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Evaluating effective methods of engaging school-leavers in adopting safety behaviors

Ian Lambie *, Charlotte Best, Hugh Tran, Julia Ioane, Matt Shepherd

School of Psychology, University of Auckland, Private Bag 92019, Auckland 1142, New Zealand

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ABSTRACT

While young adults aged between 18 and 24 years make up a significant proportion of those involved in unsafe fire behavior, research into this group is sparse. This study aimed to gain insight from university students (aged 17–24 years) into the problem of unsafe fire behavior and use among young adults, as well as the best ways to engage this group in safe fire behavior, as reported by young adults. Questionnaires were distributed to students at two New Zealand universities. Although some differences were found between those participants who did and did not engage in unsafe fire behavior, the two groups were overall similar. Therefore, campaigns targeted at young adults generally will likely be most successful. Suggestions from young adults for ways to better engage young adults in safe fire behavior included more and better education on fire safety, campaigns highlighting the negative consequences of fire, use of victims of fire in campaigns, campaigns specifically targeted at the young adult population and utilising TV advertisements and Facebook as mediums. The findings of this study will be useful in future campaign development targeting this age group.

1. Introduction

In the United States in 2014, a fire department responded to a fire every 24 s [20]. In the same year in the United States 1,298,000 fires were reported, causing 3275 deaths, 15,775 injuries and $11.6 billion in property damage. To put that in context, one civilian death occurred every two hours and 41 min and one civilian injury occurred every 33 min as the result of fire. In Britain, in the year 2012–2013, Fire and Rescue Authorities attended 192,600 fires [11], and in New Zealand, in the year 2012–2013 the New Zealand Fire Service responded to 70,907 emergency incidents, 66% of which were fire related [33]. A considerable number of these fires occur in residential locations with approximately 80% of all fire-related fatalities in the United States [20], and three quarters of all fire-related fatalities in Britain, occurring in residences [11]. One residential fire reportedly occurs every 85 s in the United States [20]. Prevalence is likely even higher due to considerable under-reporting of fire incidents [16]. Research from the United States estimates that only 3.4% of all fire incidents are attended to by fire departments, leaving an estimated 7.1 million fire incidents going unreported each year [16].

Both nationally and internationally, there has been some success in reducing fire incidence. In the period of 2003–2013, New Zealand saw a 30% reduction in the number of avoidable residential fire fatalities per 100,000 head of population [33]. Fire statistics from the [11] in Britain note a reduction in fire fatalities of 39% since the year 2003–2004, and of 5% since the year 2012–2013. Furthermore, the United States experienced a 5% reduction in home structure fire deaths in 2011 when compared to 2010 [1]. Even with these improvements however, the rate of fire incidence remains alarmingly high. Despite the large reduction in fire fatalities in New Zealand, the same cannot be said for fire injuries which were only reduced by 14% between 2003 and 2013 [33]. It is clear that this problem is far from 'resolved' and efforts must continue to attempt to most effectively address this problem.

Fire fatality has been the key focus of data in the area of fire research. This has resulted in a focus on two main groups considered "most at risk" – the under 5's and the over 50's [14,17,45]. The National Fire Protection Association, in their 2003 to 2007 fire department experience survey, found that children aged younger than 5 years were 1.5 times more likely than the general public to die in a residential fire [14]. In addition, those aged between 50 and 64 years were reportedly 1.4 times more likely to die in a residential fire than the general public and those over 75 were three times more likely than the general public to die in a residential fire [1,14]. As a result of such findings, research efforts and campaign developments to date have focused largely on these two groups. However,

* Corresponding author.
E-mail addresses: i.lambie@auckland.ac.nz (I. Lambie), cbes009@aucklanduni.ac.nz (C. Best), htra031@aucklanduni.ac.nz (H. Tran), julia.ioane@hotmail.co.nz (J. Ioane), m.shepherd@auckland.ac.nz (M. Shepherd).

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these are not the only two groups who are at risk. It is important that the method of data collection does not hone our focus to the exclusion of other at risk groups.

There is evidence to suggest that young adults are also an "at risk" group regarding fire and fire-related behavior. Data from the United States Fire Administration's National Fire Incident Reporting System between 2007 and 2009, suggests that an estimated 3800 university housing[1] fires occur each year and on average 10 students die each year as a consequence of campus-related fires [44]. Further [40,41], report that since the year 2000, 87 fatal fires have been recorded on college campuses killing 123 people. Approximately 85% of these fires occurred in off-campus student housing killing 105 people.

Further, when the focus of research is on non-fatal fire-related injuries, it is actually young adults who are identified as most at risk [14,34]. Flynn [14] has reported that individuals aged between 20 and 49 years are most at risk for non-fatal fire injury, and those aged between 20 and 24 years are 1.3 times more likely than the general public to be injured in a residential fire. This age group are also 50% more likely to be injured in a cooking incident than the general public [14]. Very little research however has to date focused specifically on this target group. This is the aim of the present study.

