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*Peer-reviewed articles*

EDITOR-IN-CHIEF

Heather R. Cotter



## Editor's Note

*By Heather R. Cotter, IPSA Executive Director/CEO, Founder and Editor-in-Chief*



Thank you for your interest in the **Sixth Edition** of the *IPSA Journal*. This scholarly resource is available to all public safety professionals. The IPSA was fortunate to have several public safety authors and peer reviewers contribute to this executive-level, peer-reviewed publication. The *IPSA Journal* is an opportunity to publish manuscripts about leadership issues and best practices applicable to all facets of public safety.

The *IPSA Journal* is for the public safety community so they can gain timely access to pertinent information that impacts decision-making, policy, administration, and operations. Our readers represent the entire public safety community: law enforcement, fire service, EMS, 911 telecommunications, public works (water, sanitation, and transportation), public health, hospitals, security, private sector, and emergency management. In this issue, readers will see the following peer-reviewed manuscripts:

1. *Explaining Attitudes Toward Fire Prevention & Education in Bloomington* by Russell L. Thompson, Greenville Fire Department
2. *The FirstNet First Responder Needs Assessment: Driving Towards Targeted Interventions* by Dr. Anna Fitch Courie, DNP, BSN, RN, MS, PHNA-BC and Mostafa Sanati, MBA, BSN, BSE, RN, FirstNet, Built with AT&T
3. *How Adults Learn: Considerations for Training of Public Safety Personnel* by Gregory Walterhouse, Bowling Green State University

**4. *The Surprise Management Theory and the Chicago Fire of 2014* by Joseph Brickley,  
New Jersey City University**

Each paper was researched by the authors, includes a literature review, offers key discussion points and they were all peer-reviewed. The IPSA has a systematic process in place for approval, rejection and resubmissions of manuscripts. The IPSA enlists peer reviewers made up of public safety practitioners and academicians with experience in scholarly writing to review all manuscripts.

It is the IPSA's vision to continually accept manuscripts and to release future editions of the *IPSA Journal*. We seek high-quality manuscripts from all public safety professionals, academia, researchers, and scholars. I encourage you to [download and review the IPSA Manuscript Guidelines, use the IPSA Journal Template](#) and submit a manuscript to us for publication consideration. There is so much knowledge to share within and between each public safety discipline.

Stay safe,

*Heather R. Cotter*

Heather R. Cotter



## *IPSA Journal*

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## Explaining Attitudes Toward Fire Prevention & Education in Bloomington

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**Explaining Attitudes Toward Fire Prevention & Education in Bloomington**  
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**Abstract**

The purpose of this study was to assess how homeownership, children in the home, and seniors in the home explain differences in residents' attitudes about the importance of fire prevention and education. A literature review provided the basis for the following hypotheses: *Homeowners will assign greater importance to fire prevention and education than renters. Residents with children in the home will assign greater importance to fire prevention and education than residents with no children in the home. Residents 65 or older will assign less importance to fire prevention and education than residents under 65.* The datasets used to test each hypothesis were described, including the operationalizations of each variable under examination. The results of empirical testing provided assessment and discussion. A lack of previous research and limited access to data resulted in several recommendations and future study.

Suggestions included, but are not limited to the following:

1. Bloomington officials taking steps to identify factors that may develop a higher level of motivation to complete future surveys.
2. Expand the survey to obtain information on those residents who do not have working smoke alarms and home escape plans.

Future studies should expand upon this applied research project by partnering with National Research Center, Inc., to compare results in other communities.

**Key Words: Fire Prevention, Education, Community, Smoke Alarms, Fire Escape Plans, Homeowners, Renters, Children, Seniors**

## **Introduction**

Delivering fire prevention and education is arguably one of the essential functions of the fire service. This education provides knowledge about preventing fires from occurring and offers vital information on what to do if a fire does break out. It can save lives, reduce injuries, and minimize property damage from the ravages of fire.

With today's fire behavior, the need for fire prevention and education is more relevant than ever. Unlike natural products from years ago, synthetic materials, such as plastics and other petroleum-based products containing carcinogens and toxins, make-up modern home furnishings. As a result, residential fires burn hotter and faster, resulting in less time for the occupants to react and safely escape. Therefore, fire service organizations stress the importance of having working smoke alarms and home fire escape plans.

Fire departments often use community risk assessments to determine the focus of their fire prevention and education efforts. Much of the fire prevention efforts are targeted to children and older adults when considering these groups are traditionally most at risk (Ahrens, 2018). However, in addition to age, other demographics and socioeconomic factors such as race, ethnicity, gender, marital status, income, education, and employment may be relevant as well. This study intends to assess how homeownership, children in the home, and seniors in the home explain differences in residents' attitudes about the importance of fire prevention and education. A literature review related to the topic is the basis for formulating hypotheses regarding how homeownership, children in the home, and seniors in the home influence attitudes toward the importance of fire prevention and education. The datasets used to test each hypothesis will be described, including the operationalizations of each variable under examination. Empirical testing provides an assessment of the results and further discussion. Based on identified

limitations, this applied research project concludes with several recommendations for future studies.

## **Literature Review**

Working smoke alarms and home fire escape plans are two of the foremost messages presented in fire prevention and education programs. The ability to get out of a home during a fire depends on advance warning provided by smoke alarms and advanced planning for a safe escape. As a minimum, the National Fire Protection Association (NFPA) recommends installing smoke alarms in every bedroom and installing them outside each bedroom and on every level of the home (NFPA, 2018). Also, households should develop a fire escape plan and practice it at least twice a year. The United States Fire Administration (USFA), the American Red Cross, and fire departments across the country echo these recommendations.

Research finds that renters are more likely to have a fire than homeowners. In their study of unreported residential fires, Greene & Andres (2009) find that the number of fires per 100 households is 7.58 for renters compared to 6.19 for homeowners. Also, renters have 55.1 unattended fires (fire department not called) for each attended fire (fire department called), while homeowners have 24.1 unattended fires for each attended fire. This information suggests that having working smoke alarms and an escape plan should be essential for rental properties.

Many states and communities recognize this importance and have adopted laws that require working smoke alarms in rental properties. However, there are inconsistencies in who is responsible for working smoke alarms in these properties, the landlord or the tenant? While many states have laws requiring landlords to install smoke alarms in rental properties, others do not. Some communities hold landlords responsible for periodically inspecting and testing smoke alarms for functionality, while others place this responsibility on the tenants. Because of these

inconsistencies, it may be challenging to determine renters' attitudes regarding smoke alarms. However, it seems apparent that tenants are undoubtedly responsible for developing an escape plan.

With increased risks of having a fire, renters ought to have a higher need for escape plans. However, several studies indicate that renters are less likely to develop an escape plan when compared to homeowners. For example, in their research on the prevalence of residential smoke alarms and fire escape plans, Ballesteros & Kresnow (2007) report owning the home is associated with designing a fire escape plan. They find among households reporting having a fire escape plan, 54.6 percent are homeowners compared to 42.9 percent that rent. These results support an earlier study that also finds homeowners are more likely to have a fire escape plan than renters, 56.7 percent compared to 34.7 percent (Runyan et al., 2005).

Children are the focus of much of the fire prevention efforts. Kids don't always know or understand the dangers or risks associated with home fires. For the period 2011-2015, 12 percent of the fire fatalities in the U.S. are children under 15 (Ahrens, 2018). Because young kids depend on their parents for their safety and wellbeing, parents need to take precautionary measures in the event of a fire.

Several studies find that having children in the home is associated with having designed a fire escape plan. In their research, *Risk and Protective Factors for Fires, Burns, and Carbon Monoxide Poisoning in U.S. Households*, the researchers report households with children less than six years old are more likely (54.5 percent) to have a fire escape plan when compared to homes without children (52.8 percent) (Runyan et al., 2005). Ballesteros & Kresnow (2007) find similar results for households with children younger than 15. They report homes with children younger than 15 are more likely to have an escape plan (56.8 percent) when compared to homes

with no children (49.2 percent). More compelling results from research in an Iowa study finds among households having a fire escape plan, homes with children under 18 are more likely to have a fire escape plan (74.4%) than homes with no children (32.5%) (Jingzhen et al., 2006).

Like children, older adults are often the focus of fire prevention and education efforts. Both the NFPA and the USFA find that older adults 65 and older are at a higher risk of death from fire than other groups. In its report, *Home Fire Victims by Age and Gender*, the NFPA finds that 33 percent of the fatalities in home fires during 2011-2015 are 65 or older (Ahrens, 2018). In its annual report on fires in the United States, the USFA (2019) finds that this subgroup accounts for 40 percent of all fire deaths in 2017. In a much earlier report, *Fire and the Older Adult*, analysis of NFIRS (National Fire Incident Reporting System) fire incident data for 2002 shows that 48 percent of the deaths amongst older adults aged 65-74 are while sleeping, and 32 percent of the deaths are while trying to escape (USFA, 2006). These reports support the need for older adults to have multiple working smoke alarms, including bedrooms, and to develop and practice home fire escape plans.

However, research indicates that older adults are not only less likely than younger adults to have multiple working smoke alarms, but older adults are also less likely to have home fire escape plans. In their study, Greene & Andres (2009) find that households with at least one person 65 years old or older are less likely to have smoke alarms in all bedrooms than homes under 65. The earlier study of Runyan et al. (2005) reports that households with at least one person 70 years old or older are less likely (37.8%) to have a fire escape plan compared to homes with no person 70 years old or older (52.8%). The study, *Perceived Risk of Home Fire and Escape Plans in Rural Households*, corroborates their findings. According to the researchers, households with at least one person 65 years old or older are less likely to have a fire escape plan

(31.7%) than homes under 65 (49.4%) (Jingzhen et al., 2006). Although reports throughout the years from both the NFPA and the USFA demonstrate that older adults ought to understand the importance of early detection for a safe escape, other research indicates that they do not.

In summary, the literature review provides a pattern among the findings. Although one study finds that renters are more likely to fall victim to fire than homeowners, other studies find that homeowners are more likely to plan for a safe escape (Greene & Andres, 2009; Ballesteros & Kresnow, 2007; Runyan et al., 2005). The literature strongly suggests that households with children are more likely to have smoke alarms and fire escape plans (Runyan et al., 2005; Ballesteros & Kresnow, 2007; Jingzhen et al., 2006). Lastly, the literature indicates that older adults are less likely to follow recommended fire prevention practices, including having multiple smoke alarms and a home fire escape plan (Greene & Andres, 2009; Runyan et al., 2005; Jingzhen et al., 2006).

## **Methodology**

This applied research project utilizes the descriptive research methodology. Survey research provides information regarding the opinions and attitudes of a scientific sample of residents in the City of Bloomington, including residents' attitudes toward the importance of fire prevention and education. Survey responses are systematically coded for quantitative purposes. Exercising the mean for a measure of central tendency, descriptive statistics summarize the data to highlight potential relationships between variables chosen for this project.

## **Hypotheses**

The literature review summarized above serves as the basis for formulating the following hypotheses:

1. For H1, homeowners will assign greater importance to fire prevention and education than renters.
2. For H2, residents with children in the home will assign greater importance to fire prevention and education than residents with no children in the home.
3. For H3, residents 65 and older will assign less importance to fire prevention and education than residents under 65.

## **Data**

The data utilized in this study of attitudes toward the importance of fire prevention and education comes from community surveys conducted in Bloomington, Indiana. The City of Bloomington contracted with National Research Center, Inc. (NRC) to conduct a community-wide survey to provide residents the opportunity to rate the quality of life in the city, as well as the quality of service delivery and overall performance of local government (NRC, 2017). First conducted in 2017, surveys were mailed to 3,000 randomly selected resident households. Residents completed a total of 595 surveys for a 21 percent response rate. In addition to the scientific random sample, all residents in Bloomington were provided the opportunity to complete an online “opt-in” survey. The online “opt-in” survey was identical to the scientific survey. A total of 1,435 online “opt-in” surveys were completed, with the results recorded in a supplemental report.

NRC administered a second survey in 2019 (NRC, 2019). Consistent with the administration of the first survey, surveys were again mailed to 3,000 randomly selected resident households. A total of 610 surveys were completed for a 21 percent response rate. In addition to the scientific survey, all residents in Bloomington were provided the opportunity to complete an online “opt-in” survey. The online “opt-in” survey was identical to the scientific survey. A total

of 132 online “opt-in” surveys were completed, with the results recorded in a supplemental report.

According to this latest report, the City of Bloomington made few changes from the original survey instrument to compare over time (NRC, 2019). Regarding the city’s fire department, the survey asks residents to rate the importance of fire services, ambulance or emergency medical services, and fire prevention and education. Also, the survey asks residents to rate the quality of fire services, ambulance or emergency medical services, and fire prevention and education. For purposes of this study, the focus is to study attitudes toward the importance of fire prevention and education by analyzing, interpreting, and comparing data provided from the 2017 and 2019 Bloomington Surveys. Regarding the online “opt-in” surveys conducted in both years, any data in the respective supplemental reports are not a part of this study.

In addition to the NRC’s final reports, datasets for the 2017 and 2019 surveys are available on the City of Bloomington (2020) website. The datasets, including variable information, are formatted in Microsoft Excel. To conduct statistical analysis for this applied research project, Dr. Melissa Miller, a professor at Bowling Green State University (BGSU), translated the datasets to IBM® SPSS® Statistics.

