 101.2, because when you push the button, the number that comes up next is 101.3." When this author presented the above description to several communication experts, all were confused.

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