1.1. Young adults and fire – what is the relationship?

Young adults are often characterised as impulsive, reckless and self-absorbed [15]. This can and often does lead to risky and dangerous behavior. The Center for Disease Control's 1995 National College Health Risk Behavior Survey provided clear evidence of this with a considerable number of college students reportedly engaging in a variety of risk behaviors. Approximately one third (28.8%) of college students aged 18–24 years were cigarette users and 41.5% reported episodic heavy drinking. In addition, 27.8% reported drinking and driving in the 30 days preceding the survey and 38.9% reported they had been in a car with a driver who had been drinking. Further, only 37.7% of students had used a condom in their most recent act of sexual intercourse in the three months preceding the survey demonstrating risky sexual behavior. When paired with fire, this propensity for risk taking behavior can have results that are both serious and long-lasting.

During adolescence, considerable brain change and development occurs. The prefrontal cortex (responsible for executive function, including coordination of thoughts and behaviors, response inhibition and self-regulation) is known to continue developing through adolescence and well into the 20s [28,38,39]. Young adults as old as 25 years old have been shown to still be developing impulse control, regulation of aggression, future orientation, personal responsibility, peer influence and consideration for the feelings and perspectives of others [28].

Risk taking behavior of young adults is also greatly influenced by their peers, more so even than parental norms and influences, gender and religion [25,35]. Additionally, young adults and subsequent risk taking behavior appear to be heavily influenced by misperceptions of their peers' behaviors and beliefs. Research has found that university students in particular have a tendency to overestimate their peers' involvement in, and acceptance of, risky behaviors such as drink-driving, heavy alcohol consumption, smoking and unsafe sex [3,21,24]. Lewis et al. [24] observed both overestimation of peer norms for risky behavior and underestimation of peer norms for protective behaviors. Concerningly, these misperceptions also have predictive power for students' future behavior [3,8,21,32].

It therefore should not be surprising that young adults are at times inclined to use fire, a known risky activity, in a more irresponsible and unsafe manner than others, for example, lighting couches on fire near residential properties and removing dying batteries from smoke alarms instead of replacing them. Further, interactions between young adults and other general fire related risk factors may also help to explain this relationship. It is important to note however that research on these related risk factors is largely taken from adult populations and so caution should be taken when considering this relationship.

A relationship between living in rented accommodation and an increased likelihood of fire incidence, fire fatalities and fire related injuries has been found throughout the literature [12,16]. This is potentially due to the differing levels of investment and consequent commitment to fire safety that home owners and renters have in property [12,16]. Young adults, particularly those who are attending university (although not exclusively), rarely own the residences they live in, often choosing to rent accommodation throughout their studies. "Crowdedness" of housing has also been found to be a contributing factor in dwelling fires with larger households typically experiencing more fire incidents than do smaller ones, and as the number of people in a household increases, so too does the incidence of fire [16,19]. Young adults who live in flats also often live with multiple people.

Young adults also often engage in a number of behaviors that can increase the likelihood of fire-related harm. Alcohol and (to a lesser extent) drug use have been found to be major contributing factors to fire-related injuries and deaths in the general public [13]. Alcohol also appears to play a key role in the incidence of fire-related burns and this appears to be rising [6,18,27]. One study found that those with a positive blood-alcohol concentration test were less likely than those who were sober to have had a condition preventing their escape from fire [6]. Alcohol use is a well recognized feature of university culture, both nationally and internationally, and alcohol consumption levels in this context have been found to be well in excess of recommended limits [43].

Smoking has also consistently been linked with the incidence of fire throughout the literature [5,18,31,36], and has been found to be the primary cause of unintentional fatal fires [5]. Smoking materials (including cigarettes, cigars or tobacco) have been found to be the cause of almost half of all fatal unintentional dwelling fires [18]. In their examination of the five most common sources of ignition in fatal fire injuries in England [31], found that smoking materials had the highest fatal fire injury rates for both males and females over the age of 14 years (15–59 years). Despite a public push to reduce smoking, it continues to be relatively common among young adults [7]. Approximately half of those young adults who report smoking consider themselves to be "social smokers", engaging in smoking only in certain social contexts [2,29].

There may also be a connection between alcohol use and smoking [5]. reported that, of the victims of fatal fire incidents who had high alcohol readings, 70% of the fires were started by cigarettes. When considering the 65 adults in the study, there were only 2 instances of fire being started by cigarettes where alcohol use was absent. This connection may be particularly relevant in light of the social nature of smoking for many young adults as social smoking is strongly associated with alcohol use [29].

Despite it not being the focus of the literature to date, support can still be found for the proposition that young adults are an at risk group when it comes to fire and fire-related behavior. Further examination of this group and of fire-related risk research separately suggests this relationship should not actually be surprising. The present study aims to investigate this under-researched population in order to gain unique insight into the relationship between young adults and unsafe fire behavior and in turn into the best way to address this moving forward. This is the first study to utilize this target population as its focus.

2. Method

Following approval and commission from the New Zealand Fire Service to undertake this study, ethical approval was granted by the University of Auckland Human Subjects Ethics Committee (No. 012651).

Data was collected as part of a wider project commissioned by the New Zealand Fire Service. The data in this study is one subset of the

[1] University housing is taken to include college and university residential buildings, dormitories and sorority and fraternity houses.