

Paper Presented at the Third International Conference on Fire Safety,
The University of San Francisco, San Francisco, California

CULTURAL VARIATIONS IN THE BEHAVIOR OF PEOPLE
IN FIRE SITUATIONS

BY

Dr. John L. Bryan, Professor and Chairman
Department of Fire Protection Engineering
University of Maryland
College Park, Maryland 20742

January 16, 1978

I. INTRODUCTION

This paper is a summary and examination of one portion of a research study report, which is available from the Center for Fire Research at the National Bureau of Standards under the following title and identification: Smoke as a Determinant of Human Behavior in Fire Situations (Project People), NBS-GCR-77-94, June 30, 1977. The research study was initiated in September, 1974, and completed on June 30, 1977 with financial support from the Department of Commerce, National Bureau of Standards under Grant No. 4-9027. The study involved the interviewing of 584 participants in 335 fire situations, at the scene of the fire by fire department personnel. This study would not have been possible without the sincere, dedicated and valuable assistance of the following members of the Fire Service Advisory Committee, representing the participating jurisdictions.

James M. Jones, Lieutenant, City of Annapolis, Maryland Fire Department.

Bruce W. Hisley, Division Chief, and Frank Homberg, Jr. Captain,
Fire Prevention, Anne Arundel County, Maryland Fire Department.

Frank Little, Battalion Chief, and Lyman H. Howe, Lieutenant,
Investigation, Baltimore, Maryland Fire Department.

Stephen R. Kearney, Captain, Fire Prevention, Baltimore County,
Maryland, Fire Department.

William P. Wheeler, Sergeant, College Park, Maryland Volunteer Fire
Department.

Charles P. Dismuke, Chief Fire Marshal, and James A. Milke, Fire
Protection Engineer, Fairfax County, Virginia Fire Department.

Richard W. Shaw, Deputy Fire Administrator, and Martin J. Lepore, Sergeant,
Howard County, Maryland Fire Department.

Walter A. Wise, Captain and Earle B. Poole, Lieutenant, Fire Prevention,
Montgomery County, Maryland Fire and Rescue Service.

David T. Endicott, Education Specialist, Prince William County, Virginia
Fire Department.

II. THE COMPARISONS WITH ASPECTS OF THE BRITISH 1972 STUDY

This study conducted in the urban area of Baltimore, Maryland, and the surrounding suburban Maryland and Virginia communities was patterned after the study completed by Wood, (14) in England in 1972. As previously reported, Wood participated in the design and planning for this study, primarily in relation to the development of the questionnaires for use by the fire department officials. This paper will attempt to provide meaningful comparisons of these study results with the results of Wood's previous study.

A. Comparison of the Fire Incident Variables.

The variables related to the fire incident were compared between both studies. The variables of; Building Occupancy for the Fire Incidents, The Time of the Fire Incident, The Floor of Origin of the Fire Incident, and The Area of Smoke Spread in the Fire Incident Building, were all compared.

1. Comparison of the Occupancy of Buildings.

The occupancies of the buildings involved in both studies relative to the occurrence of the fire incidents is presented in Table I. An examination of the rank order of the British occupancies involved dwellings, factories, shops, and apartments. While the four most frequent occupancies for the Project People study consisted of dwellings, apartments, restaurants, schools and hotels. An examination of Table I indicated there were significant differences between the number of buildings in both studies relative to the British study having a greater percentage of factories, shops, and garages. While the greater percentage of dwellings, and

TABLE I
COMPARISON OF OCCUPANCY OF BUILDINGS

Occupancy	British Per Cent	U.S. Per Cent	$P_1 - P_2$	$SE_{P_1 - P_2}$	CR
Dwelling	50.6	63.6	13.0	3.19	<u>4.08**</u>
Apartments	6.4	20.9	14.5	1.94	<u>7.47**</u>
Factory	16.7	0.6	16.1	2.12	<u>7.59**</u>
School	0.7	1.5	0.8	0.60	1.33
Hotel	1.8	1.5	0.3	0.83	0.36
College	0.3	0.9	0.6	0.45	1.33
Office	0.6	0.9	0.3	0.53	0.57
Hospital	1.3	0.6	0.7	0.66	1.06
Restaurant	1.2	2.0	0.8	0.75	1.07
Shop	7.2	1.2	6.0	1.47	<u>4.08**</u>
Club	1.4	0.6	0.8	0.70	1.14
Garage	1.9	0.3	1.6	0.78	<u>2.05*</u>
	952	335			

* Critical Ratio significant at or above the 5 per cent level of confidence.
**Critical Ratios significant at or above the 1 per cent level of confidence.

apartments in the Project People study was also a statistically significant difference. All of these differences were statistically significant at the 1 per cent level of confidence with the exception of the difference in the percentage of garages in the British study which was significant at the 5 per cent level of confidence. Thus, it appeared the British study obtained more fire incidents from the nonresidential type of occupancy primarily the factories, shops and garages. It should be remembered the Project People study included only two manufacturing plants, two stores, and one service station.

2. Comparison of The Time Distribution for The Fire Incidents.

The time distribution of the 952 fire incidents in the British study and the 335 fire incidents in the Project People study are presented in Table II. It may be observed the rank order relationship of the time periods for both studies are similar, with the greatest percentage of incidents in the 1200 to 1800 time period, the second greatest percentage of incidents occurred during the 1800 to 2300 time period. The third greatest fire incident period for both studies was the 0600 to 1200 time period, and the time period with the lowest frequency of fire incidents was the 2300 to 0600 time period. The classification of the times of the fire incidents in Table II was presented with the four time periods, since this was the format utilized in Wood's (14) study. It should be noted the only significant difference relative to the percentage of fire incidents in any of the time periods, was the indication that only 14 per cent of the British fire incidents occurred between 2300 and 0600 while 21.4 per cent of the fire incidents in the Project People study occurred during this same early morning period.

TABLE II
COMPARISON OF THE TIME OF INCIDENT

Time of Incident	British Per Cent	U.S. Per Cent	$P_1 - P_2$	$SE_{P_1 - P_2}$	CR
0600 - 1200	22.4	23.0	0.6	2.68	0.22
1200 - 1800	38.2	33.8	4.4	3.09	1.42
1800 - 2300	25.4	21.8	3.6	2.75	1.31
2300 - 0600	14.0	21.4	7.4	2.34	<u>3.16**</u>
	952	335			

**Critical Ratio significant at or above the 1 per cent level of confidence.

3. Comparison of the Floor of Origin of the Fire Incident.

The floor of fire origin for the fire incidents relative to the 952 fire incidents in the British study and the 335 fire incidents in the Project People study were compared and analyzed in Table III. The classification of the floor of origin shown in this table is the classification procedure utilized in Wood's (14) study. Upon examination of Table III it is apparent the rank order of the floor of fire origin is similar for both studies with the exception of the origin of the fire incidents in the basements in the Project People study. The percentages of the fire incidents relative to the floors of fire origin differed in a statistically significant manner relative to the British study containing 64 per cent of their fire incidents originating on the first floor as contrasted with 45.1 per cent of the fire incidents in the Project People study originating on the first floor. This difference was significant above the 1 per cent level of confidence. Another significant difference involved the 15.8 per cent of the fires originating in basements in the Project People study as opposed to only 3 per cent of the British fires in the basements. The final significant difference was the difference between 22 per cent of the British fire incidents originating on the second floor as contrasted with 28.1 per cent of the fire incidents in the Project People study. This difference as shown in Table III was significant at the 5 per cent level of confidence.