## **Operationalization**

For testing the hypotheses, the variable **IMPORT\_fire\_prevention** is employed from the Bloomington Survey Data. The variable **IMPORT\_fire\_prevention** serves as the dependent variable in each hypothesis. It is an ordinal variable with 4+ categories and is being treated as a ratio for testing purposes. This variable records responses to a question asking residents to rate the importance of fire prevention and education as follows: 1 = not at all important, 2 = somewhat important, 3 = very important, 4 = essential, or 5 = don’t know.

For testing H1, the variables **own\_rent** and **IMPORT\_fire\_prevention** are employed from the Bloomington Survey Data. The variable **own\_rent** serves as the independent variable. It is a nominal variable indicating if the resident owns or rents the place he or she lives. The responses are coded as follows: 1 = rented and 2 = owned.

For testing H2, the variables **kids** and **IMPORT\_fire\_prevention** are employed from the Bloomington Survey Data. The variable **kids** serves as the independent variable. It is a nominal variable indicating if kids 17 and under live in the resident's (Rs) home. The responses are coded as follows: 1 = no and 2 = yes.

For testing H3, the variables **age\_65\_plus** and **IMPORT\_fire\_prevention** is employed from the Bloomington Survey Data. The variable **age\_65\_plus** serves as the independent variable. It is a nominal variable indicating the resident (R) or other in the home is 65 or older. The responses are coded as follows: 1 = no and 2 = yes.

## **Results**

Tables (Appendix A) summarize the results obtained from empirical testing (Appendices B and C). Performing T-tests for each independent variable (homeownership, residents with children, and residents with seniors) paired with the dependent variable (attitudes toward the importance of fire prevention and education) provides the following results:

For H1, the researcher hypothesized that homeowners would assign greater importance to fire prevention and education than renters. As shown in Table A1, there is practically no difference in the importance of fire prevention and education between homeowners and renters for the 2017 Survey. Homeowners in Bloomington rate an average of 2.95 on the ordinal measure for the importance of fire prevention and education compared to 2.99 for renters. The results of the T-test are not statistically significant. Therefore, the data does not support H1.

Similar to the 2017 results, there is practically no difference in the importance of fire prevention and educations between homeowners and renters for the 2019 Survey. Table A1 shows that homeowners rate an average of 3.13 on the ordinal measure for the importance of fire prevention and education compared to 3.05 for those who rent. Again, the results of the T-test are not statistically significant. Therefore, not only is the hypothesis that homeowners will assign greater importance to fire prevention and education than renters not supported by the 2017 data, H1 is not supported by the 2019 data, as well.

For H2, the researcher hypothesized that residents with children in the home would assign greater importance to fire prevention and education than residents with no children in the home. As shown in Table A2, there is little difference in the importance of fire prevention and education between residents with children and residents with no children for the 2017 Survey. Residents with children rate an average of 2.92 on the ordinal measure for the importance of fire prevention and education compared to 2.99 for no children in the home. The results of the T-test are not statistically significant. Thus, the data does not support H2.

However, the findings in Table A2 for the 2019 Survey support the second hypothesis. Residents with children in the home rate an average of 3.43 on the ordinal measure for the importance of fire prevention and education compared to 3.01 for residents with no children. The results of the T-test are statistically significant at the .001 level. In other words, the probability that the relationship reported in Table A2 for the 2019 Survey can be attributed to sampling error alone is no more than .001 or 0.1 percent. The results are consistent with the hypothesis. Thus, the hypothesis that residents with children in the home will assign greater importance to fire prevention and educations than residents with no children in the home is supported by the 2019 data.

For H3, the researcher hypothesized that residents 65 or older would assign less importance to fire prevention and education than residents under 65. For the 2017 Survey, the findings in Table A3 show homes with residents 65 or older rate an average of 3.30 on the ordinal measure for the importance of fire prevention and education, while homes with no residents 65 or older rate an average of 2.92. The results of the T-test are statistically significant at the .001 level. In other words, the probability that the relationship reported in Table A3 can be attributed to sampling error alone is no more than .001 or 0.1 percent. Although statistically significant, the results are not consistent with the hypothesis. Residents 65 or older assign more importance to fire prevention and education, not less, than residents under 65. Thus, H3 is not supported.

Table A3 shows similar results for the 2019 Survey. Homes with residents 65 or older rate an average of 3.28 on the ordinal measure for the importance of fire prevention and education, while homes with no residents 65 or older rate an average of 3.03. The results are statistically significant at the .01 level. In other words, the probability that the relationship reported in Table A3 can be attributed to sampling error alone is no more than .01 or one percent. Although statistically significant, the results are not consistent with the hypothesis. As found with the 2017 Survey, residents 65 or older assigned more importance to fire prevention and education, not less, than residents under 65. Thus, neither the 2017 nor the 2019 data support the third hypothesis.

## **Discussion**

This study intends to assess how homeownership, children in the home, and seniors in the home explain differences in residents' attitudes about the importance of fire prevention and education. Based on the literature summarized above, the first hypothesis or H1 is that

homeowners will assign greater importance to fire prevention and education than renters. One study found that renters are more likely to fall victim to fire than homeowners, while other studies found that homeowners are more likely to plan for a safe escape (Greene & Andres, 2009; Ballesteros & Kresnow, 2007; Runyan et al., 2005). Presumably, those who develop a home fire escape plan are more likely to assign importance to their community's fire prevention and education programs. Despite possibly being less at risk of having a fire, it is still logical that homeowners in Bloomington will assign greater importance to fire prevention and education than those who rent.

The literature strongly suggests that households with children are more likely to have smoke alarms and fire escape plans when compared to homes with no children (Runyan et al., 2005; Ballesteros & Kresnow, 2007; Jingzhen et al., 2006). Therefore, the second hypothesis or H2 is that residents with children in the home will assign greater importance to fire prevention and education than residents with no children. Again, this hypothesis is based on a presumption that households who follow recommended fire prevention practices are more likely to assign importance to fire prevention and education.

Lastly, the literature summarized above indicates that older adults 65 years and older are more at risk of death from fire than other groups (Ahrens, 2018; USFA, 2019; USFA, 2006). Therefore, residents in Bloomington 65 and older ought to assign greater importance to fire prevention and education than younger ones. However, several studies suggest that older adults are less likely to follow recommended fire prevention practices, including having multiple smoke alarms and a home fire escape plan (Greene & Andres, 2009; Runyan et al., 2005; Jingzhen et al., 2006). Maintaining consistency with the presumption made in H1 and H2 above, the third

hypothesis or H3 is that residents 65 or older will assign less importance to fire prevention and education than residents under 65.

Somewhat surprisingly, data from the 2017 Bloomington Community Survey does not support any of the hypotheses. For H1, the results of empirical testing find that homeowners in Bloomington are no more likely to assign greater importance to fire prevention and education than renters. The same for H2; the results of empirical testing indicate that residents with children in the home are no more likely to assign greater importance to fire prevention and education than residents with no children. For H3, test results show residents 65 or older assign greater importance to fire prevention and education, not less, than residents under 65.

Continued empirical tests for the 2019 Bloomington Community Survey yield similar results for H1 and H3, but not H2. Consistent with 2017, results of the 2019 data find that homeowners in Bloomington are no more likely to assign greater importance to fire prevention and education than renters. Like 2017, the 2019 results also find that residents 65 or older give greater importance to fire prevention and education than residents under 65, not less as predicted. However, unlike the 2017 data, the 2019 data supports H2; residents with children in the home assign greater importance to fire prevention and education than residents with no children.

In further comparison, among residents with children in the home, there appears to be a significant increase in attitudes toward the importance of fire prevention and education. For 2019, this group rates an average of 3.43 on the ordinal measure for the importance of fire prevention and education compared to 2.92 for 2017 (Table A2). The other groups or categories of residents used in this study, except homes with seniors, only show slight increases in attitudes. Among homes with no children, residents rate an average of 3.01 in 2019 compared to 2.99 in

2017 (Table A2). Table A1 shows similar results among those that rent (3.05 in 2019 compared to 2.99 in 2017) and homeowners (3.13 in 2019 compared to 2.95 in 2017).

Similarly, among homes with no residents under 65, residents rate an average of 3.03 in 2019 compared to 2.92 in 2017 (Table A3). However, Table A3 shows that average ratings among homes with residents 65 or older stayed relatively the same (3.28 in 2019 compared to 3.30 in 2017). Considering that the average ratings among five of the six groups increased to some degree suggests that attitudes toward fire prevention and education in Bloomington are improving. The increase in average ratings also indicates that the Bloomington Fire Department improved its overall efforts in providing fire prevention and education programs to its community with a primary focus on children.

To determine the accuracy of these conclusions, the researcher conducted a phone interview with the Bloomington Fire Department's Fire Prevention Officer (FPO) (T. Figolah, personal communication, March 12, 2021). Interestingly, the FPO is aware that the city has conducted community surveys, but he has never seen the reports nor reviewed the data. According to the FPO, not only did he replace his predecessor in 2017, other changes included a new mayor and a new fire chief. Under the previous administration, the focus of the department's fire prevention and education efforts was towards seniors. This focus explains why homes with seniors rate a higher average towards fire prevention and education compared to homes without seniors, not less as predicted. Among the groups used in this study, residents with seniors represent the highest-rated average (3.30) for the 2017 Bloomington Survey and the second highest-rated average (3.28) for the 2019 Bloomington Survey.

In 2017, the department's fire prevention and education programs' focus shifted its priority to children. The department has improved its consistency in providing education to the

local school district, including preschool-aged children. The fire department now presents fire prevention education to preschool-aged children, first graders, and third graders. Additional presentations are provided annually to middle school students at a school assembly. In addition to the presentations, the kids are provided with adult fire prevention literature to take home to their parents. Fire department personnel advise the children to inform their parents what they learned. According to the FPO, “This lets parents know what their kids did that day at school and provides conversation at the dinner table.” Hypothetically, the Bloomington Fire Department doubles its fire prevention outreach when the kids get home that day. This change in priorities helps explain why there is such a dramatic increase among homes with children. Residents’ attitudes toward fire prevention and education among homes with children improved their average rating from 2.92 in 2017 to 3.43 in 2019. The 3.43 average rating in 2019 is the highest rating among the groups selected for this research for both the 2017 and 2019 Bloomington Surveys.

Although kids are now the priority of fire prevention and education efforts in Bloomington, the department still focuses on other groups like seniors. Department personnel provides a presence at community events such as farmer markets and festivals, where they pass out fire prevention literature and talk with those in attendance. Like many, Bloomington Fire Department recently partnered with the American Red Cross to receive and install smoke alarms in the community. These are free to residents who do not have alarms already established in their homes. The department also conducts “blitz attacks” from time to time. According to the FPO, personnel often complete these in the weeks after a residential structure fire. Firefighters go door to door on the block the fire occurred to ensure working smoke alarms are in the homes, and if not, ask if they can enter and install them at no charge. These new approaches to fire prevention

and education throughout the community explain the slight improvements in attitudes observed among the groups used for this study.

The information provided by the FPO helps explain residents' attitudes toward fire prevention and education in Bloomington. However, the fact remains that the findings of this study are not consistent with the results of other researchers identified in the literature review. Data from the 2017 Bloomington Community Survey does not support any of the hypotheses, and data from the 2019 Survey only supports one of the three (H2). These inconsistencies from previous research may be due to the limitations of this study.

### **Limitations**

There are several significant limitations in this study that can be addressed in future research. The purpose of this study is to assess how homeownership, children in the home, and seniors in the home explain differences in residents' attitudes about the importance of fire prevention and education. However, due to the lack of previous research studies on the topic, a search for similar studies where researchers used the importance of fire prevention and education as a variable could not be found. Therefore, this study refers to two of the foremost messages presented in fire prevention and education presentations, early detection and safe escape. Presumably, those who install multiple working smoke alarms and/or develop a home fire escape plan are more likely to assign importance to their community's fire prevention and education programs. With these presumptions, and based on the review of literature, hypotheses were formed and tested.

Five of the six T-tests performed for this study do not support the hypotheses. Therefore, the presumptions made to form the hypotheses do not support this study. Existing studies involving smoke alarms and home fire escape plans summarized in the literature review range

from 2005 (Runyan et al.) to 2009 (Greene & Andres). More recent studies involving these specific fire prevention measures were not located when reviewing literature for this study. Therefore, research for this project is limited to scholarly sources that may be outdated for the present time.

The majority of the empirical test results are either not statistically significant or are inconsistent with the respective hypothesis. Again, five of the six T-test performed for this study do not support the hypotheses. This may be due to limited access to data. For this study, the only datasets used are from the 2017 and 2019 Bloomington Community Surveys conducted by National Research Center, Inc., both of which only had a 21 percent return rate. Considering the rate of those who did not respond, non-response bias may be an influencing factor in the results obtained for this study.

Lastly, although comprehensive, the survey instrument used in Bloomington limits the scope of fire prevention-related questions to two. The survey only asks residents to rate the importance of fire prevention and education and to rate fire prevention and education quality. The survey questionnaire does not obtain any information regarding residents practicing fire prevention measures such as installing smoke alarms or developing home fire escape plans.