4. Comparison of the Area of Smoke Spread in the Fire Incident Building.

TABLE III
 COMPARISON OF THE FLOOR OF
 ORIGIN OF THE FIRE INCIDENT

Floor	British Per Cent	U.S. Per Cent	$P_1 - P_2$	$SE_{P_1-P_2}$	CR
Basement	3.0	15.8	12.8	1.56	<u>8.21**</u>
1	64.0	45.1	18.9	3.15	<u>6.00**</u>
2	22.0	28.1	6.1	2.72	<u>2.24*</u>
3	5.0	5.4	0.4	1.41	0.28
Other	6.0	5.6	0.4	1.50	0.27
	952	335			

* Critical Ratio significant at or above the 5 per cent level of confidence.
 **Critical Ratios significant at or above the 1 per cent level of confidence.

The percentage of fire incidents involving smoke spread for both this study and the British study are presented in Table IV . It is apparent from examination of this table the percentage of fire incidents with smoke spread in the various categories of none, room, floor of origin, and other floors were all significant differences at either the 1 or the 5 per cent level of confidence. It is of interest to note the British study included a greater percentage of the fire incidents with no smoke spread, and incidents with the smoke spread confined to the room. While the Project People study indicated a greater percentage of incidents with smoke spread on the floor of origin and to other floors of the fire incident building. All of these differences were statistically significant to the 1 per cent level of confidence, with the exception of smoke spread to other floors which was significant at the 5 per cent level of confidence.

B. Comparison of The Participant Populations.

The participant population of Wood's (14) study consisted of 2193 individuals, 954 females or 43.4 per cent of the population, and 1239 males for 56.5 per cent of the population. Thus, this British study consisted of a total of 952 fire incidents, with a participant population of 2193 individuals. The Project People study consisted of a total of 335 fire incidents and 584 participants.

1. Comparison of The Sexual Distributions of The Participants.

The sexual distribution of the two participant populations are presented in Table V . It should be observed, the British study had a male dominated population while the Project People study possessed a female dominated population. This table presents the comparison of the female and male populations for both studies, and it is apparent the differences

TABLE IV
COMPARISON OF SMOKE SPREAD

Area	British Per Cent	U.S. Per Cent	$P_1 - P_2$	$SE_{P_1 - P_2}$	CR
None	12.0	6.0	6.0	1.99	<u>3.02</u> **
Room	33.0	14.8	18.2	2.92	<u>6.23</u> **
Floor of Origin	28.0	43.7	15.7	3.02	<u>5.20</u> **
Other Floors	27.0	35.5	8.5	2.94	<u>2.89</u> **
	952	318			

**Critical Ratios significant at or above the 1 per cent level of confidence.

in the percentages of participants of both sexes are statistically significant differences indicated above the 1 per cent level of confidence. It should be noted the differences in the male and female populations for both studies are almost identical, being 11.4 per cent for the females, and 11.3 per cent for the male members of the populations. As originally presented in Table XXIV on page 65 of the study report, (3) the Project People study had 319 female participants for 54.8 per cent of the participant population, and 263 males for 45.2 per cent of the participant population, with two participants that were not identified as to their sexual characteristics. Thus, the Project People study was predominately female with 54.8 per cent of the total participant population, while the British study was predominately male with 56.5 per cent of their participant population.

2. Comparison of The Ages of The Participant Populations.

The age distribution of the British and the Project People studies are presented in Table VI. The classifications utilized in this table are the age classifications utilized in Wood's (14) report. The age data presented in the study report (3), in Table XXV on page 67, was recomputed to prepare Table VI. It is obvious, age data was only available for 534 or 91.4 per cent of the total Project People participant population. The examination of Table VI indicates there were statistically significant differences in the percentages of the populations in two age brackets, the 20-29 year olds and the 40-49 year olds. Both of these differences were significant above the 1 per cent level of confidence. The difference in the 20-29 year old subpopulations involved a greater percentage of the Project People population, with a difference of 8.3 per cent between the two study populations. While the difference in the 40-49 year olds, involved

TABLE V
 COMPARISON OF THE PARTICIPANT
 POPULATIONS RELATIVE TO SEXUAL DISTRIBUTION

Sex	British		U.S.		P_1-P_2	$SE_{P_1-P_2}$	CR
	Participants	Per Cent	Participant	Per Cent			
Female	954	43.4	319	54.8	11.4	2.54	<u>4.49**</u>
Male	1239	56.5	263	45.2	11.3	2.58	<u>4.38**</u>
		2193		582			

$$X^2 = 23.6***$$

** Critical Ratio significant at or above the 1 per cent level of confidence.
 ***Chi-Square significant at or above the 1 per cent level of confidence.

TABLE VI
 COMPARISON OF THE PARTICIPANT
 POPULATIONS RELATIVE TO AGE DISTRIBUTION

Age	British Per Cent	U.S. Per Cent	$P_1 - P_2$	$SE_{P_1-P_2}$	CR
< 9	1.0	1.3	0.3	0.51	0.59
10 - 19	10.0	12.2	2.2	1.50	1.47
20 - 29	22.0	30.3	8.3	2.08	<u>3.99**</u>
30 - 39	23.0	21.7	1.3	2.05	0.63
40 - 49	21.0	15.4	5.6	1.97	<u>2.84**</u>
50 - 59	13.0	11.0	2.0	1.63	1.23
60 - 69	6.0	4.7	1.3	1.14	1.14
70 - 79	2.0	2.4	0.4	0.70	0.57
80 - 89	1.5	0.8	0.7	0.58	1.21
90 - 99	0.5	0.2	0.3	0.31	0.97
	2193	534			

**Critical Ratios significant at or above the 1 per cent level of confidence.

a greater percentage of the British population, 21.0 per cent, as opposed to the Project People 15.4 per cent, for a difference between the two study populations of 5.6 per cent. The other age difference between the two study populations varied from .3 per cent to 2.2 per cent, and none of these differences were statistically significant.

Thus, it would appear the British participant population contained more male participants, and was slightly older than the Project People participant population. While the Project People populations tended to be slightly younger, and included more female members in the participant population.

3. Comparison of The Participant Populations Relative to The Means of Awareness of The Fire Incident.

Table VII presents the comparison of the means of awareness, which alerted the members of the participant populations to the occurrence of the fire incident in both studies. The classification of the means of awareness was adopted from the British study. It should be noted this table reduced the means of awareness from the eleven classifications previously presented in the study report (3), for the Project People populations to the seven classifications for both populations. Thus the means of awareness for the Project People population were computed and reclassified for comparison within the classification of the means of awareness for the British study.

Examination of Table VII indicates the means of awareness of the two populations are generally similar, with the exception of the British classification of "Flame", which for the purposes of this comparison included the Project People classification of, "Saw Fire." The British population had 15 per cent of the participants alerted to the fire incident by the, "flame," while 8.1 per cent of the Project People population were

TABLE VII
 COMPARISON OF THE PARTICIPANT POPULATIONS
 RELATIVE THE MEANS OF AWARENESS OF THE FIRE INCIDENT

Means of Awareness	British Per Cent	U.S. Per Cent	$P_1 - P_2$	$SE_{P_1 - P_2}$	CR
Flame	15.0	8.1	6.9	1.64	4.21**
Smoke	34.0	35.1	1.1	2.27	0.48
Noises	9.0	11.2	2.2	1.41	1.56
Shouts & Told	33.0	34.7	2.7	2.25	1.20
Alarm	7.0	7.4	0.4	1.23	0.33
Other	2.0	2.8	0.8	0.70	1.14
	2193	569			

** Critical Ratio significant at or above the 1 per cent level of confidence.

alerted by the sight of the flames. This difference of 6.9 per cent in the percentages of the two populations was statistically significant above the 1 per cent level of confidence. The other differences in the means of awareness of the two populations varied from .4 per cent to 2.7 per cent and were not statistically significant differences at the 5 or 1 per cent levels of confidence. It should be observed most of the participants in both populations were alerted to the fire incident by the occurrence of smoke or by the notification of other participants.

C. Comparison of The Actions of The Participant Populations.

The first, second, and third actions of the participants from both studies were compared to determine any significant differences in the percentages of the populations participating in the various actions. The comparison of the actions was accomplished utilizing the intent of the meaning of the description of the action, even though there was slightly different wording utilized in the two studies. Additionally, some of the categories were not compared due to a complete absence of cases in one of the populations. The classifications of "telephoned others - relatives", "went to the fire alarm", "woke up", and "check on pets" from the Project People study, and the classifications of, "minimise risk", "organise evacuation", "request help from others", "give help to others", and "cover face with wet towel etc.", from the British study.

The British study included the classification, "Some fire fighting action", thus, the Project People study action classifications of "got extinguisher" and "tried to extinguish" were combined with the action

of "fought fire", to provide an equivalent classification. An example of classifications that were considered to be equivalent, even though differences in wording occurred, was the Project People classification of "notified others" considered to be equivalent to the British action of "warn other people".

1. Comparison of The Participant Populations Relative to Their First Actions.

The two participant populations were compared on a total of seventeen first actions which appeared to be comparable, from the total of twenty-nine first actions listed for the British population, and twenty-five first action classifications for the Project People participant population.

Table VIII presents the comparison of the first actions for both the Project People and the British participant populations, utilizing eighteen of the Project People action classifications. An examination of this table indicates ten significant differences in the participants from the two populations, relative to the first actions, with eight of the differences significant above the 1 per cent level of confidence, and two of the differences significant above the 5 per cent level of confidence.

Relative to these differences in the first actions, the British participants had a higher percentage of utilization of the following first actions than did the Project People participants: "fought fire," "went to fire area", "closed door to fire area", "pulled fire alarm", "turned off appliances". The Project People participants had a higher percentage of participants than the British population in the utilization of the following

TABLE VIII
 COMPARISON OF THE FIRST ACTIONS
 OF THE PARTICIPANT POPULATIONS

Actions	British Per Cent	U.S. Per Cent	P_1-P_2	$SE_{P_1-P_2}$	CR
Notified Others	8.1	15.0	6.9	1.38	5.00**
Searched for Fire	12.2	10.1	2.1	1.51	1.39
Called Fire Dept.	10.1	9.0	1.1	1.40	0.79
Got Dressed	2.2	8.1	5.9	0.85	6.94**
Left Building	8.0	7.6	0.4	1.27	0.31
Got Family	5.4	7.6	2.2	1.11	1.98*
Fought Fire	14.9	10.4	4.5	1.63	2.76**
Left Area	1.8	4.3	2.5	0.70	3.57**
Nothing	2.1	2.7	0.6	0.69	0.87
Had Others Call F.D.	2.8	2.2	0.6	0.76	0.79
Got Personal Property	1.2	2.1	0.9	0.55	1.64
Went to Fire Area	5.6	2.1	3.5	1.01	3.47**
Removed Fuel	1.2	1.7	0.5	0.53	0.94
Enter Building	0.1	1.6	1.5	0.30	5.00**
Tried to Exit	1.6	1.6	0	0	0
Closed Door to Fire Area	3.1	1.0	2.1	0.76	2.76**
Pulled Fire Alarm	2.7	0.9	1.8	0.70	2.57*
Turned Off Appliances	4.1	0.9	3.2	0.85	3.20**
N = 18	2193	580			

* Critical Ratios significant at or above the 5 per cent level of confidence.

**Critical Ratios significant at or above the 1 per cent level of confidence.

first actions: "Notified Others," "Got Dressed," "Got Family," "Enter Building," and "Left Area." The differences between the two participant populations were significant above the 1 per cent level of confidence for all the significant first actions with the exception of the significant differences in the first actions of "Got Family" and "Pulled Fire Alarm," which were significant above the 5 per cent level of confidence.

2. Comparison of The Participant Populations Relative to Their Second Actions.

The two participant populations were compared relative to their second actions as reported in both studies. There was not an indicated reduction in the size of the British population from the first action to the second action. However, as indicated in the study report (3), the Project People participant population utilizing a second action consisted of 506 participants, a reduction of 74 participants from the first action population. This reduction was the result of the methodology of the Project People study, which did not collect actions from the participants, once the participants had successfully evacuated the building, unless the participant was involved in reentry behavior. An examination of the British study report by Wood (14) indicated no reduction in the number of participants for the first, second, and third actions, while indicating an increase from the first to the third action in the action classification of "nothing," which in the British study was described with the following terminology: "Inaction (watch others, etc.)". Thus, it may be the increase in the percentage of the British participants for the second and third action classification of "nothing" consisting of 14.9 per cent for the second action, and 43.1 percent for the third action,

may be the actions by these participants following their evacuation from the building. Thus, the action following evacuation of the building being included in the British study and excluded from the Project People study provides this difference as primarily a methodological difference in both of these studies.

Table IX presents the comparison of the two participant populations relative to their second actions. It appears that ten of the action classifications have significant differences in the percentages of the participants which utilized the various actions. The British participant population had a higher percentage of utilization of the following second actions: "Fought Fire," "Nothing," "Went to Fire Area," "Enter Building," "Closed Door to Fire Area," and "Turned Off Appliances." Four of these six actions were also actions with a higher percentage of utilization by the British population as first actions, with a significant difference from the Project People population. The only significant differences not present as a first action with a higher percentage of the British population was the action classification of "Enter Building." The Project People participant population had a higher percentage of utilization of the following second actions: "Notified Others," "Called Fire Department," "Left Building," and "Got Family." Two of these actions were also significantly different in the percentage of participants utilizing these actions as first actions. These actions had a greater percentage of the Project People population involved as illustrated previously in Table VIII, and were the "Notified Others," and the "Got Family" actions.