### **Recommendations & Future Study**

Concluding this study, the researcher now questions if an error was made in presuming that those who have installed smoke alarms and/or developed home escape plans will assign greater importance to their community's fire prevention and education programs. Besides the studies presented in the literature review and utilized to formulate the hypotheses for this study, additional research was not found. Most of these studies regarding the installation of smoke alarms and/or developing home fire escape plans were completed before 2010. This presents the

question, have trends changed in the past 10-12 years? The answer is unclear without future research.

Both the 2017 and 2019 Bloomington Community Surveys resulted in a return rate of 21 percent. Although this may fall in the range of a typical response rate, a response rate of 50 percent or higher is more desirable. A higher response rate can minimize non-response bias that can occur when people are unwilling to respond to a survey due to a factor that makes them differ from people who do respond. With this in mind, the researcher recommends that Bloomington officials take steps to identify factors that may develop a higher level of motivation to complete future surveys.

Regarding the survey instrument used in Bloomington, the researcher recommends the expansion of the survey to ask residents not only how they rate the importance of fire prevention and education, but also to obtain information on those who do not have working smoke alarms and home escape plans. Considering that Bloomington is conducting a satisfaction survey and not a risk assessment, city leaders may or may not find any value in this additional information. However, for future study, this additional information may help determine if there is a relationship between practicing fire prevention measures and one's attitude toward the importance of fire prevention.

Only datasets related to the 2017 and 2019 Bloomington Surveys were utilized to test the hypotheses formulated for this study. The NRC developed and administered the survey instrument. Because the NRC is a leading survey research and evaluation firm, it is apparent that the NRC has developed similar survey instruments for other communities across the country. For future research, this study can be continued by partnering with the NRC. Provided with access and sufficient time, survey reports and associated datasets from other communities can be

used for further analysis. Using the same variables identified for this study, additional empirical testing can compare Bloomington's results.

In a broader scope, the researcher recommends that fire service leaders review annual reports by the USFA and NFPA. Based on data from NFIRS, their reports provide valuable information on national trends regarding fire injuries and deaths. However, these trends may or may not be relevant at the local level. Therefore, fire service leaders should determine who is most at risk in his or her respective community to decide where to focus fire prevention and education efforts. In addition to the variables used for this study, other demographics and socioeconomic factors such as race, ethnicity, gender, income, education, and employment should all be considered when designing or updating a prevention and education program. Conducting community risk assessments and periodically reviewing individual department's fire incident data can both be used in making these determinations. In any case, improving attitudes toward fire safety in the home may prevent future injuries and deaths.

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## Appendix A – Tables

**Table 1**

*Importance of Fire Prevention & Education by Homeownership*

	2017 Survey		2019 Survey	
	Mean	Number of Cases	Mean	Number of Cases
Rented	2.99	306	3.05	298
Owned	2.95	149	3.13	160

Results are not statistically significant.

SOURCE: 2017 & 2019 City of Bloomington Community Surveys

**Table 2**

*Importance of Fire Prevention & Education by Presence of Children in Home*

	2017 Survey		2019 Survey	
	Mean	Number of Cases	Mean	Number of Cases
No	2.99	353	3.01	381
Yes	2.92	103	3.43	75

Results are not statistically significant.

SOURCE: 2017 City of Bloomington Community Survey.

Results are statistically significant ( $t = -4.342$ ,  $df = 111.811$ ,  $p < .001$ , one-tailed).

SOURCE: 2019 City of Bloomington Community Survey.

**Table 3**

*Importance of Fire Prevention & Education by Presence of Seniors in Home*

	2017 Survey		2019 Survey	
	Mean	Number of Cases	Mean	Number of Cases
No	2.92	389	3.03	387
Yes	3.30	67	3.28	70

Results are statistically significant ( $t = -3.895$ ,  $df = 102.236$ ,  $p < .001$ , one-tailed).

SOURCE: 2017 City of Bloomington Community Survey.

Results are statistically significant ( $t = -2.407$ ,  $df = 101.021$ ,  $p < .01$ , one-tailed).

SOURCE: 2019 City of Bloomington Community Survey.

## Appendix B – Empirical Testing: 2017 Bloomington Community Survey

### T-Test for Homeownership

#### Group Statistics

	Own or rent place in which R	N	Mean	Std. Deviation	Std. Error Mean
	lives				
IMPORTANCE - fire prevention and education	Rented	306	2.99	.883	.050
	Owned	149	2.95	.800	.066

#### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference		Lower	Upper
IMPORTANCE - fire prevention and education	Equal variances assumed	2.172	.141	.382	453	.702	.033	.086		-.135	.201
	Equal variances not assumed			.395	321.504	.693	.033	.083		-.130	.195

## T-Test for Children in the Home

### Group Statistics

		Kids 17 and under in Rs			
	home	N	Mean	Std. Deviation	Std. Error Mean
IMPORTANCE - fire prevention and education	no	353	2.99	.845	.045
	yes	103	2.92	.888	.087

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
IMPORTANCE - fire prevention and education	Equal variances assumed	.823	.365	.797	454	.426	.076	.096	-.112	.264
	Equal variances not assumed			.776	160.537	.439	.076	.098	-.118	.270

## T-Test for Seniors in the Home

### Group Statistics

	R or other in home 65 or older	N	Mean	Std. Deviation	Std. Error Mean
IMPORTANCE - fire prevention and education	no	389	2.92	.864	.044
	yes	67	3.30	.723	.088

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
IMPORTANCE - fire prevention and education	Equal variances assumed	.819	.366	-3.435	454	.001	-.383	.112	-.602	-.164
	Equal variances not assumed			-3.895	102.236	.000	-.383	.098	-.578	-.188

## Appendix C – Empirical Testing: 2019 Bloomington Community Survey

### T-Test for Homeownership

#### Group Statistics

	Own or rent place in which R lives	N	Mean	Std. Deviation	Std. Error Mean
IMPORTANCE - fire prevention and education	Rented	298	3.05	.849	.049
	Owned	160	3.13	.801	.063

#### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
IMPORTANCE - fire prevention and education	Equal variances assumed	.307	.580	- .976	456	.330	-.080	.082	-.240	.081
	Equal variances not assumed			- .993	343.167	.321	-.080	.080	-.237	.078

## T-Test for Children in the Home

### Group Statistics

		Kids 17 and under in Rs			
	home	N	Mean	Std. Deviation	Std. Error Mean
IMPORTANCE - fire prevention and education	no	381	3.01	.829	.042
	yes	75	3.43	.763	.088

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
IMPORTANCE - fire prevention and education	Equal variances assumed	.089	.765	-4.108	454	.000	-.424	.103	-.627	-.221
	Equal variances not assumed			-4.342	111.811	.000	-.424	.098	-.618	-.231

## T-Test for Seniors in the Home

### Group Statistics

		R or other in home 65 or older	N	Mean	Std. Deviation	Std. Error Mean
IMPORTANCE - fire prevention and education	no		387	3.03	.842	.043
	yes		70	3.28	.780	.093

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference		Lower	Upper
IMPORTANCE - fire prevention and education	Equal variances assumed	.081	.777	2.282	455	.023	-.247	.108		-.459	-.034
	Equal variances not assumed			2.407	101.021	.018	-.247	.102		-.450	-.043

## **Author Biography**

Russell Thompson is the Fire Chief for the City of Greenville (OH). Promoted to chief in 2016, he has served with the Greenville Fire Department since 2002 after serving nine years with the U.S Army Military Police. Russell earned an Associate of Arts degree in Police Administration from Eastern Kentucky University and a Bachelor of Science degree in Fire Administration from Bowling Green State University. In addition to being certified as a fire instructor and fire safety inspector, he holds the Ohio Fire Chief (OFC) and Ohio Fire Executive (OFE) designations through the Ohio Fire Chiefs' Association.



## The FirstNet First Responder Needs Assessment: Driving Toward Targeted Interventions

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**The FirstNet® First Responder Needs Assessment: Driving Toward Targeted Interventions**  
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**Abstract**

In 2017, when AT&T was awarded the contract to build FirstNet, it became a public safety champion. The literature is filled with examples of the critical health risks facing public safety because of their work. First responders experience some health risk factors (such as PTSD, anxiety, and depression) at rates far exceeding the general population. However, the literature lacks data supporting feedback from the first responders themselves on the needs, barriers, and enablers that support their health and wellness. This lack of data drove the development and deployment of the First Responder Needs Assessment in December 2020. The purpose of the First Responder Needs Assessment was to systematically identify priorities for the FirstNet Health and Wellness Coalition to address by asking first responders about their health and wellness needs. This paper will present the results of 368 first responders who provided input into public safety's health and wellness needs. The results show that first responders were willing to identify areas of health and wellness they perceived needed improvement. Results also identified barriers to engagement in the pursuit of physical and mental health and wellness. The First Responder Needs Assessment is only one piece of the larger initiative by the FirstNet Health and Wellness Coalition. The Coalition aims to improve first responder health and wellness through contributing to the body of knowledge and evidence. Further study is needed to identify other areas of first responder health and wellness that require attention.

**Key Words: Capital, Comma, Punctuation**

Needs Assessment, Community Health Planning, First Responders, Coalition Planning Tools, Public Health, Wellness Coalition.

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## Introduction

The FirstNet program at AT&T is a historic 25-year public-private partnership whereby AT&T is responsible for building out the telecommunications infrastructure of a standalone, wireless, broadband network built with and for public safety. This network is designed to help ensure public safety has a reliable and effective network to respond to natural and artificial disasters at a moment's notice (FRNA, 2020). FirstNet is more than just a wireless network – it includes advanced services, applications, and purpose-built devices. It provides public safety interoperability between agencies at the state, local, federal, and tribal levels (FRNA, 2020).

An unexpected outcome of this network build was an awareness by AT&T's leadership that emergency response impacts the health and wellness of public safety. Therefore, that leadership began to pursue ways to integrate health and wellness into the FirstNet mission. Consequently, it established the FirstNet Health and Wellness Program in May 2020 to support first responder health and wellness efforts through advocacy, resources, and relationships. One strategic arm of the FirstNet Health and Wellness program is the FirstNet Health and Wellness Coalition (FNHWC).

This Coalition's mission is to integrate responder, community, industry, and academic capabilities to support the health, wellness, and readiness of American first responders. This effort brings together over 20 public safety organizations representing over 1.3 million first responders to strategically identify the most critical priorities facing first responders and lend their resources to creating meaningful solutions.

### The FNHWC

1. Establishes a framework to integrate leadership across first responder professions
2. Assesses and analyzes existing data on first responder health and wellness needs

3. Identifies key priorities for action
4. Facilitates action planning in which to address priorities
5. Evaluates the effectiveness of activities for future planning and activities (Courie, 2020).

This model is derived from the Mobilizing Action through Planning and Partnerships (MAPP) process for community health improvement planning but applied in an organizational setting rather than a community (NACCHO, 2015; SAMHSA, 2018).

As a part of this process, the Coalition analyzed reports from the literature on the health problems that face public safety. Although surveillance systems and systematic approaches to responder health risks vary by profession, the literature on these risk factors is well documented. What is lacking in the body of evidence is the perceptions of health and wellness, corresponding needs, and barriers to access health programs from the responders' point of view. Subsequently, the Coalition conducted a First Responder Needs Assessment to capture these data to help inform its action planning efforts.

## **Background**

First responders experience higher rates of depression, post-traumatic stress, burnout, anxiety, and other issues, compared with the general population (Heyman & Douglas, 2018. Benedek et al. 2007; SAMHSA, 2018). Often, officer deaths by suicide can outnumber the number of deaths in the line of duty. It is well documented that emergency response providers face health risk factors because of the work they do. Consistent with the Department of Homeland Security (2017) and Federal Emergency Management Agency (2020), first responders are considered emergency response providers and are defined in 6 U.S.C. 101 (6) as "Federal, State, and local governmental and nongovernmental emergency public safety, fire, law

enforcement, emergency response, emergency medical (including hospital emergency facilities), and related personnel, agencies, and authorities." However, there is no single organization that tracks health risk factors facing American emergency response personnel. Consequently, current data are derived from disparate organizations with different methods and data points.

The National Fire Protection Agency estimates 1,115,000 firefighters are currently active in the United States. Of that total, 2/3 are volunteers, and 1/3 are career firefighters (Everts & Stein, 2020). USAFACTS (2021) states in 2019, there were approximately 1,000,000 full-time and part-time law enforcement officers employed in the country. The National Institute for Occupational Safety and Health (2020) reported that in 2018 there were 240,800 career E.M.T.s and paramedics with many more volunteer units. In addition, the National Emergency Numbers Association (NENA, 2021) reported over 100,000 dispatchers currently working at over 5,700 public safety access points (PSAP). All totaled, the Department of Homeland Security (2017) estimates there are over 3 million emergency response personnel practicing in the United States today.

Currently, there is growing awareness of the mind, body, and spiritual stressors facing public safety. One of the ever-increasing problems is suicide. Many first responders' lives are lost to suicide every year. In 2017 at least 103 firefighters and 140 police officers committed suicide. This number is higher than lives lost in the line of duty. Mental illnesses such as PTSD and depression are contributing factors (Heyman et al., 2018). The number is much greater, as no specific agency systematically tracks suicide rates for paramedics, E.M.T.s, and other emergency response personnel. If left untreated, traumatic stress can take its toll on first responders.

Therefore, there is increasing advocacy towards supporting first responders' mental, physical,

and spiritual health to get upstream from the problems they face due to their service to our communities.