TABLE IX
COMPARISON OF THE SECOND ACTIONS
OF THE PARTICIPANT POPULATIONS

Actions	British Per Cent	U.S. Per Cent	P_1-P_2	$SE_{P_1-P_2}$	CR
Notified Others	3.6	9.6	6.0	1.06	5.66**
Searched For Fire	2.2	2.4	0.2	0.75	0.27
Called Fire Dept.	11.1	14.5	3.4	1.61	2.11*
Got Dressed	0.6	1.8	0.6	0.45	1.33
Left Building	8.8	20.9	12.1	1.57	7.70**
Got Family	3.6	5.9	2.3	0.98	2.34*
Fought Fire	18.3	12.8	5.5	1.89	2.91**
Left Area	2.1	2.8	0.7	0.73	0.96
Nothing	14.9	0	14.9	1.63	9.14**
Had Others Call F.D.	3.3	4.0	0.7	0.91	0.77
Got Personal Property	1.0	1.0	0	0	0
Went To Fire Area	3.2	1.0	2.2	0.82	2.68**
Removed Fuel	1.6	1.0	0.6	0.61	0.98
Enter Building	2.2	0.8	1.4	0.68	2.05*
Tried to Exit	1.3	2.4	1.1	0.61	1.80
Closed Door to Fire Area	4.0	0.2	3.8	0.89	4.26**
Pulled Fire Alarm	1.1	0.6	0.5	0.50	1.00
Turned Off Appliances	2.6	0.6	2.0	0.73	2.73**
N = 18	2193	506			

* Critical Ratios significant at or above the 5 per cent level of confidence.

**Critical Ratios significant at or above the 1 per cent level of confidence.

3. Comparison of The Participant Populations Relative to Their Third Actions.

The participant population for the Project People study relative to third actions consisted of 365 participants, indicated in the study report (3). The third actions of the two populations from the British study and the Project People study are presented for comparison in Table X. It should be noticed the action classifications were increased to twenty-one categories from eighteen to include the additional three classifications from the Project People participant population of, "Await the Fire Department," "Went to Balcony," and "Open Doors-Windows." These classifications were matched for the purposes of the comparisons in this table with the action classifications from Wood's (14) study of, "Await Rescue by Fire Brigade," "Move to a Safe Place (within Building)" and "Something Which Increases The Risk." The classification of "Open Doors-Windows," was included for "something which increases the risk,"¹³ since this was an example of actions included in this classification by Wood.

Examination of Table X indicates there are ten of the twenty-one actions classifications which are statistically significantly different relative to the percentage of utilization by the two participant populations. The British population was statistically significantly higher in their utilization of the following third actions: "Nothing," "Went to Fire Area," "closed Door to Fire Area," and "Turned Off Appliances." The Project People population was statistically significantly higher in the utilization of the following third action classifications: "notified Others," "Called the Fire Department," "Left Building," "Had Others Call Fire Department,"

¹³Peter G. Wood, The Behavior of People in Fires. Borehamwood: British Fire Research Station, Fire Research Note 953, p. 46.

TABLE X
 COMPARISON OF THE THIRD ACTIONS
 OF THE PARTICIPANT POPULATIONS

Actions	British Per Cent	U.S. Per Cent	P_1-P_2	$SE_{P_1-P_2}$	CR
Notified Others	1.1	5.8	4.7	0.75	6.26**
Searched for Fire	0.7	0.8	0.1	0.47	0.21
Called Fire Dept.	8.5	12.7	4.2	1.63	2.57*
Got Dressed	0.2	0.3	0.1	0.25	0.40
Left Building	8.4	35.9	27.5	1.86	14.78**
Got Family	1.5	1.4	0.1	0.69	0.14
Fought Fire	12.4	15.0	2.6	1.88	1.38
Left Area	1.4	1.1	0.3	0.66	0.45
Nothing	43.1	0	43.1	2.73	15.79**
Had Others Call F.D.	2.1	4.1	2.0	0.87	2.30*
Got Personal Property	0.9	0.8	0.1	0.53	0.19
Went to Fire Area	1.2	0	1.2	0.56	2.14*
Removed Fuel	1.2	1.1	0.1	0.62	0.16
Enter Building	2.1	1.1	1.0	0.79	1.27
Tried to Exit	0.3	0.5	0.2	0.31	0.65
Closed Door to Fire Area	2.2	0.3	1.9	0.77	2.46*
Pulled Fire Alarm	0.2	0.5	0.3	0.25	1.20
Turned Off Appliances	1.6	0.3	1.3	0.66	1.97*
Await F.D.	0.5	3.6	3.1	0.53	5.84**
Went to Balcony	1.3	2.7	1.4	0.69	2.02*
Open Doors-Windows	0.8	1.1	0.3	0.50	0.60
N = 21	2193	365			

* Critical Ratios significant at or above the 5 per cent level of confidence.

**Critical Ratios significant at or above the 1 per cent level of confidence.

"Await Fire Department," "Went to Balcony."

It should be noted the action classification of "Fought Fire," did not show a statistically significant difference between the two participant populations as a third action although this action had been a predominate British action significantly different as both a first and second action. The differences between the two participant populations were statistically significant above the 1 per cent level of confidence for the differences in the third action classifications of "Notified Others," "Left Building," "Nothing," and "Await Fire Department." The other significant differences between the third action classifications presented in Table X were significant above the 5 per cent level of confidence.

The continuing significant difference by the first, second and third actions with a higher percentage of utilization by the Project People participants for the classifications of "Notified Others," and "Left Building" should be remembered. The continuation of this significant difference between the two participant populations for all three actions may indicate a cultural difference.

4. Comparison of The Participant Populations Relative to The First Actions of The Participants With Fire Experience.

Table XI presents the comparison of the differences in the percentage of the participants from the British study and the Project People study who had previous experience in a fire incident prior to the fire incident included in the research study. It will be observed that 543 of the British participants, or approximately 24.8 per cent of the total British participant population had previous experience in a fire incident. Considering the Project People participant population,

TABLE XI
COMPARISONS OF THE FIRST ACTIONS OF FIRE EXPERIENCED PARTICIPANTS

Actions	British Per Cent	U.S. Per Cent	P_1-P_2	$SE_{P_1-P_2}$	CR
Notified Others	5.0	14.6	9.6	2.30	<u>4.17**</u>
Searched for Fire	14.0	12.2	1.8	3.05	0.59
Called Fire Department	10.0	9.8	0.2	2.67	0.07
Got Dressed	2.0	11.6	9.6	1.78	<u>5.39**</u>
Left Building	6.0	5.5	0.5	2.09	<u>0.24</u>
Got Family	2.0	6.1	4.1	1.52	<u>2.70**</u>
Fought Fire	19.0	8.4	10.6	3.30	<u>3.21**</u>
Left Area	1.0	3.0	2.0	1.08	1.85
Nothing	1.0	4.2	3.2	1.15	<u>2.78**</u>
Had Others Call F.D.	2.0	1.2	0.8	1.18	0.68
Got Personal Property	1.0	1.2	0.2	0.88	0.23
Went to Fire Area	8.0	3.6	4.4	2.27	1.94
Removed Fuel	1.0	1.2	0.2	0.88	0.23
Enter Building	0	0.6	0.6	0.28	<u>2.14*</u>
Tried to Exit	1.0	1.2	0.2	0.88	0.23
Closed Door to Fire Area	2.0	0.6	1.4	1.15	1.22
Pulled Fire Alarm	5.0	1.2	3.8	1.76	<u>2.16*</u>
Turned Off Appliances	4.0	0.6	3.4	1.56	<u>2.18*</u>
N = 18	543	165			

*Critical ratios significant at or above the 5 per cent level of confidence.

**Critical ratios significant at or above the 1 per cent level of confidence.

165 of the participants had experience in a previous fire incident which was approximately 28.3 per cent of this total participant population.

It should be observed that eight of these first action classifications had significant differences relative to the percentage of participants that participated in the various first actions for the fire experienced participants. The British participants had a higher percentage of utilization with the following first actions: "Fought Fire," "Pulled Fire Alarm," and "Turned Off Appliances." The Project People participants with fire experience had a higher percentage of utilization of the following first actions: "Notified Others," "Got Dressed," "Got Family," "Nothing," and "Enter Building." These differences in the percentage of participants relative to the first action classifications were statistically significant above the 1 per cent level of confidence with the exception of the following actions which were significant above the 5 per cent level of confidence: "Enter Building," "Pulled Fire Alarm," and "Turned Off Appliance." There were no significant differences in the first action utilization by the members of the Project People population with and without previous fire experience. It should also be remembered from the comparison of the first actions of the total participant populations from both studies, previously presented in Table VIII, all of these first actions were also statistically significantly different with the exception of the first action classification of "Nothing."

5. Comparison of the Participant Populations Relative to the First Actions of the Female Participants.

The first actions of the female participants from both the British and the Project People studies were compared, relative to the percentage of participants who utilized various first actions. Table XII presents

TABLE XII
COMPARISONS OF THE FIRST ACTIONS OF THE FEMALE PARTICIPANTS

Actions	British Per Cent	U.S. Per Cent	P_1-P_2	$SE_{P_1-P_2}$	CR
Notified Others	10.0	13.8	3.8	2.00	1.90
Searched for Fire	11.0	6.3	4.7	1.90	<u>2.47*</u>
Called Fire Department	11.0	11.4	0.4	2.01	0.20
Got Dressed	3.0	10.1	7.1	1.37	<u>5.18**</u>
Left Building	9.0	10.4	1.4	1.86	0.75
Got Family	9.0	11.0	2.0	1.88	1.06
Fought Fire	8.0	7.4	0.6	1.72	0.35
Left Area	3.0	4.1	1.1	1.14	0.96
Nothing	2.0	2.8	0.8	0.94	0.85
Had Others Call F.D.	2.0	1.3	0.7	0.85	0.82
Got Personal Property	2.0	2.5	0.5	0.90	0.55
Went to Fire Area	3.0	2.2	0.8	1.06	0.75
Removed Fuel	1.0	2.2	1.2	0.73	1.64
Enter Building	0	0.9	0.9	0.29	<u>3.10**</u>
Tried to Exit	2.0	1.6	0.4	0.87	0.46
Closed Door to Fire Area	4.0	1.3	2.7	1.14	<u>2.36*</u>
Pulled Fire Alarm	1.0	0.6	0.4	0.60	0.66
Turned Off Appliances	5.0	0.9	4.1	1.25	<u>3.28**</u>
N = 18	954	318			

*Critical ratios significant at or above the 5 per cent level of confidence
 **Critical ratios significant at or above the 1 per cent level of confidence

the comparison of the first actions by the female participants of both studies, and it should be remembered the female participants consisted of 54.8 per cent of the Project People participant population, and 43.4 per cent of the British participants as previously presented in Table V .

There were five first actions which resulted in a statistically significant difference in the percentage of utilization by the female participants for the two populations as compared in Table XII . The British female participants had a higher percentage of utilization for the following first actions: "Searched for Fire," "Closed Door to Fire Area," and "Turned Off Appliances." While the Project People female participants had a higher percentage of utilization of the following two first actions: "Got Dressed," and "Enter Building." It should be remembered, from Table VIII previously presented, that all of these first actions were also statistically significant between both total participant populations with the exception of the first action of, "Searched for Fire."

6. Comparison of The Participant Populations Relative to The First Actions of The Male Participants.

The comparison of the first actions of the male participants from both of the participant populations are presented in Table XIII. Examination of this table indicates there are eight of the first action classifications in which the percentage of utilization of the actions indicated a statistically significant difference between these two male participant populations.

The British male participants had a significantly higher utilization of the following first action classifications: "Called Fire Department," "Fought Fire," "Closed Door to Fire Area," and "Pulled Fire Alarm." The

TABLE XIII
COMPARISON OF THE FIRST ACTIONS OF THE MALE PARTICIPANTS

Actions	British Per Cent	U.S. Per Cent	P_1-P_2	$SE_{P_1-P_2}$	CR
Notified Others	6.0	16.3	10.3	1.82	5.66**
Searched for Fire	13.0	14.9	1.9	2.30	0.83
Called Fire Department	10.0	6.1	3.9	1.97	1.98*
Got Dressed	2.0	5.8	3.8	1.10	3.45**
Left Building	7.0	4.2	2.8	1.67	1.68
Got Family	3.0	3.4	0.4	1.18	0.34
Fought Fire	20.0	14.6	5.4	2.66	2.03*
Left Area	1.0	4.6	3.6	0.85	4.24**
Nothing	2.0	2.7	0.7	0.97	0.72
Had Others Call F.D.	3.0	3.4	0.4	1.18	0.34
Got Personal Property	1.0	1.5	0.5	0.64	0.78
Went to Fire Area	8.0	1.9	6.1	1.72	3.55
Removed Fuel	1.0	1.1	0.1	0.67	0.15
Enter Building	0	2.3	2.3	0.43	5.35**
Tried to Exit	1.0	1.5	0.5	0.71	0.70
Closed Door to Fire Area	3.0	0.8	2.2	1.08	2.04*
Pulled Fire Alarm	4.0	1.1	2.9	1.25	2.32*
Turned Off Appliances	3.0	0.8	2.1	1.08	1.94
N = 18	1239	262			

*Critical ratios significant at or above the 5 per cent level of confidence.
**Critical ratios significant at or above the 1 per cent level of confidence.

male participants from the Project People study in contrast had a higher percentage of utilization of the following first actions: "Notified Others," "Got Dressed," "Left Area," and "Enter Building." It will be remembered from Table VIII, these first actions were all statistically significant between the total participant populations for both studies with the exception of the first action of "Called Fire Department." It should also be noticed the first actions which previously indicated a significant difference in the comparison between the total participant populations, and were not significant when comparing the male participants. These two first actions were the action classifications of "Got Family" and "Went to Fire Area."

These differences were statistically significant at both the 1 per cent and 5 per cent levels of confidence. The differences in the first action classifications of "Notified Others," "Got Dressed," "Left Area," and "Enter Building" were all significant above the 1 per cent level of confidence with the other four first actions being significant above the 5 per cent level of confidence.