## **Methods**

From December 2020-January 2021, the FNHWC deployed the First Responder Needs Assessment Survey utilizing SurveyMonkey (SurveyMonkey, 2020). The purpose of the First Responder Needs Assessment was to systematically identify priorities for the FNHWC to address by asking first responders about their health and wellness needs. The first responder associations that joined the FNHWC shared the survey link via email with their membership. Additionally, the survey link was shared through the electronic FirstNet newsletter.

The needs assessment consisted of an five-question evaluation to quickly capture the needs of first responders that the AT&T organization felt it could best support, along with seven demographic questions. The survey was approved by the AT&T Business Marketing Organization and legal team and follows standards for public health practice and market analysis.

First responders were first asked to choose the top three problems facing public safety from a list of concerns derived from the literature and input from the FNHWC. Then, the respondents were asked, "If someone offered a free program to improve first responder health, which of the following would be of greatest impact?" Again, a list of options was provided from which to choose and an open-ended response option.

The next question explored barriers. Respondents were asked, "What are the top three things that prevent the first responder from participating in activities that enhance their health?" Next, we asked the first responder to identify the top three most valuable ways to engage first responders in their health and wellness needs. This line of questioning ensured that we identified their priorities, identified barriers, and identified ways our program could best facilitate

engagement in health and wellness activities. As a closing question, we asked a broad, open-ended question to garner qualitative responses to help inform our efforts. This question asked, "Are there any other health and wellness needs, programs, services, issues that you would like to include in this survey for consideration?"

## **Results**

A total of 475 first responders consented to the survey, and 368 complete data sets were analyzed for results. Responses were derived across all first responder professions including law enforcement (22.3%), fire (35.3%), emergency management (14.4%), dispatch (16%), paramedics (5.2%), and emergency medical personnel (1.4%). Most responses represented fire and police. The demographic characteristics of the respondents are in Table 1. Most respondents were between the ages 45-54, male, married, Caucasian, with at least a bachelor's degree.

### **Table 1: The First Responder Needs Assessment Demographics (see appendix)**

The first question respondents were asked to answer was, "Thinking about first responders, what are the top three problems you think public safety faces (please choose three)?" The top three problems identified across respondents were post-traumatic stress disorder (39.9%), depression (23.6%), and access to mental health care (22.0%). Table 2 provides the response rates across all options listed. In the "other" category, themes from free-text responses surround concerns with public perception of public safety, lack of governmental support, and issues with sleep and exhaustion.

### **Table 2: The top three problems facing public safety (see appendix)**

The next question posed to the audience was, "If someone offered a free program to improve first responder health, which of the following would be of greatest impact (please choose three)?" The top three most selected responses included programs that addressed: stress

management (50.8%), physical fitness training (22.8%), and wellness/life coaching (22.3%).

The "other" category did not have any significant trends in free-text responses.

**Table 3: Programs with the Greatest Impact (see appendix)**

The next question was centered around barriers. Respondents were asked, "What are the top three things that prevent first responders from participating in activities that enhance their health (please choose three)?" The top three responses included not enough time (56.3%), work-life balance (56%), and cost of activities (33.4%). Table 4 consists of all response options and rates. Some of the most significant themes in the "other" free-text response option include a lack of motivation, exhaustion from shift work/schedules, and difficulty "getting over the hump" of fatigue to focus on personal health and wellness.

**Table 4: Barriers to engaging activities that enhance health (see appendix)**

Finally, respondents were asked, "What do you think is the most valuable way to engage first responders in their health and wellness (please choose three)?" The top three ways to engage first responders were reported as engagement and emphasis from leadership (47.6%), awards and incentives (42.7%), and amplification of awareness of programs (33.7%). Table 5 includes all possible responses and their rates. Themes from the free text "other" response support leadership and organizational wellness, focusing on establishing standards, integrating the union, and making health and wellness training a standard like other training required for public safety.

**Table 5: Ways to engage first responders in health and wellness (see appendix)**

The survey closed with an open-end free text option for the respondents to provide "any other health and wellness needs, programs, services, issues that you would like to include for consideration." This option resulted in 222 free text responses with a semantic analysis of 36% positive responses, 45% neutral, and 18% negative responses. The themes from these responses

reiterated many of the free-text comments addressed so far. There were consistent comments about the need for leadership and organizations to engage in first responder wellness, a lack of programs that addressed sleep habits and family member participation, and ways to better integrate health and wellness into first responder work schedules and organizations.

## **Discussion**

A systematic review of literature conducted by Jones (2017) showed that first responders were at much higher risk for post-traumatic stress disorder, depression, and suicidal tendencies. These data demonstrate awareness of the respondent's mental and physical stressors, including post-traumatic stress, depression, access to mental healthcare, and drug and alcohol abuse concerns. First responders perceive the stresses to their health and wellness with issues that are consistent in the literature. The data gathered by the Needs Assessment Survey also indicated areas in which responders wanted to improve their wellness through stress management, physical fitness, wellness coaching, and resilience training. These results support perceptions that first responders see an opportunity to engage in addressing their health and wellness risk factors, indicating that the population is prepared to engage in action, not just contemplating the issues that face them. The data also identify areas where action can be taken, areas where responders want to engage, and therefore, are more likely to participate in activities that improve their well being.

The respondents also shared barriers to engaging in wellness activities, such as insufficient time, work-life balance struggles, the cost of activities, and a lack of awareness of resources. These barriers are consistent with the perceived barriers to engaging in health and wellness activities in many populations. (Ebert et al., 2019). In healthcare workers and nurses who work long shifts like first responders and face many stress factors, several areas were

addressed by employers for health improvement. Ongoing education, skill development plans, leadership development, education on stress management skills, team building, and communication improvement exercises have proven helpful in addressing mental health concerns (Grey et al., 2019). First responder agencies such as law enforcement, fire, and EMS could utilize similar improvement programs to increase satisfaction, health, and wellness.

As health promotion practitioners develop engagement strategies to manage first responder health and wellness needs, they must be exceedingly aware of the barriers perceived by first responders. The demands of shift work and non-traditional work hours present unique challenges to public safety engaging in traditional wellness offerings. Departments and organizations focused on first responder health and wellness needs will need to consider the timing and frequency of offerings to meet the various shift requirements.

Interestingly, the respondents shared valuable ways to engage first responders in their health and wellness needs. Specifically, the respondents wanted to see their leadership engaging in health and wellness, not just speaking to it. One respondent remarked: "Leadership needs to be involved with this {wellness} at the same level as other staff and provide funding and participation that shows their real support."

From the free text section of the surveys, it was concluded that the respondents felt that organizations need to provide awards and incentives for participation, increased amplification of wellness programs, and identify standards for well-developed first responder programs. These results are promising as they indicated first responders are aware of their health and wellness needs and risk factors. They see the barriers that may prevent them from engaging and offered insight into solutions that may help improve first responder health and wellness activities.

## **Limitations**

The study was not without limitations. The primary limitation to the survey was the convenience sample because the participants were limited to the first responder associations selected to participate in the survey by the FNHWC. Also, race and ethnicity diversity were not well-represented in this study. Because of the survey design and self-reporting format, some self-selection bias will inevitably affect the Coalition's efforts. The sample size was relatively small and not generalizable. However, the results of the study were used to direct the Coalition's efforts systematically.

In future studies, larger sample size is needed to generalize the results for effective implementation. Also, target sampling is required to address the lack of diversity in participants. The sample size and variety could be addressed by targeting first responder departments directly. Future studies may target career and volunteer departments separately. Having separate sets of data can help create a contrast between career and volunteer first responders.

## **Conclusion and Recommendations**

The First Responder Needs Assessment is only one piece of the FirstNet Health and Wellness Coalition's efforts to drive its process, engage in first responder health and wellness needs, and collaborate with public safety solutions. The total response rate from all the surveys sent out and the number of completed data sets used was 77.4%. Future iterations of the survey will seek to improve response rates, address gaps in responses by race, and identify trends in perceptions of health and wellness. These efforts will continue to contribute to the body of knowledge on the perception of emergency response personnel to their health and wellness and areas and where we can engage in supporting improved outcomes. The FirstNet Health and Wellness Coalition will also continue to work towards engaging the first responder population in

areas that the needs assessment highlights, as well as working towards removing existing barriers to engagement

Collaborating with public safety facilitates innovation, dialogue, and solutions that will help systematically develop action plans to address these top concerns. You cannot build an effective program without engaging the stakeholders you wish to serve. The data gathered will be used to guide FirstNet, Built with AT&T, in efforts to manage first responder physical and mental health disparities and improve their health and wellness. These action plans are the critical next step in ensuring our activities support the most pressing health and wellness needs of the population we seek to serve: first responders.

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## Appendix: Tables and Figures

**Table 1: First Responder Needs Assessment Demographics**

<b>Age</b>	18-24	25-34	35-44	<b>45-54</b>	55-64	65+	PNTA*
Percentage	1.4%	9.8%	23.9%	<b>35.3%</b>	23.1%	6%	0.5%
<b>Gender</b>	<b>Male</b>	Female	Other				PNTA
Percentage	<b>70.7%</b>	28.3%	0.3%				0.8%
<b>Ethnicity</b>	A.A./Black	Asian	<b>Caucasian</b>	Latino/Hispanic	Native Am.	Other	PNTA
Percentage	2.7%	0%	<b>85.6%</b>	3.8%	0.8%	1.6%	4.9%
<b>Education</b>	HS Grad	Trade	AD	<b>BS/BA</b>	MS/MA	Doctoral/Prof	PNTA
Percentage	13%	6.8%	22.8%	<b>35.9%</b>	17.1%	1.9%	2.4%
<b>Marital Status</b>	Unmarried	<b>Married</b>	Cohabiting	Divorced	Widowed	Separated	PNTA
Percentage	12.2%	<b>70.7%</b>	3%	8.7%	1.4%	1.1%	3.0%

\*PNTA: Preferred not to answer

**Table 2: The top three problems facing public safety**

Answer Choice	Percentage	Answer Choice	Percentage
Access to healthcare	3.0%	Lack of health/mental-care workers	9.0%
<b>Access to mental healthcare</b>	<b>22.0%</b>	Lack of healthcare insurance	2.2%
Alcohol and Drug Abuse	20.9%	Lack of morals or values	1.9%
Anxiety	19.0%	Lack of purpose/hope	5.4%
Cancer	15.5%	Lack of resilience	5.2%
Cardiovascular Disease	14.9%	Line of Duty Death	4.3%
Child Abuse	0.0%	Lung disease	0.8%
Communication Issues	11.7%	Metabolic problems/obesity	10.9%
COVID-19	17.1%	Personal Safety	14.1%
Domestic Violence	3.3%	<b>Post-Traumatic Stress Disorder</b>	<b>39.9%</b>
<b>Depression</b>	<b>23.6%</b>	Suicide	9.5%
High Blood pressure	9.0%	Toxic culture	12.8%
Hostile Work Environment	5.7%	Other (please specify)	9.2%
Implicit Bias	9.0%		

**Table 3: Programs with the Greatest Impact**

Answer Choices	Percentage	Answer Choices	Percentage
Bias training	7.6%	<b>Physical Fitness Training</b>	<b>22.8%</b>
Compassion training	8.2%	Relationship Building	5.7%
Cultural Competence	7.1%	Resilience Training	20.7%
Alcohol and Drug Abuse	6.3%	Professional Development Scholarships	5.4%
Dealing with Anxiety	20.1%	Sleep skills	12.8%
How to be a better leader	9.8%	Strength Training	3.0%
How to run a 5 or 10K	0.3%	<b>Stress Management</b>	<b>50.8%</b>
Leadership training	17.7%	Suicide Prevention	9.0%
Healthy nutritional choices	15.5%	Therapy Dogs	5.2%
Marriage/Family	13.9%	Tobacco Cessation	1.6%
Mindfulness training	13.3%	<b>Wellness/Life Coaching</b>	<b>22.3%</b>
Peer counseling programs	19.3%	Other (please specify)	1.9%

**Table 4: Barriers to engaging activities that enhance health**

Answer Choices	Percentage	Answer Choices	Percentage
<b>Cost of activities (it's too expensive)</b>	<b>33.4%</b>	<b>Not enough time</b>	<b>56.3%</b>
Fear of impact on employment	18.2%	Not interested in being healthier	10.3%
Lack of awareness of programs	32.3%	Stigma (internal/external)	23.4%/23.4%
Lack of community support	5.7%	Times that activities are offered	0%
Lack of culturally competent providers	8.7%	<b>Work-life balance</b>	<b>56%</b>
Lack of organizational support	26.1%	Other (please specify)	6.3%

**Table 5: Ways to engage first responders in health and wellness**

Answer Choices	Percentage	Answer Choices	Percentage
<b>Amplification of awareness of programs</b>	<b>33.7%</b>	Personal Protective Equipment	9.2%
<b>Awards/Incentives</b>	<b>42.7%</b>	Podcasts	3.3%
Biometrics/biofeedback	11.4%	Retreats	10.1%
Digital applications	6.5%	Small group classes	14.4%
<b>Engagement from Leadership</b>	<b>47.6%</b>	Sponsored training	24.2%
Fitness testing	14.7%	Web-based tools	7.9%
Identify standards for wellness programs	24.2%	Web-based training	8.7%
Mobile training	7.3%	Webinars	3.8%
Mobile Wellness Centers	11.4%	Wellness Symposiums/Conferences	13.0%
Newsletters	1.6%	Other	4.3%

## **Author Biographies**

Dr. Anna Fitch Courie, Director of Responder Wellness, FirstNet Program at AT&T is a nurse, Army wife, former university faculty, and author. Dr. Courie has worked for over 20 years in the health care profession including Bone Marrow Transplant, Intensive Care, Public Health, and Health Promotion practice. Dr. Courie holds a Bachelor's in Nursing from Clemson University; a Master's in Nursing Education from the University of Wyoming; and a Doctor of Nursing Practice degree from Ohio State University. Dr. Courie's area of expertise is integration of public health strategy across disparate organizations to achieve health improvement goals.