7. Comparison of The Participant Populations Relative to The Reasons for The Reentry Behavior of The Participants.

The phenomenon of reentry as discussed in the complete study report (3), was also included in Wood's, (14) study. Table XIV presents the comparison of the reasons for the reentry behavior of the participants engaging in this behavior from both studies. The classification in this table contains the eight categories utilized by Wood with three additions. The twenty reasons presented for the Project People participants in the study report (3), were recomputed for these eleven categories. The 163 participants from the Project People study consisted of 27.9

per cent of the total participant population, while the 943 British participants consisted of 44.1 per cent of the British participant population.

Examination of Table XIV indicates that statistically significant differences in the percentages of the participants from both studies were found for all the reentry reasons with the exception of the reason of, "Save Personal Effects." The British participants had a higher percentage of providing the following reasons for their reentry behavior: "Fight Fire," "Observe Fire," "Shut Doors," "Await Fire Department," and "Fire Not Severe." The Project People Participants had a higher percentage of utilization of the reasons for reentry under the following classifications: "Call Fire Department," "Rescue Pets," "Assist Fire Department," "Notify Others," and "Assist Evacuation." The classifications of "Notify Others," "Assist Fire Department" and "Assist Evacuation" did not show up in the British responses, and the British reason of "Await Fire Department" did not occur in the Project People Participants' reasons for reentry.

8. Comparison of The Participant Populations Relative to Various Participant Behaviors.

The percentage of the participants from both populations relative to the percentage of participants involved in the various behaviors were compared in Table XV. The following behaviors were considered in this comparative analysis: The evacuation from the fire incident building; The reentry of the fire incident building; The fire fighting activities; The movement of the participants through smoke; and the behavior of the participants in turning back due to heat or smoke in their evacuation efforts.

TABLE XIV
COMPARISON OF REASONS FOR REENTRY BEHAVIOR OF PARTICIPANTS

Reasons	British Per Cent	U.S. Per Cent	$P_1 - P_2$	$SE_{P_1 - P_2}$	CR
Fight Fire	36.0	22.2	13.8	4.02	<u>3.43**</u>
Observe Fire	19.0	11.0	8.0	3.25	<u>2.46*</u>
Save Personal Effects	13.0	17.2	4.2	2.91	1.44
Shut Doors	10.0	0.6	9.4	2.38	<u>3.95**</u>
Await Fire Department	9.0	0	9.0	2.26	<u>3.98**</u>
Call Fire Department	2.0	5.5	3.5	1.32	<u>2.65**</u>
Rescue Pets	2.0	7.4	5.4	1.40	<u>3.86**</u>
Fire Not Severe	5.0	1.2	3.8	1.74	<u>2.18*</u>
Notify Others	0	8.0	8.0	0.92	<u>8.69**</u>
Assist Fire Department	0	7.4	7.4	0.88	<u>8.41**</u>
Assist Evacuation	0	2.5	2.5	0.54	<u>4.63**</u>
N = 11	943	163			

*Critical ratios significant at or above the 5 per cent level of confidence.
**Critical ratios significant at or above the 1 per cent level of confidence.

TABLE XV
COMPARISON OF BEHAVIORS OF PARTICIPANT POPULATIONS

Behavior	British Per Cent	U.S. Per Cent	$P_1 - P_2$	$SE_{P_1 - P_2}$	CR
Evacuation	54.5	80.0	25.5	2.30	<u>11.09**</u>
Reentry	43.0	27.9	15.1	2.30	<u>6.57**</u>
Fire Fighting	14.7	22.9	8.2	1.74	<u>4.71**</u>
Moved Through Smoke	60.0	62.7	2.7	2.29	1.18
Turned Back	26.0	18.3	7.7	2.01	<u>3.83**</u>
	2193	584			

**Critical ratios significant at or above the 1 per cent level of confidence.

Relative to these five categories of participant behavior it may be observed the differences were statistically significant for four of the five behaviors. The British participants had a higher percentage of their total participant population involved in the behaviors of "reentry," and the "turned back" behavior. While the Project People participants had a higher percentage of the total participant population involved in the behaviors of: "Evacuation" and "Fire Fighting." It should be observed the difference in the participants relative to the movement through smoke was not significant with percentages of 60 and 62.7, for the two participant populations. It is of interest to note that a greater percentage of the Project People population left the building than in the British study. This difference may be a direct result of the differences previously indicated in Table I relative to the occupancies of the fire incident buildings involved in both studies, with the British study containing a significantly higher percentage of nonresidential buildings.

D. Comparison of The Effects of Smoke on The Participant Populations.

The variables of the movement of the Project People participants through the smoke and the turned back behavior of these participants, due to the effects of both heat and smoke were examined in the complete study report. (3) Table XV previously presented the percentages of the participant population for both studies involved in these behaviors, with an approximately equal population involved in the movement through smoke behavior, and a higher percentage of the British population involved in the turned back behavior.

1. Comparison of The Visibility Distance for The Participant Populations Relative to Movement Through Smoke.

Table XVI presents the visibility distance in feet, for the participant population involved in the movement through smoke, at the time the movement was initiated. It should be noted that 1316 British participants, and 322 Project People participants moved through smoke during their evacuation or related actions in the fire incident building. Relative to the visibility distance categories, these eight classifications were utilized in Wood's (14) report in Yards, and were converted to feet to enable the comparison of the data from both populations. Five of the eight visibility distance classifications indicated significant differences in the percentage of the participant population involved. The British population had higher percentages for the following visibility distances: "3 to 6 feet," "7 to 12 feet," and "above 60 feet." The Project People participants thus had a higher percentage of participants with a visibility distance of "13 to 30 feet" and "46 to 60 feet." All of these differences were significant above the 1 per cent level of confidence with the exception of the visibility distance of 7-12 feet, which was significant above the 5 per cent level of confidence. Thus, it would appear the visibility distance of the participants as they moved through smoke, would influence the distance the participants could move through the smoke.

2. Comparison of The Distance Moved Through Smoke for The Participant Populations.

The distance moved through the smoke, and the distance moved through the smoke relative to the visibility distance of the participants for the

TABLE XVI

COMPARISON OF THE VISIBILITY DISTANCE FOR THE PARTICIPANT POPULATIONS
RELATIVE TO MOVEMENT THROUGH SMOKE

Visibility Distance (Feet)	British Per Cent	U.S. Per Cent	$P_1 - P_2$	$SE_{P_1 - P_2}$	CR
0 - 2	12.0	10.2	1.8	1.99	0.90
3 - 6	25.0	17.2	7.8	2.65	<u>2.94**</u>
7 - 12	27.0	20.2	6.8	2.73	<u>2.49*</u>
13 - 30	11.0	31.7	21.7	2.24	<u>9.69**</u>
31 - 36	3.0	2.2	0.8	1.03	0.78
37 - 45	3.0	3.7	0.7	1.08	0.65
46 - 60	3.0	7.4	4.4	1.21	<u>3.64**</u>
> 60	17.0	7.4	9.6	2.24	<u>4.29**</u>
	1316	322			

*Critical ratio significant at or above the 5 per cent level of confidence.
**Critical ratios significant at or above the 1 per cent level of confidence.

Project People population were examined in the study report.(3)The distance of the participant movement through the smoke is presented in Table XVII for both of the study participant populations. Upon examination of this table it is apparent there are significant differences in the percentage of the participants that moved the various distances. The British participants had a higher percentage of their population which moved according to the following distance classifications: "3-6 feet," "7-12 feet," "31-36 feet," and "above 60 feet." The Project People population had a higher percentage of their population which moved in the distance categories of: "13-30 feet," and "46-60 feet."

One of the most interesting observations relative to the movement through smoke, beyond the distance moved, is the relatively large percentages of the participant populations from both studies which moved through the smoke. As previously indicated in Table XV, 60 per cent of the British participants, and 62.7 per cent of the Project People participants moved through smoke.

3. Comparison of The Visibility Distance for The Participant Populations Relative to The Turned Back Behavior.

The turned back behavior, was a reversal in the direction of movement by the participant in the movement to an area of safety. The visibility distance of the participants at the time they engaged in the turned back behavior is presented for both participant populations in Table XVIII. It should be noted in this table the percentage of the participants who were forced to turn back for both populations. For the Project People study 85 of the 345 participants who moved through smoke had to turn back which was approximately 24.6 per cent of these participants. While for the British participants, 570 of the 1316 participants, or approximately

TABLE XVII
COMPARISON OF THE DISTANCE MOVED THROUGH SMOKE FOR THE PARTICIPANT
POPULATIONS

Distance Moved (Feet)	British Per Cent	U.S. Per Cent	$P_1 - P_2$	$SE_{P_1 - P_2}$	CR
0 - 2	3.0	2.3	0.7	1.02	0.69
3 - 6	18.0	8.4	9.6	2.23	<u>4.30**</u>
7 - 12	30.0	17.1	12.9	2.71	<u>4.76**</u>
13 - 30	19.0	45.5	26.5	2.62	<u>10.11**</u>
31 - 36	5.0	2.0	3.0	1.25	<u>2.40*</u>
37 - 45	4.0	4.1	0.1	1.19	0.08
46 - 60	5.0	11.0	6.0	1.47	<u>4.08**</u>
> 60	15.0	9.6	5.4	2.10	<u>2.57*</u>
1316					

*Critical ratios significant at or above the 5 per cent level of confidence.
**Critical ratios significant at or above the 1 per cent level of confidence.

43.3 per cent of the participants who moved through smoke had to turn back.

Examination of Table XVIII indicates for both populations the shorter visibility distances relative to the turned back behavior when compared with the visibility distances presented in Table XVI for the movement through the smoke. There were only three visibility distances with significant differences between the British and the Project People populations. The British population had a higher percentage of the participants with a visibility distance of "3-6 feet." While the Project People participants had a higher percentage of participants in the visibility categories of "13-30 feet" and "46-60 feet." These differences in the visibility distances of the participants between the two participant populations were statistically significant above the 1 per cent level of confidence.

III. SUMMARY AND CONCLUSIONS

The conclusions presented represent the results of the comparisons of the data obtained in the Project People Study (3), and the British study conducted by Wood (14). It should not be assumed the differences which have been identified between the two populations should be considered to be cultural differences. There is the possibility, cultural variables have provided some influence on the differences and the similarities presented in this paper. However, the variation in the sizes of the study populations, the structural occupancies represented in the fire incidents, with the sexual distributions of the populations, considering the male prevalence in the British study and the female prevalence in the Project People study, may be more significant than cultural variables on the results presented in this paper.

TABLE XVIII
COMPARISON OF THE VISIBILITY DISTANCE FOR THE PARTICIPANT POPULATIONS
RELATIVE TO THE TURNED BACK BEHAVIOR

Visibility Distance (Feet)	British Per Cent	U.S. Per Cent	$P_1 - P_2$	$SE_{P_1 - P_2}$	CR
0 - 2	29.0	31.8	2.8	5.31	0.53
3 - 6	37.0	22.3	14.7	5.57	<u>2.64**</u>
7 - 12	25.0	22.3	2.7	5.02	0.54
13 - 30	6.0	17.6	11.6	3.07	<u>3.78**</u>
31 - 36	0.5	1.2	0.7	0.90	0.77
37 - 45	1.0	0	1.0	1.10	0.91
46 - 60	0.5	4.7	4.2	1.16	<u>3.62**</u>
> 60	1.0	0	1.0	1.10	0.91
	570	85			

**Critical ratios significant at or above the 1 per cent level of confidence.

a. The four most popular occupancies of the British study in rank order were as follows: "Dwellings," "Factories," "Shops," and "Apartments." The four most popular occupancies of the Project People study in rank order were: "Dwellings," "Apartments," "Restaurants," and both, "Schools and Hotels."

b. The statistically significant differences between the occupancies in both studies, indicated the British study had a greater percentage of "Factories," "Shops" and, "Garages." The Project People study had a greater percentage of "Dwellings," and "Apartments."

c. The rank order of the percentage of the fire incidents relative to the time of occurrence for both studies was as follows: The highest percentage of incidents occurred between 1200 to 1800. The next highest percentage of fire incidents occurred from 1800 to 2300. While the third highest number of fire incidents occurred between 0600 to 1200. The time interval from 2300 to 0600 had the least number of fire incidents in both studies. The only statistically significant difference between the number of fire incidents in the time periods, concerned the 21.4 per cent of the Project People fire incidents in the 2300 to 0600 time period.

d. The comparison of the floor of fire origin had 3 significant differences between the two studies. The Project People study had a higher percentage of fire incidents originating in the basement and the second floor. While the British study had a greater percentage of fire incidents with the fire origin on the first floor.

e. There were 4 significant differences concerned with the extent of the smoke spread in the fire incidents from both studies. The British study

had a higher percentage of fire incidents with, "No Smoke Spread," and the smoke spread confined to the, "Room or Area of Origin." While the Project People study had a greater percentage of fire incidents with smoke spread involving the, "Floor of Origin," and, "Other Floors." A total of 79.2 per cent of the Project People fire incidents involved smoke spread of one or more floors.

f. The participant population in the British study appeared to be predominately male with 56.5 per cent of the participants. The Project People participant population in contrast was female dominated with 54.8 per cent of the participant population. These sexual differences between the participant populations in both studies were statistically significant by the Chi-Square Analysis.

g. The distribution of the ages of the participants in both studies were compared and there were two significant differences between the populations. The British study had a greater percentage of participants in the 40 to 49 age group. The Project People study had a higher percentage of participants in the 20 to 29 age range. It thus appeared the British participant population was slightly older, and contained more male participants than the Project People participant population.

h. The means of awareness by which the participant population became aware of the fire incident were compared for both populations. The rank order of the means of awareness was identical for the first and second stimuli for both studies involving "Smoke" and "Being Told." There was only 1 significant difference in the means of awareness between the two populations. This significant factor was the difference between the 15 per cent of the British population and the 8.1 per cent of the Project People population which became aware of the fire incident by, "Flame."