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## How Adults Learn: Considerations for Training of Public Safety Personnel

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**How Adults Learn: Considerations for Training of Public Safety Personnel**  
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**Abstract**

To date, research in the field of adult educational psychology has been limited. This qualitative meta-synthesis literature review focused on what current research data reveals about adult educational psychology, adult learning and its application to public safety personnel training. The following questions presented by Don Charles in 1980 formed the basis of this inquiry. 1) What does research tell us about the capacities of adults to learn and retain? 2) What factors other than cognitive functioning affect adult performance? 3) How and in what ways does the adult wish to involve himself as a learner? 4) How might we go about guiding the mature learner using present knowledge? 5) What theoretical concerns arise from consideration of the foregoing? This inquiry revealed while psychological factors dictate how adults learn their motivation to learn is influenced more by sociological factors. Motivation to learn does not decrease with age; adult learners benefit from social interaction with other students, rely on reflection and crystallized intelligence, prefer and benefit from self-assessment, self-correction, self-direction and self-control, and that sleep is important to off-line processing of new material. Less structured courses with more choices, opportunities to rely on experience, critical thinking and collaboration with others in interactive discussions, group activities and social support all facilitate adult learning. Considerations for course design that promote adult learning include, less structured, self-paced courses with more choices, pre-knowledge quizzes, practice exercises, simulations, review questions, case studies, Socratic questioning, use of interactive courseware where students progress at their own pace and the opportunity for self-assessment and self-correction.

**Key Words: Andragogy, Education, Educational Psychology, Learner, Online, Adult Learning, Reflection, Collaboration, Self-Regulation, Training**

## **Introduction**

How do humans learn and what is the best approach to education and training? There have been many attempts to answering these questions overtime, including philosophical approaches from Plato, Aristotle, Rousseau and Cicero, and scientific approaches from psychologists and other scientists including Freud, Skinner, Pavlov, Tolman and Vygotski. Yet, traditionally the study of the human learning process and the philosophy of education have focused on children rather than adults. More recently, focus has shifted to the study of how and for what reasons adults learn. Andragogy is a theory that focuses specifically on adult learning with the core premise being that adults are self-directed, take responsibility for their decisions and that the life experience adults bring to the learning environment provides a basis for further learning (Donavant, 2009).

This qualitative meta-synthesis literature review will focus on adult learning by reviewing and synthesizing studies to determine what psychological, sociological and physiological factors influence the adult learning process; and how these factors can influence the pedagogy and philosophy for adult education. This inquiry focuses generally on the applicability of adult online education to public safety personnel because of its rapid growth in higher education and employment in-service and recertification training. However, this research is also fully applicable to adult face-to-face training. Drexel University reports that between 2002 and 2014 the number of higher education students enrolling in at least one online course increased from 1.6 to 5.8 million students (Betts, 2017). In addition, many employers are using online courseware for employee annual refresher training on sexual harassment, ethics, diversity, safety and other topics. Moreover, many professions including law enforcement (Mugford et al., 2012), the fire service, and the medical profession, including emergency medical services (Jerin

et al., 1998; Shah et al. 2012), are using internet-based refresher and continuing education training. Online training and education provides flexibility, easy access, adaptability to individual training styles and cost effectiveness (Lam-Antoniades et al., 2009). These benefits are important for those doing shift work, such as police officers, firefighters, nurses and emergency medical service personnel, whose shifts do not always allow them to attend classes in the physical classroom. The potential savings of travel and other training related costs (Mugford et al., 2012), may allow public safety organizations to stretch limited training budgets. Online learning is often a better fit for nontraditional adult learners trying to balance the demands of career and family while earning a degree, or acquiring or maintaining job-related certifications.

Fitting the bill of non-traditional learners are police officers. One study found that police officers preferred online to traditional instruction, felt it was appropriate for professional development, and provided more training opportunities, but was not a replacement for the necessary “hands-on” components of police training (Donavant, 2003). Applying adult learning theory to police training Birzer (2003), suggests that because police work frequently involves decision, choice, discretion, problem solving and leadership, that traditional behaviorist and mechanistic training need to give way to more student-centered learning. Online training for firefighters also shows promise, with online nodes providing effective support for firefighter training (Holmgren, et al., 2017).

## **Literature Review**

Don Charles (1980) wrote “the middle years of life from the 20’s through the 50’s have been neglected by psychology in general and educational psychology in particular” (p. 289). This inquiry seeks to determine what research has been conducted in the forty intervening years since

Dr. Charles made this statement, and what the research reveals about adult learning. In his 1980 article, Dr. Charles posited five questions related to adult educational psychology:

What does research tell us about the capacities of adults to learn and retain; what factors other than cognitive functioning affect adult performance; how and in what ways does the adult wish to involve himself as a learner; how might we go about guiding the mature learner using present knowledge; and, what theoretical concerns arise from consideration of the foregoing? (p. 289).

Finding answers to these research questions forms the basis of this inquiry.

### **Why Adults Learn**

Though research is somewhat limited and not directly related to the research questions, a brief look at why adults choose to learn is instructive. According to Courtney (1992), adult learning is more a function of social participation rather than internal psychological or cognitive motivation. Courtney posits that most adult education is voluntary, based on the individual's discretionary time, occurs in group contexts and is bound to social roles and rewards. This is supported by Crossan et al. (2003), who report that adults participate in learning for a variety of reasons, including social, economic and demographic factors, for example, career trajectories, greater mobility, family influences and religion. Talmage et al. (2019) found that a subtheme for adult learning is socializing and sense of community.

### **Age**

Studies have investigated the impact of age on cognitive ability to learn, retention of new information and on motivation to learn. Gegenfurtner and Vauras (2011) conducted a meta-analysis of 38 studies with 6977 participants from the past twenty-five years to study the impact of age on "motivation to learn and transfer of training" in adult continuing education (p. 34).

Motivation to learn is defined as the desire of the student to learn new content. Transfer of training is defined as the productive use of newly learned content. Transfer of training is highly influenced by the student's motivation to learn. Gegenfurtner and Vauras (2011) did not find any evidence of age-related decline in motivation to learn. In fact, the researchers found that motivation to learn and the transfer of training remain high with age and even increase for some older adults. The researchers recommended that "training programs should offer the possibility of social interaction because the expectation of contact with peers seems emotionally meaningful" particularly for older students (p. 42). The researchers also concluded that the motivation to learn "plays a moderate role" in training transfer (p. 40).

Maurer, Weiss, and Barbeite (2003) in a study of 800 employees from across the United States investigated how age may influence individual learning preparedness. The researchers found that age related changes in older workers may result in fewer qualities that predispose and prepare them for challenging learning experiences. They identified a number of factors that may be variable motivators depending on employee age, and should be considered in the training of older workers. These factors include having been involved in similar development activities previously, believing in the need for development and their ability to develop skills, the expectation of receiving intrinsic benefits from participating, perceiving themselves as possessing learning qualities and having social support development from within and without the organization. The researchers found that older workers in younger workforces may not receive the requisite social support for their ability to learn. Social support from within the organization as well as external support, for example family, serves as an important motivator for adult learning. Employers need to consider these factors when developing employee training programs. Another study found a positive relationship between education level and previous

exposure to online delivery, but a negative relationship between age and online learning success for police officers (Donavant, 2009).

Though motivation to learn and the ability to transfer training remain moderately high, research indicates that cognitive ability starts to decline in early adulthood. Salthouse (2009) reports that some aspects of age-related cognitive decline in healthy adults has been observed in early adulthood and certainly before age 60. However, these declines may not be detectable at early stages and performance on vocabulary and general information tests have consistently been found to increase at least until age 60. Salthouse also reports substantial declines in speed and memory variables after age 60. However this is beyond the primary education and training years for most individuals and is close to retirement age for most.

Also related to age is the question of whether adults and children learn differently. A study by Kuhn and Pease (2006) suggests that learning operates under increasing executive control between middle childhood and early adulthood. Executive control is closely associated with conceptual learning requiring cognitive engagement rather than simple associative learning. The development of executive control depends on subjective experiences becoming objects of reflection at a higher level. The authors found without executive control the younger participants in the study viewed things “the way they are” while older participants with executive control were able to temporarily “bracket” existing beliefs to inhibit their influence on the interpretation of new data. The development of executive control requires considerable cognitive functioning. The study found that executive control does not develop at a discrete point but over a continuum depending on the individual. This suggests that learning develops with age along a continuum and through executive control and cognitive engagement adults do learn differently than children. Research also indicates a link between age and various functions related to intelligence.

## **Intelligence**

Intelligence is classified as either fluid or crystallized. Fluid intelligence relates to the ability to find solutions to new problems through the use of logic. Conversely, crystallized intelligence is the ability to retrieve one's knowledge reserves and experiences and apply them to various situations (McCrobie, 2016). Research has found a varied pattern of change in these types of intelligence as a person ages. Crystallized intelligence typically increases with age, resulting from situations experienced and retention of the acquired information, which is commonly referred to as "life experience." Fluid intelligence is attached to problem-solving situations where one has limited understanding and no knowledge connection.

Research indicates that fluid cognition capabilities maximize during the middle age years and experience declines after the age of 40, and the processing speed of information starts to decline after age 30 (McCrobie, 2016). Similarly, the speed at which one learns begins to decline around age 25 (Salthouse, 2010). These declines may be caused in part by decreased cardiovascular circulation and depression which can adversely impact adult learning (McCrobie, 2016). However, all is not lost. Mental capacity and functionality of adult learners can be improved through engagement in new technologies, including computers that require the constant engagement and interaction of the brain (McCrobie, 2016).

Mugford et al., (2012) in a study of cognitive load training related to police officers, report that online learning provides a "greater degree of interactivity between the learner and the training environment" (p. 326). Sage et al. (2015), found that memory recall and mind set of control was higher when adult students had control over a pause function on a computer slide program. Participants of the study were 72 college undergraduates with a median age of 19. The study consisted of four different action sequences on a slide show where the computer advanced

slides automatically. The four action sequences were (1) free pause: where viewers could pause the show at any time, (2) sub-goal pause: show was paused after sub-goals and viewer clicked to continue, (3) timed pause: show paused after every 20 slides and viewer clicked to continue, (4) no pause: no viewer interaction (Sage, et al., 2015). The participants reported they liked the free pause option the best and the no pause option the least “even though only a handful of people used the click to pause mechanism” (p. 186). The no pause version resulted in the lowest memory recall and participants reported the free pause option was the easiest to learn from and they felt most in control. This led the researchers to conclude that “the mindset of being in control, rather than clicking or pausing itself, seemed to enhance students' positive experiences with the learning medium” (p. 186). Translating the findings of this study into course design indicates the optimal approach to presenting information may be to provide information at a measured pace, in segments that can be paused and in a way that does not overburden students. Therefore, allowing students control over a program might be a valuable design consideration regardless of whether they use it.

Also, research conducted by Harrington et al. (2017) suggests that decline in fluid intelligence in otherwise cognitively normal older adults, may be an indicator of preclinical Alzheimer's disease and not representative of normal cognitive aging as previously hypothesized. While the aforementioned research is insightful, other researchers question the efficacy of current models of measuring adult intelligence. The measurement of adult intelligence started largely during World War I to facilitate military selection, and the methods of assessment were extensions of those used for children. Still, most assessments of adult intelligence are laboratory based resulting in insufficient criterion measures (Ackerman, 2017). Research conducted by Shakeel and Goghari (2017) found that as used in their study, subjective

measures were not able to predict fluid intelligence and objective measures did not substantially account for fluid intelligence. This led the researchers to conclude that neither are substitutes for direct measurement of fluid intelligence. They did qualify that future studies may identify other subjective/objective measures that can be used to reliably measure fluid intelligence.

Anderson and Craik (2017) forecast the future of cognitive aging research to be based more on longitudinal studies that are currently ongoing compared to the cross-sectional studies of the past. They also believe technological advances will help researchers move from their “labs into the real world and track cognitive functioning as it is influenced by people’s environments” (p.1). Finally, Kievit et al. (2017) propose a “watershed model” to measure fluid intelligence that includes links between fluid intelligence and processing speed; and white matter integrity and processing speed.

### **Sleep**

The importance of sleep to an individual’s general health has been well established. Insufficient sleep has been linked to obesity, diabetes, coronary heart disease, stroke and accidents resulting in injury (CDC, n.d.). With increasing age, even in healthy adults, sleep quality and quantity are diminished. This is also true for some younger adults doing shift work in particular firefighters. But, what effect does sleep or the lack thereof have on learning? The CDC (n.d.) reports that insufficient sleep slows cognitive reaction time and accuracy. And, as reported by Fischer, Wilhelm and Born (2007), a large number of studies “provide compelling evidence” that the consolidation of memories is enhanced by sleep (p. 214). Memory consolidation is a process triggered by a learning experience whereby the newly learned information is encoded and transformed into an enduring form. This off-line processing occurs during sleep. This

process counteracts forgetting and aids in retrieval of the information through the process of reflection.