i. There were 10 significant differences in the first actions

between the two studies. The British population had a higher percentage of utilization of the following 5 actions: "Fought Fire;" "Went to Fire Area;" "Closed Door to Fire Area;" "Pulled Fire Alarm;" and, "Turned Off Appliances." The Project People population had a greater percentage of utilization of the following 5 first actions: "Notified Others;" "Got Dressed;" "Got Family;" "Enter Building;" and, "Left Area."

j. There were also 10 significant differences in the second actions between the two populations. The British participants had a greater percentage of participants selecting the following 6 actions: "Fought Fire;" "Nothing;" "Went to Fire Area;" "Enter Building;" "Close Door to Fire Area;" and, "Turned Off Appliances." The Project People population had a higher percentage of participants using the following 4 actions: "Notified Others;" "Called the Fire Department;" "Left Building;" and, "Got Family."

k. There were another 10 significant differences in the third actions between the participant populations in the two studies. The British participants had a greater percentage of utilization of the following 4 actions: "Went to Fire Area;" "Closed Door to Fire Area;" "Turned Off Appliances;" and, "Nothing." The Project People population had a higher percentage of utilization of the following 6 third actions: "Notified Others;" "Called the Fire Department;" "Left the Building;" "Had Others Call The Fire Department;" "Await the Fire Department;" and, "Went to Balcony."

l. Approximately 24.8 per cent of the British participant population had previous fire experience, while 28.3 per cent of the Project People participants had previous fire experience. There were 8 significant differences in the first actions of the participant populations with

previous fire experience from both studies. The British previous fire experience population had a greater percentage of participants using the following 3 first actions: "Fought Fire;" "Pulled Fire Alarm;" and, "Turned Off Appliances." The Project People previous fire experience populations had a greater percentage of participants using the following 5 first actions: "Notified Others;" "Got Dressed;" "Got Family;" "Nothing," and, "Enter Building."

m. There were 5 significant differences between the first actions of the female participant populations from both studies. The British female participants had a higher percentage of utilization of the following 3 first actions: "Searched for Fire;" "Closed Door to Fire Area;" and, "Turned Off Appliances." The Project People female participants had a greater percentage of utilization of the first actions of: "Got Dressed," and, "Enter Building."

n. There were 8 statistically significant differences in the first actions of the male participant populations from both studies. The British male population had a higher percentage of utilization of the following 4 first actions: "Called the Fire Department;" "Fought Fire;" "Closed Door to Fire Area;" and, "Pulled Fire Alarm." The Project People male population had a higher percentage of utilization of the following 4 first actions: "Notified Others;" "Got Dressed;" "Left Area;" and, "Enter Building."

o. Approximately 27.9 per cent of the Project People participant population engaged in reentry behavior. The British study had a reentry population consisting of 44.1 per cent of the total participant population. There were 10 significant differences in the reasons for the reentry

behavior between the populations in both of these studies. The British population had a higher percentage of participants with the following reasons for reentry: "Fight Fire;" "Observe Fire;" "Shut Doors;" "Await Fire Department;" and, "Fire Not Severe." The Project People population had a higher percentage of participants with the following reasons for reentry: "Notify Others;" "Assist Evacuation;" "Assist Fire Department;" "Rescue Pets;" and, "Call the Fire Department."

p. There were 4 significant differences in the behavior modes between the two participant populations. The British population had a higher percentage of the participants engaged in the reentry behavior and the turned back behavior. While the Project People population had a higher percentage of the participants engaged in the Fire Fighting and Evacuation Behavior. There was no significant difference in the percentage of the populations involved in the movement through smoke, with 60 per cent of the British population and 62.7 per cent of the Project People Population.

q. There were 5 significant differences in the visibility distances relative to the movement through smoke for the two populations. The British participants had a higher percentage of their participants with visibility distance of: "3 to 6", "7 to 12", and "above 60 feet". The Project People population had a higher percentage of participants with visibility distances at the time of moving through smoke of: "13 to 30", and, "46 to 60 feet".

r. There were 5 significant differences in the distance moved through the smoke for both populations. The British population had a higher percentage of participants moving as follows: "3 to 6", "7 to 12", and, "above 60 feet". The Project People population in contrast had a higher percentage of persons moving, "13 to 30 feet", and "46 to 60 feet".

s. The turned back behavior involved 24.6 per cent of the Project People participant population, and 43.3 per cent of the British participant population.

t. There were 3 significant differences in the visibility distance at the time of the turned back behavior between the two populations. The British participant population had a higher percentage of participants with a visibility distance of: "3 to 6 feet". The Project People participant population had a greater percentage of participants with a visibility distance of: "13 to 30 feet" and, "46 to 60 feet".

IV. SELECTED BIBLIOGRAPHY

1. Brave, Ronald M. A Study of the Effectiveness of Various Colors for Exit Sign Lighting. College Park: Fire Protection Curriculum, University of Maryland, 1964.
2. Brown, Roger W., "Mass Phenomena," in Lindzey, Gardner, (ed.) Handbook of Social Psychology. II, Cambridge: Addison-Wesley, 1954, 833-873.
3. Bryan, John L. Smoke as a Determinant of Human Behavior in Fire Situations. (Project People). Washington, D.C.: Center for Fire Research, National Bureau of Standards, NBS-GCR-77-94, June 30, 1977.
4. Cannon, Wayne L. A Study of the Effectiveness of Exit Markings in Multi-storied Department Stores. College Park, Fire Protection Curriculum, University of Maryland, 1968.
5. Canter, David and Rowan Matthews, Behaviour in Fires: The Possibilities for Research. Borehamwood: Building Research Establishment, Fire Research Station, CP 11/76, 1976.
6. Crossman, Edward R. F. W., William B. Zachary and W. Pigman, FIRST: A Fire Risk and Readiness Study of Berkeley Households. Berkeley: Department of Industrial Engineering, University of California, UCB FRG/WP 75-5, 1974.
7. Garrett, Henry E., Statistics in Psychology and Education. New York: Longmans, Green and Co., 4th edition, 1953.
8. Latane, Bibb and John M. Darley, "Group Inhibition of Bystander Intervention in Emergencies," Journal of Personality and Social Psychology, X, 3, (1968), 215-221.
9. National Fire Prevention and Control Administration, Highlights of the National Household Fire Survey. Washington, D.C., U.S. Department of Commerce, 1975.
10. Nie, Norman H., G. Hadlaihull, Jean G. Jenkins, Karin Steinbrenner, and Dale H. Bent, SPSS, Statistical Package for the Social Sciences. 2nd ed., New York: McGraw-Hill, 1975.
11. O'Neill, John G. An Attempt to Correlate Life Loss in Residential Fires to the Social Class of the Persons Involved. Fire Protection Curriculum, University of Maryland, 1969.
12. Underwriters' Laboratories, Inc. Study of Smoke Ratings Developed in Standard Fire Tests in Relation to Visual Observations. Chicago: Underwriters' Laboratories Bulletin of Research 56, 1963.

13. Withey, Stephen B. "Reaction to Uncertain Threat," in Baker, G. W. and Dwight W. Chapman, Man and Society in Disaster. New York: Basic Books, 1962.
14. Wood, Peter G. The Behavior of People in Fires. London: British Joint Fire Research Organization. Fire Research Note 953, November, 1972.