Other research supports the role of sleep in the consolidation and integration of newly learned words (Kurdziel, et al., 2017). The researchers suggest a link between adequate sleep and transforming newly learned words and concepts into long-lasting memory. The learning and retention of words is important to adults continuing their education, as they must often learn novel words and concepts. This is especially true of older adults remaining in or re-entering the workforce. Another study supports the active role of sleep in consolidation of motor skill learning with the researchers finding a correlation between motor task improvement and sleep physiology (Mantua et al., 2015). Motor skill learning is essential for many occupations including police officers and firefighters.

Sleep deprivation often occurs in firefighters who are awakened from sleep to respond to emergencies at a moment's notice. Research has shown that sleep deprivation as-short-as three hours significantly impairs learning and memory (Lee, et al., 2019). Another study of importance to all emergency services workers suggests a link between sleep difficulties, safety-signal learning and threat-safety discrimination (Marshall, et al., 2014). The data suggest that sleep disruption, particularly REM sleep fragmentation may play a role in safety signal learning, threat-safety discrimination and ultimately a role in the development of post-traumatic stress disorder. Safety signals are learned cues that predict the non-occurrence of an aversive event and are important factors in the inhibition of fear and stress responses (Christianson, et al., 2012).

Interestingly, Fischer et al. (2007) found that sleep exerts an opposite effect on memory consolidation in children compared to adults. Consistent with other studies the researchers found that implicit learning was enhanced in adults after nocturnal sleep compared to retention

intervals during daytime wakefulness. However, contrary to the expectations of the researchers “retention sleep clearly deteriorated implicit knowledge” in children. This finding led the researchers to conclude that sleep plays a different role in implicit off-line learning in adults and children and further supports the conclusion that adults learn and process information differently than children.

These findings should serve as a warning sign for non-traditional adult students who are often sleep deprived as a result of balancing career, family, and academic pursuits. The Centers for Disease Control and Prevention (CDC) report that a third of American adults are not getting adequate sleep on a regular basis. At least one study indicates that naps have a beneficial impact on hippocampus-dependent memories (Studte, Bridger & Mecklinger, 2015). The hippocampus is the part of the brain that is responsible for forming, organizing and storing memory.

### **Metacognitive Strategies**

Self-regulation has been defined as “involving self-awareness, self-motivation and behavioral skill to implement knowledge appropriately” (Zimmerman, 2002, p. 66). Component skills of self-regulation include: goal setting, strategy for attaining goals, monitoring progress, restructuring physical and social context for goal compatibility, time management, attributing causation to results and adapting future methods (p. 66). This is similar to B.F. Skinner’s programmed instruction where students progress at their own rate, check their answers, and advance after answering correctly (Harasim, 2017). A 2007 French study conducted by Jézégou involving French-speaking adults studying in an e-learning environment to earn a diploma, set out to identify the role of openness of the e-learning components and student’s self-regulated behavior in managing those components. Jézégou’s study was based on the socio-cognitive theory of self-regulation and theoretical definition of “openness.” The socio-cognitive theory of

self-regulated learning holds that behaviors are not primarily influenced by environmental components as supported by the behaviorist approach, nor do they depend solely on internal or personal characteristics. Instead, behaviors (B) are “part of a system of reciprocal causality between personal (P) characteristics” and environmental (E) components. These three dimensions do not carry the same weight or act simultaneously. The study found that students adjusted to the formal pedagogical components as imposed by their teachers, while also taking advantage of “liberties of choice offered to them by teachers to create the informal conditions of their e-learning situation” (p. 197).

This is supported by Dobrovolny (2006) whose study found that adult subjects relied on self-assessment, self-checks, simulations and practice exercises to assess their knowledge. The implications of these findings include providing adult learners sufficient opportunities for self-checks and self-assessment. This may be accomplished through practice exercises or simulations. Dialogs and discussions are also important in the design of technology based learning. This is supported by the research of Birzer (2003) that suggests to make police training more beneficial, it needs to be as experiential, interactive, and participatory as possible, incorporating simulation exercises and problem solving activities. According to Mugford (2012), research suggests that when dealing with complex learning tasks, collaborative learning can be more beneficial compared to individual learning, in terms of learning transfer.

Chen informs us that there are three foundations of adult learning. First, adults are not “blank slates”, but are self-directed and their learning is optimized when their experience is “recognized and utilized in the learning process” (Chen, 2015, p. 407). Second, adult learning is transformative leading to personal development. Third, reflection, critical thinking, challenging assumptions and exploring alternatives are all critical elements of adult learning. In order to test

these tenets, Chen studied non-traditional adult students in an eleven week, quarter-based, upper-level psychology course, which was designed to offer customized learning experiences. Students selected, with instructor approval, “a benign lifestyle-based topic that they would like to see personal change” (p. 410). Students were presented with two options for approaching their topic. First, they could discuss or think about course material based on their personal observations or observations of others, or, they could “directly discuss the relevance of the material to their personal experience” (p. 410). Interestingly all participants chose to focus their learning on both observations and experiences relying on a reflective process.

The results of Chen’s study revealed three factors of interest to adult educators. First, “disciplinary courses utilizing adult learning principles can be effective at teaching adults” (p. 416). For example reflection is important to adult learners who tend to rely on life experiences. Topic choice and self-directedness are also important. Emotional and cognitive processes are engaged in adult learners who tend to challenge pre-existing perspectives leading to transformation. Second, emotions play a significant role in self-directedness leading adult learners to consider change through ownership. Third, facilitating self-directedness requires the removal of barriers freeing students to experience a broader range of emotions (Chen, 2015). Birzer (2003), advocates self-directed learning as a more effective training method for police officers where the trainer serves as a facilitator and creates an environment of learning rather than teaching. Research by Holmgren et al. (2017) found that online training requires a shift from teacher-centered to student-centered, and courses need to be designed to facilitate self-directed and interactive learning among students. Mugford et al., (2012), in a study of police training, report that online training can reduce extraneous cognitive load, which is a by-product of teacher-centered training, and is detrimental to the learning process.

Consistent with the findings of Chen, Dobrovolny (2006) found that adult learners rely on reflection to make sense of life experiences in support of constructing new knowledge and that prior experiences are the foundation upon which adult learners construct new information. Dobrovolny's qualitative study took place in a corporate setting and investigated how small groups of seven adults learned from fast paced, technology-based instruction. The design of the study is described as follows:

A constructivist theory of learning was the primary conceptual framework for this study and "learning" was defined as the process whereby learners personalize and/or customize new information; it is the process whereby learners make new information relevant and/or meaningful to themselves (Dobrovolny, 2006, p. 156).

The study found that participants used reflection by looking for similarities and differences based on their prior experiences. This is consistent with schema theory which holds that learning is easier when information is chunked into subgroups and compared to existing knowledge (Harasim, 2017; Mugford et al. 2012). The participants used conversations, asked questions, problem solved, taught others something they learned, and discussed confusing terminology suggesting there is a complex link between reflection and collaboration in adult learners.

The work of Nicholas et al. (2012) suggests reflective learning may be enhanced by collaboration and highly elaborative open-ended questions which aid adult learners in recalling experiences. The research of Mugford et al. (2012) suggests that specific questions during the learning process can promote deep processing of the instructional material. The Socratic method of teaching is one example where probing questions are asked to facilitate critical thinking. Altorf (2016) tells us that reflection on experience is an integral part of Socratic dialogue and can create a sense of belonging and community among participants in an educational process.

Applying this concept to police training, research by Birzer (2003) recommends that trainers of police officers design training to capitalize on student's experience. In part this can be accomplished by providing trainees with case studies and allowing self-directed group discussions and debate by trainees (Birzer, 2003). Case studies are also effective in teaching different scenarios and questioning preconceived notions for critical team training such as wildland firefighters (Ishak & Williams, 2017). Holmgren et al., (2017) describe the online learning process of firefighters as being more goal-oriented focusing on course objectives, reflection and literature processing, as students question, analyze, design and test their own solutions.

A pioneer in collaborative learning was Lev Vygotsky who advanced the theory that collaboration is important to knowledge construction, and that learning involves the individual in relationship to the environment and interaction with others (Harasim, 2012). According to research conducted by Dobrovolny (2006), there are a number of factors implicit to adult learning. First, adults benefit from socio-cultural learning; that is, they learn not only by themselves but also with others. Knowledge is constructed by conversing with others and analyzing problems, finding solutions and meeting goals together (Dobrovolny, 2006). This is consistent with the finding of Gegenfurtner and Vauras (2012) about the importance of social interaction in adult learners. Derksen et al. (2015) found that a gap in learning and memory ability between younger and older learners can be closed by collaborative social interaction in the learning process to a point of the gap being statistically indistinguishable.

## **Discussion**

*What does research tell us about the capacities of adults to learn?* There is no evidence to suggest that adult learners need special motivation to learn or that their ability to transfer

learning is diminished with age. In fact, motivation to learn and transfer of training remains high and may even increase with age (Gengenfurtner & Vauras, 2011). While fluid cognition, the ability to solve problems, and the speed of processing information decline after age 40 and 30 respectively, crystallized intelligence, or “life experience” typically continues to increase with age (McCrobie, 2016). Adult learners, rely on reflection using life experience to construct new knowledge based on prior experience (Dobrovolsky, 2006). Learning is optimized when experience can be used in the learning process by comparing new knowledge to experience (Chen, 2015; Harasim 2017; Mugford, 2012; Birzer, 2003). Research suggests reflective learning may be enhanced by collaboration with others particularly when highly elaborative open-ended questions are posed to prompt the recall of experience and deep processing of the instructional material (Nicholas et al., 2012; Mugford et al. 2012). In a study of wildland firefighters, research revealed that firefighters can also learn from the experiences of their colleagues when communicated in trainings (Ishak & Williams, 2017).

Sleep is also important to transferring newly learned information into long-lasting memory and to the consolidation of memory (Kurdziel, et al., 2017; Fischer, et al. 2007). Adult learners also rely on executive control, which requires cognitive engagement rather than associative learning. Executive control develops over a continuum of years and not at any given point in time (Kuhn & Pease, 2006). Research indicates that adults continue to have the cognitive ability to learn albeit at a possibly slower rate than when they were younger. However, research suggests this decline could result from physiological factors and may be improved by engagement with new technologies (McCrobie, 2016).

*What factors other than cognitive functioning effect adult performance?* Studies indicate that decreased cardiovascular circulation and depression can both have an adverse impact on

adult learning (McCrobie, 2016). Sleep has also been found to enhance the “consolidation of memories” which is a process that consolidates and encodes new information that aids in information retrieval. Sleep is also believed to enhance implicit off-line learning in adults (Fischer et al., 2007). This is problematic considering the CDC reports that a third of American adults do not get adequate restorative sleep on a regular basis. The problem of insufficient and interrupted sleep, particularly fragmented REM sleep, is compounded for those doing shift work such as law enforcement officers, firefighters and emergency medical services personnel. On the other hand, the findings of one study suggest naps may have a beneficial impact on hippocampus and the forming, organizing and storing of memories (Studte, Bridger & Mecklinger, 2015).

*How and in what ways does the adult wish to involve himself as a learner?* The answers to this question can be divided into why and how. Why adults choose to learn is typically more a function of sociological rather than psychological motivators (Courtney, 1992). Adult learning is often contingent upon available discretionary time, economic factors, career and family influences (Crossan, 2003). Adults typically pursue education and training to prepare themselves for promotion, a career change, a sense of self-achievement or family influence such as setting a positive example for their children. A number of studies suggest, adults prefer to involve themselves in the learning process through self-regulation and openness of learning components including choices and options signaling a need to shift from teacher-centered to student centered pedagogy (Zimmerman, 2002; Birzer 2003; Holmgren, et al., 2017). Some examples of self-regulation include goal setting, monitoring progress and time management (Jézégou, 2007). Adults also involve themselves in learning by employing reflection, critical thinking, challenging assumptions and exploring alternatives (Chen, 2015). Adult learners also rely on self-assessment and self-correction and teaching others something they have learned (Dobrovlny, 2006). By

knowing the cognitive and non-cognitive factors relevant to adult learning, and knowing why and how adults learn, education and training programs can be structured to facilitate and guide adult learning.

*How might we go about guiding mature learners using present knowledge?* It is recommended that training and education programs include social interaction (Gengenfurtner & Vauras, 2011; Harasim, 2012; Derksen, et al., 2015; Birzer, 2003). This is supported by Dobrovlny's (2006) research that found adults benefit from socio-cultural learning including analyzing problems, finding solutions and meeting goals in concert with others. Social interaction can be encouraged through dialogue, discussion forums and group activities. Collaborative social interaction may also close the gap in learning and memory ability between younger and older learners (Derksen, et al., 2015). Engagement in new technologies including computers can also increase the mental capacity and functionality of adult learners. Interaction and control are important elements of engagement with technology for example training segments that can be paused, or require a click to advance (McCrobie, 2016; Sage et al., 2015). Flexibility of course design is important in allowing adult students some self-direction and options. Opportunities for self-checks and self-assessment can be provided by offering pre-knowledge quizzes, practice exercises, simulations, review questions and application and analysis problems (Dobrovlny, 2006). Older learners also benefit from social support both from within and outside of the workplace boosting confidence in their ability to continue learning new information. Another important motivator of adult learners is the expectation of intrinsic benefits from the learning process (Maurer, et al., 2003).

*What theoretical concerns arise from consideration of the foregoing?* The primary theoretical concern identified by this inquiry is that adults learn differently from children and

adolescents. Executive control develops with age and is relied upon by adult learners where children have yet to fully develop this skill and typically rely on associative learning (Kuhn and Pease, 2006). Adults also rely on reflection and crystallized intelligence another skill still developing in children (McCrobie, 2016). And, while sleep facilitates the consolidation of memory in adults it has the opposite effect in children (Fischer et al., 2015). Further research and study is needed on the psychology of adult learning particularly the differences between how adults and children learn to develop more appropriate metrics for assessing adult learning.

### **Limitations**

This inquiry is limited to a review and synthesis of the current literature. Though a diligent effort has been made to present the most applicable literature, including counterpoints, as is the case with all literature reviews, data reduction was necessary. Accordingly, sources of literature with the most recent applicable research data were selected but from a practical standpoint not all research on the topic of adult learning could be included. While some recent studies were found much of the research is a decade or more old and continuing quantitative and qualitative studies are needed on the psychology of adult online learning. Also, studies specific to public safety training were limited. To date many of the metrics used to assess adult learning have been derived from studies of how children learn and new metrics for assessing adult learning need to be developed. Historically many of the studies on learning have been laboratory based and more real world studies with human subjects are needed. Similarly, more longitudinal studies are needed as historical research in this area has been largely based on cross-sectional studies. Studies assessing the differences in how children and adults learn are limited and future study is needed. Because motivation to learn in adults has a direct relationship to training transfer and memory consolidation future research is needed on what motivates adults to continue

learning. Because different theories exist to explain age related cognitive decline future study is needed to determine what role various cognitive, psychological and physiological factors play. Finally, future study is needed specific to the training demands and efficacy of online training for public safety personnel including police officers, firefighters and emergency medical services personnel.

## **Recommendations**

Whether developing customized in-house training or using online courseware for adult participants the following recommendations apply.

- Because adults rely on reflection and crystallized intelligence in constructing new knowledge, training needs to be structured to facilitate the use of reflection in the training process, this can be accomplished through application and analysis problems and case studies where participants have the opportunity to apply critical thinking, challenge assumptions, explore alternatives and problem solve. Socratic style probing questions in discussions are another effective method of engaging experiential recall.
- Engagement through social interaction facilitates adult learning and training programs need to provide opportunities for interactive discussions among participants, collaboration with other participants through group activities and the opportunity to ask questions. The use of interactive courseware depending on design is a good option for facilitating engagement of adult learners
- Adult learners prefer self-control, time management and goal setting which can be accomplished by using computer based training where the participants progress at their own pace, and have the opportunity to pause, click to advance, click to return to previous material, and to self-assess and self-correct.

- Training programs for adults need to be less structured with more choices, including being self-paced, containing pre-knowledge quizzes, practice exercises, simulations and review questions which help fulfill adult learners preferences for self-direction, self-assessment and self-correction. Providing alternatives and options in the course structure also facilitates adult learning.
- Adult learners benefit from social support from supervisors, co-workers and family to boost confidence in their ability to face challenging learning experiences. They are also motivated by the expectation of intrinsic rewards from learning, for example an increase in self-esteem. Support by younger learners for older learners in the same setting, can be facilitated by collaborative social interaction in the learning process
- Finally, adult learners need adequate restorative sleep to facilitate the transfer for newly learned information into long-lasting memory. If adequate sleep is not possible naps may be beneficial in filling the lost sleep gap.

These recommendations are important for those responsible for the design and delivery of online education and training programs, or the selection online courseware to facilitate employee training and recertification. Though the focus of this research was adult online learning these recommendations also apply to adult face-to-face training and education programs.

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## **Author Biography**

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## The Surprise Management Theory and the Chicago Fire of 2014

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## **The Surprise Management Theory and the Chicago Fire of 2014**

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### **Abstract**

When an organization is surprised by an unforeseen emergency, it relies on its Emergency Action Plan (EAP) to help remediate and guide the organization to recovery. When an organization's EAP is not prepared for a surprise disaster, managers and employees are relied upon. This occurred at the Chicago Air Route Traffic Control Center in 2014 when an insider threat caused a fire later known as the Chicago Fire. The Chicago Center's EAP did not anticipate this disaster and was quickly thrown to the wayside. The managers at the Chicago Center unknowingly followed the requirements of the surprise management theory to guide the center to a swift recovery. The Chicago Centers managers' decision-making based around the surprise management theory was successful and may be an effective model for future training. Training that focuses on decision-making during surprise scenarios is also reviewed, applying some of the surprise management theory principles. In conclusion, the surprise management theory is effective in decision-making during a surprise disaster. Training that focuses on the surprise management requirements may enhance managers' resiliency and decision-making abilities during a surprise crisis.

**Key Words:** Surprise Management Theory, Emergency Action Plan, Disaster Recovery, Chicago Fire, FAA, Insider Threat, Resilience, Training, Continuity of Operations, Business Continuity, Recovery, Linear Thinking, Non-Linear Thinking

## **Introduction**

In a world that is constantly evolving to depend more on technology, effective policy and planning must be implemented if these technological dependences are suddenly unavailable.

Technology is developing at exponential speeds; one could assert that its evolution is faster than policies can keep up. When a natural disaster or crisis occurs, it is possible that these relied upon technologies will no longer be available, and people may be relied on. Contingency plans and Emergency Action Plans (EAP) may not have anticipated these surprising realizations, leaving the environment chaotic. Contingency plans are designed to reduce the impact of a disaster with policies and procedures to guide an organization to continue operations (Ab Aziz et al., 2019). By definition, a contingency plan is virtually identical to an EAP. Therefore, they will both be referred to as an EAP moving forward. An EAP is a plan designed to minimize and alleviate the adverse effects and consequences, respectively, while enabling the recovery process of an emergency through procedures (Binder, 2001). EAP plans need to be updated, improved, and regularly rehearsed (Wang et al., 2020) since the technology they may fall too is forever changing. These plans may not anticipate surprise occurrences, leaving a state of chaos identical to the Federal Aviation Administration (FAA) and the Chicago Fire of 2014.

## **Literature Review**

The FAA maintains, operates, and manages America's National Airspace System (Hampton, 2015). FAA essentially ensures that aircraft of all types safely operate while they are flying over America's airspace. On September 26, 2014, a fire was intentionally caused by an FAA contracted employee at the Chicago Air Route Traffic Control Center that destroyed the highly relied upon a technology known as the FAA Telecommunications Infrastructure (FTI) (United States Department of Transportation & Hampton, 2015). The contractor also slashed the

main lines for the primary and backup systems (Hirschman, 2014). The fire became known as the Chicago Fire. The FTI that was destroyed in the Chicago Fire provided critical communications that support the FAA's air traffic operations; with the FTI being destroyed, the Chicago Air Route Traffic Control Center could not provide air traffic control for two weeks, resulting in losses of over 350 million dollars (United States Department of Transportation & Hampton, 2015). With the unexpected occurrence of the Chicago Fire, the slashing of the primary system lines, the FAA's EAP was tested.

### **FAA's Pre-Disaster EAP**

Typically, tornados and other natural disasters that may occur are for a limited time, allowing organizations to rely on backup systems until the primary is functioning again. When the primary and backup system lines were slashed, any redundancy to bring network communication was gone. With both systems being cut and a fire that caused the entire facility to evacuate while aircraft were in orbit around the Chicago Facility, the FAA's existing EAP was not prepared for an insider threat of this magnitude (United States Department of Transportation & Hampton, 2015). The primary focus of FAA's policies at the Chicago Fire was to prevent threats from the outside; it was not adequately designed in order to avoid insider threats (United States Department of Transportation & Hampton, 2015). Many policies are written to protect infrastructure from the outside coming in. However, employees can be the most significant vulnerability as they typically have more access and privileges than outsiders. Insiders who become disgruntled, like the FAA contracted employee, have been found to exploit gaps in existing policy to harm the organizations' infrastructure (Saxena et al., 2020). The effects an insider threat can cause are apparent in the Chicago Fire situation.

Since the contractor slashed the FTI's that the FAA relied so heavily on for communication and planes were in orbit around the facility, the existing EAP was tested again to ground the aircrafts. Not only were the communication lines down, but the building had been evacuated due to the fire (Hirschman, 2014). The existing EAP was up to date with all FAA policies and regulations during the Chicago Fire. However, it did not have a contingency plan to transfer communication to other FAA facilities (United States Department of Transportation & Hampton, 2015). With the EAP not addressing a strategy to transfer communication to neighboring air traffic control facilities and the facility being evacuated due to a fire, the situation seems to be at a chaotic standstill. Quickly realizing that the existing EAP was not adequate for such a surprise disaster, the Chicago Centers personnel abandoned the current plan and built off the previous 2008 EAP (United States Department of Transportation & Hampton, 2015).

The 2008 EAP was the foundation for transferring airspace responsibilities to neighboring FAA centers; however, the airspace map from 2008 was severely outdated (United States Department of Transportation & Hampton, 2015). Even the previous EAP had failed from a policy standpoint with such an outdated airspace map, as the Pre-Fire EAP met all requirements and did not require an updated map. The conditions were lifted for not having an updated airspace map in 2009 EAP's due to the previous outages not exceeding a few hours (United States Department of Transportation & Hampton, 2015).

When the requirements were uplifted to maintain an airspace map, a Spare Air Route Traffic Control Center (SPARTCC) located in Atlantic City, New Jersey was designated to be used during outages; however, the equipment at the SPARTCC was not compatible during the time of the Chicago Fire due to outdated equipment (United States Department of Transportation

& Hampton, 2015). Uplifting the requirement to maintain an up-to-date airspace map in EAPs and non-compatible equipment at the SPARTCC is an example of not expecting the unexpected.

When the Chicago Center personnel realized that the Airspace map had been so outdated, FAA managers, Controllers, and Technicians began making calls from personal phones and drafting plans to continue the scheduled flights with altered flight maps to surrounding FAA facilities; at the same time, firefighters rushed to extinguish the fire (Hirschman, 2014). These employees showed remarkable resilience by demonstrating leadership, innovation, willingness, and adaptability in a chaotic unexpected environment. The previous 2008 airspace map was extremely outdated due to years of alterations and required significant changes. Within 24 hours of the fire initiating, 220 Controllers from the Chicago facility also willingly drove to surrounding FAA facilities to aid them with the massive increase in workload (Hirschman, 2014). The Chicago TRACON, the control facility for approaching flights, was not affected by the fire; this allowed controllers at neighboring facilities to handwrite flight progress strips and manually call the Chicago TRACON to coordinate an aircraft (United States Department of Transportation & Hampton, 2015). Handwritten processes can be much slower, increase the risk of discrepancies, and cause more delays than most automatic processes. This manual handwritten process took around thirty minutes but continued operations with significant delays (United States Department of Transportation & Hampton, 2015). The controllers' quick thinking and effectiveness allowed the flight contingency until the FTI communication lines could be restored.

The resilience of FAA employees when the fire stopped was not accounted for in the discarded EAP. The damage caused by the fire was massive, with a projected time to recovery of several months (Hirschman, 2014). Once technical experts could reenter the Chicago facility, it

was determined that the damage from the fire was too significant. It would be faster to replace all damaged equipment than to attempt to fix it (Hirschman, 2014).

The damage was vast due to the Chicago Center's fire suppression systems being water-based (United States Department of Transportation & Hampton, 2015). Water-based systems are effective at containing fires but cause significant damage to technical equipment. The use of water-based systems is a prime example of how the EAP policy failed to consider the consequences of the specialized equipment. According to the United States Department of Transportation and Hampton (2015), FAA employees worked with contractors 24 hours a day for 17 days straight to replace the destroyed communication equipment; FAA employees and contractors replaced over ten miles of cables, rerouted communications to neighboring facilities, configured and installed over twenty racks of telecommunication equipment, reestablished 835 telecommunication circuits, and completed an inspection of all of the newly installed equipment to ensure that everything worked accordingly.

When employees at the Chicago facility were faced with a difficult decision to rebuild such a massive amount of equipment, their resourcefulness showed when they restored normal operations in just 17 days instead of the several months estimated in recovery time. The FAA estimated such a rapid restoration of operations at the Chicago Center to cost over five million dollars (United States Department of Transportation & Hampton, 2015). The same day that operations were restored to normal, the Chicago Center handled over six thousand aircraft (Hirschman, 2014), demonstrating the perseverance and significance of all parties involved.

Another remarkable example of the Chicago Center's employees' adaptability and resilience is that they were not fully trained on the pre-disaster EAP from the start. According to the United States Department of Transportation and Hampton (2015), the requirement for

employees to meet EAP exercises was met at the time of the Chicago Fire. However, the condition was completed in the form of fire drills or tabletop discussions. These fire drills and tabletop discussions were done for the support staff and excluded the air traffic, controller employees. FAA officials believed it was unrealistic to accurately train employees on EAPs in a similar environment to an emergency. Even though FAA employees had not received any beneficial real training exercises that mimicked a natural emergency setting, employees still managed to overcome the hurdles that the Chicago Fire presented.

According to Hirschman (2015), FAA employees developed a newly found gratitude for each other, and camaraderie was formed during the Chicago Fire as employees, managers, technical specialists, and controllers worked side by side better than they ever have. It can be implied that this newly found gratitude and camaraderie may have been gained before the Chicago Fire had employees been trained in EAP during realistic emergency scenarios instead of just a tabletop discussion or fire drill.

### **The Surprise Management Theory**

With employees' resiliency and non-linear thinking, operations were back to normal and were restored in 17 days. When the EAP failed, the people did not. Groups of individuals became surgeon-like, adapting to the chaotic environment effectively and appropriately. The Chicago Fire and the traits these groups of individuals exhibited meet the surprise management theory's principles. The goal of the surprise management theory is to clear any constraints or barriers, react in an anticipated state, and eliminate or reduce any obstacles that stand in the way of completing the desired task (Farazmand, 2009). The Chicago Center staff actions met the goal of the surprise management theory in every aspect. The Chicago Center staff eliminated the obstacle that the pre-disaster EAP faced. The EAP was discarded as it did not anticipate an

insider threat or plan to transfer communication to neighboring flights. The Chicago Staff cleared constraints and barriers of not having a means to transfer communication; the controllers cleared these constraints by handwriting flight progress strips and manually calling the Chicago TRACON to coordinate an aircraft. The Chicago Centers staff reacted in an anticipated state when technical experts predicted rebuilding the damaged equipment would take longer than replacing it.

### **Five Principles of the Surprise Management Theory**

The surprise management theory is comprised of five principles. The first principle is that it requires traits of its experts and managers to exhibit advanced skills, knowledge, and attitudes that are typically not found in standard government routine positions; these experts and managers usually do not function well in routine work, and they thrive in highly dynamic environments (Farazmand, 2009). These leaders are essentially wired to enjoy and excel in what most people would call a chaotic environment. The Chicago Centers controllers, technical experts, and managers displayed those advanced skills, knowledge, and attitudes during the recovery of normal operations when they were found to be working together better than they ever have (Hirschman, 2015). In such a chaotic environment, attitudes could be unpredictable and volatile; those employees effectively communicated with what can be implied various types of individuals and attitudes to recover in a more than timely manner.

The second principle of the surprise management theory is that anything expected, and routine, is not accepted (Farazmand, 2009). The Chicago Centers EAP met this second principle when the Chicago Fire occurred; it was expected and routine to rely on the EAP for guidance. After all, that is why the EAP was developed in the first place. When the Chicago Center employees reviewed the EAP at the time of the fire, they quickly determined that they would not

accept its guidance (United States Department of Transportation & Hampton, 2015). Whether those employees rejected it because it did not have the proper direction to help them during the fire or not, the EAP was ultimately not accepted.

The third principle requires the emergency to be a chaotic and indeed a surprising occurrence (Farazmand, 2009). The Chicago Fire was certainly a surprise, as policymakers did not anticipate the threat of an insider. This is reflected in how the EAP had no solution to transfer communications when the primary and the backup systems were down.

The fourth principle is that the environment must be flexible and constantly altering (Farazmand, 2009). The forever-altering environment is the type that the surprise management leaders thrive in, where ordinary people would not be able to adapt or necessarily handle it constantly. The Chicago Centers environment was highly flexible as employees worked 24 hours a day for 17 days straight to recover normal operations (United States Department of Transportation & Hampton, 2015). Controllers were also flexible as they began driving to neighboring facilities to assist, calling on personal cell phones, handwriting flight progress strips, and altering flights from one facility to another.

The fifth and final principle is that the authority figures must have unrestrained resources consisting of equipment, skills, technologies, tools, etc., and be very disciplined (Farazmand, 2009). The managers at the Chicago Center during the time of the Chicago Fire displayed their available resources when they decided to build the damaged systems from scratch instead of rebuilding them. The managers spent over five million dollars in just 17 days (United States Department of Transportation & Hampton, 2015). This demonstrated great discipline through execution and spending, as it was projected to take months to recover.

Meeting all these surprise management theory principles can be difficult and seem impossible. Finding the right leader to spearhead the surprise management team who meets these principles and personality traits can be crucial to find success. However, the managers of the Chicago Center during the Chicago Fire met all these principles. During a time when all may have seemed lost, and chaos thrived, these managers emerged as surprise managers and critical players in the swift recovery.

### **Surprise Management Strategic Conditions**

According to Farazmand (2009), when an encounter with a surprise meets the five requirements of the surprise management theory, a surprise manager will emerge that meets specific strategic conditions. These strategy conditions comprise four key focuses: loci, foci, who (s), and positions. Loci denotes locations, governance, and organizational level where the crisis is happening or the emphasis is sited; it means the absolute focus of solving or removing and problem-specific, with every target being considered multiple or single (Farazmand, 2009). This Loci was demonstrated by the Chicago Centers managers when their focus was considered at every level and target. The Chicago Center's local level and the targets consist of evacuating the facility, rebuilding damaged systems, and handwriting flight progress strips. The other location is the federal level, with the targets being sending controllers to assist neighboring facilities, transferring flights via personal cell phones to airports to handle the increased volume.

The second of the four key points are Foci. Foci denote the area of focus or strain during the crisis circumstances consisting of social, political, relations, disaster, etc.; this is vital for surprise managers as their focus is dialed in for results, and they do not lose focus on other alternative points for development (Farazmand, 2009). The Chicago Centers managers demonstrated Foci when they first focused on the disaster by evacuating the facility. The second

was the social aspect when they managed to gain the social acceptance of controllers and technical experts to work around the clock willingly to rebuild and continue operations under extreme conditions. The third was the relations aspect when controllers willingly drove to neighboring facilities to help them increase air traffic. The managers protected and may have even improved their relations with other facilities. The managers also focused on social relations during the disaster. They enabled controllers and technical experts to form a new camaraderie and gratitude for each other while working with each other better than they ever have (Hirschman, 2015), which is a true testimony of how effective the Chicago Centers managers were during this crisis.

The third of the four key points is the Who (s). Farazmand (2009) referenced that the Who (s) represents the institutional and individual actors in strategic positions acting accordingly and making critical verdicts. The Who (s) during the Chicago Fire were the firefighters, controllers, technical experts, managers in strategic command positions, and many more not mentioned in this article. Without these key actors, the surprise management theory would not work in the real world. No matter what decisions are made in critical times, they would be imperative without a responsive supporting cast (Farazmand, 2009). This is all the more reason why these actors involved should receive specific surprise management training to ensure that when this does occur in the real world as it did in the Chicago Fire, the best results can be achieved.

The last of the four key points are positions. Positioning refers to the strategic repositioning and positioning of key actors; this is a dynamic surprise management function that requires constantly adapting (Farazmand, 2009). The Chicago Centers managers displayed the critical point of positioning when they positioned controllers to neighboring facilities and

brought in the proper technical experts to assist in rebuilding the damaged systems. This was proven when the Chicago Center spent over 300 thousand dollars on travel during the 17 days (United States Department of Transportation & Hampton, 2015). The managers also assigned vital technical experts and controllers to function without tripping over each other to recover in such a brief period. Had managers who did not have these positioning traits position employees, they could have had too many employees in one location at a time. This could have caused a delay or impeded the progression towards recovering operations due to the sheer volume of personnel and differing personalities.

The Chicago Centers displayed excellent surprise management in practice without proper training. During this surprise disaster, the Chicago Centers staff's resilience is unparalleled and should not be viewed as typical. It should not have taken a disaster for the EAP to have been discarded and revamped. Organizations need to review and train employees on proper EAP deployments. The Chicago Center's swift recovery to normal operations should be considered lucky as their employees lacked effective training. After reviewing what occurred during the Chicago Fire and the surprise management theory, organizations should seek effective training in the form of surprise management to help build resilience and gauge where their employees stand when faced with a genuine surprise disaster.

### **Surprise Management Training**

For surprise management theory to be effective in the form of real-world training, the surprise management theory principles need to be identified, and numerous additional requirements need to be met to ensure success. These requirements consist of a mindset rewiring where emergency crisis and response situations far from routine are viewed as experiences to train surprise management teams (Farazmand, 2009). This could be difficult for organizations

concerned with the financial, personal, resources, and other losses that occur during/after an emergency response situation.

In a study conducted by Weick (1995), it was found that managers often think linearly when approaching problem-solving, which limits their mindset and can be a costly mistake when experiencing an unexpected problem. To manage unforeseen situations, managers need to get away from linear thinking and think strategically to improve their problem-solving skills (Weick & Sutcliffe, 2011). By focusing on non-linear thinking training, employees may begin to develop a new approach to problem-solving. The second requirement is that resources are required, such as tools, equipment, knowledge, skills, traits, and others (Farazmand, 2009). These resources may be costly; however, depending on how employees respond to a genuine surprise disaster, the repercussions could far exceed the cost of training resources. The third requirement is that leaders and managers must undergo rigorous, high stressful, and specialized surprise training that presents situations that appear to be impossible (Farazmand, 2009). Undergoing training that meets those specifications equips managers and leaders to expand their critical thinking skills and make impossible situations possible. The final requirement is that authority figures must be self-sufficient towards performance to be able to have laser focus on crises, the ability to reposition role players and critical assets in a dynamic function, communicate with organizational levels and locations, and finally be able to communicate with officials to determine critical decisions with a focus surprise management strategic condition (Farazmand, 2009). These requirements may be needed to achieve superior results. The standard presentation, lecture or annual briefing may no longer be effective when an organization's back is up against the wall due to a surprise disaster. An investment in employee training is an investment into the organization's future success.

Even when all the requirements are not met for surprise management training, but the surprise is the foundation of the training, positive results may occur. In a study conducted by Landman et al. (2020), pilots were given scenarios in a flight simulator with non-linear model solutions; the pilots were divided into an experimental and a control group. The Experimental group received training on relaxing, reviewing the entire scenario, analyzing the issues, and executing a course of action during a surprise scenario. Pilots in both groups had similar flight hours, age, and years employed as a pilot. After the experimental group received training, both groups were attached to simulators and given surprise and startling scenarios. The experimental group trained before the simulations significantly outscored the control group in decision-making, demonstrating that participants can dramatically improve their performance when the focus of training is on decision-making during a surprise and startling events.

The study conducted by Landman et al. (2020) met three of the four requirements for surprise management training. The first requirement met was non-linear thinking (Farazmand, 2009) by presenting the pilots with surprise and startling crises to learn and improve. The second was the requirement of resources (Farazmand, 2009), which was met with simulators and the knowledge and skill that went into developing them. The third requirement was the rigorous and high-stressful events (Farazmand, 2009), which was met when pilots were presented with surprising and startling events at a moment's notice. The only requirement that was not met was the repositioning of characters as pilots were not tasked with reassigning key actors.

With training that focuses on decision-making during surprises showing positive results (Landman et al., 2020), it could be implied that training designed explicitly around every aspect of the surprise management theory may produce better results as surprise management focuses on many more strategic dynamics. Those strategic dynamics consist of loci, foci, who (s), and

positions (Farazmand, 2009). Training managers on those four strategic dynamics and the other surprise management theory principles may significantly improve their decision-making skills when faced with a surprise crisis.

## **Discussion**

When EAPs fail to consider all the possibilities that may occur, people are relied upon to adapt and overcome whatever surprise crisis occurs. The Chicago Centers EAP was unable to consider the realization of an attack coming from an insider. Insider threats are currently on the rise and present the greatest danger to government and civilian infrastructure (Saxena et al., 2020). It will be critical for FAA, other government agencies, and non-government agencies to develop security policies to protect themselves from insider threats. At the same time, if these newly created policies are too strict and unfair, the policies themselves may lead employees to become disgruntled, leading to insider threats (Saxena et al., 2020). A fair and adequate policy is needed to balance employees and requirements.

When the Chicago Fire occurred, managers realized that the existing EAP was inadequate and quickly discarded it. The Chicago Center relied on its managers and employees to overcome the crisis. Managers unknowingly responded to the situation using the surprise management theory. The managers met all five of the requirements for the surprise management theory, and normal operations were recovered in 17 days. This proves the effectiveness of the surprise management theory in practice. The managers and employees showed incredible resilience even though they were not adequately trained on the pre-disaster EAP or the surprise management theory.

Organizations should not rely on employees to overcome surprise disasters if those employees are not adequately trained. With the Chicago Centers manager and employees

demonstrating remarkable resilience and swift recovery following the surprise management theory, it can be implied that training in the form of surprise management may be practical. Training that focuses on decision-making during surprise scenarios is effective (Landman et al., 2020). By applying the surprise management theory in its entirety, managers may build greater resilience, and effective surprise managers like the Chicago Centers managers may be created.

### **Limitations**

The limitations of this study were that the effectiveness of surprise management theory through training was not tested. Due to time constraints, the authors could not create surprise management theory training material to test. The surprise management theory may have training available, but to the best of the author's knowledge, it does not.

### **Recommendations**

It can be recommended that future research be done to test the effectiveness of surprise management theory training on managers. Researching the effectiveness of surprise management theory through training will determine if organizations can tailor their EAP training to fit surprise management requirements to build resilience and enhance decision-making during surprise occurrences. These findings may help improve the creation of EAPs and their policies. Research could also be done to determine the effectiveness of surprise management training on ordinary employees as one of the requirements of surprise management is to have a solid supporting staff. These findings may improve training and development for EAPs.

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