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PERCEPTION OF POSSIBLE STORE-FIRE AND HUMAN BEHAVIOUR IN IT

ABSTRACT

Human aspects of dangerous fires became an important field of psychological interest in the recent years. The reason for this lays in numerous fires caused by people, but also in tragedies caused by inappropriate human behaviour in them. Human cognition of possible fire development, and their behaviour in fire, were the subjects of this research. The

results of the fire simulation study, conducted for the two storied shop centre were compared with the answers of its employees and buyers. Also the answers of both groups were compared. The questionnaire comprises questions about the probability of fire in the store, its dangerousness and possible causes, safety of the building and safety preparedness of the personnel, responsibility for the buyers, evacuation, etc. Answers were analysed and explained in the terms of recent findings about human behaviour in dangerous situations.

INTRODUCTION

Human behaviour during dangerous fires became an important field of psychological interest only in recent years. Therefore, the observation, made by John Keating and Elizabeth Loftus (1981), that we know a lot about the behaviour of the fire, but much less about the behaviour of people in fire, is completely justified. With regard to the fact that the majority of fires is caused by people, and that they themselves are often victims of fires, it is surprising, that this kind of research appeared so late. Indeed, it is evident that only technical precautions are not enough, because very often they can not prevent human failures, mistakes, and unsuitable behaviours. Therefore, every fire precaution that does not take into account human behaviour, will be insufficient, and often even unsuitable. Only the understanding of psychological aspects of the origin and course of fires, can in important ways contribute toward the reduction of their harmful consequences. Findings about behaviour of people in fires also represent the direct demand to change regulations, traditional behaviour etc.

Fires are usually experienced as complex, rapidly changing events. Especially in their early stages they are usually highly ambiguous, and provide insufficient information for people to begin acting. But this information is necessary for them to understand the situation and take the appropriate role in it. An important insight into the structure and dynamics of behaviour during fires was given by the research of Wood (1972), Canter et al. (1978), Sime (1988), and many others. Canter et al. also offered the general model of behaviour during fire. In the sequence of acts there appeared three points of potential sequence change: the first immediately after the initial cues ("investigate" or "misinterpret"), the second comes after seeing some valid cue of fire (e.g. smoke), and the third follows the occurrence of the particular preparation. It is evident from the model that potential actions increase in variety as the sequence of behaviour unfolds. This means, that general statements about all fires can be made only for the initial stages of the sequen-

ce, while later actions are more likely to be highly specific for different environments.

Some other psychological findings will be discussed in connection with particular points of our research. We tried to find out, how the personnel and buyers of a two storied shop centre estimate different aspects of a possible fire, and behaviours of persons present in it. The answers of both groups were compared between themselves as well as with the results of the fire simulation study, conducted for the same building (Grm & Urbas, 1990).

METHOD

Subjects: 59 members of personnel and 40 buyers took part in the research. In both groups women prevailed (85% and 60%); the average age of personnel was somewhat lower (33.3 vs. 40.5 years), because of the greater age range of buyers. Secondary level of education prevailed. Between the personnel there were the greatest number of shop-assistants, mainly from the ground (47.5%) and first floor (33.9%). Buyers were buying mainly on ground floor (40%) and in basement (45%), either only (20%) or in combinations with other floors. Even 42.5% of buyers were buying in this shop centre every day, 17.5% every second day and 32.5% once a week. The majority of buyers therefore had the opportunity to get acquainted with the building, though the acquaintance depend also on the way somebody uses the building, and not only on the frequency of visits. All this means, that the answers of both groups are at least to a certain degree comparable.

Materials: A closed type questionnaire with 28 questions was used. It comprised questions about demographic data, probability of fire in the store, its dangerousness and possible causes, about safety in the building and safety preparedness of the personnel, about responsibility for the buyers, about evacuation, about behaviour of people in fire etc.

Procedure: All subjects filled the questionnaires by themselves, either alone or in a group. Buyers were motiva-

ted for cooperation by the coupon which brings them a certain prize (e.g. fire extinguisher).

RESULTS AND DISCUSSION

It is well known that big shop centres are relatively highly menaced buildings with regard to fire, because of the large, vertically and horizontally connected shop areas, great quantity of different goods, and a great number of visitors in the whole object. Particularly, if all safety measures are not put into effect, dangerous fires are probable. The object under consideration was no exception. Safety evaluation and computer simulation study of possible fire (SIA procedure) showed, that the accomplished fire safety measures did not meet all the fire safety demands. We shall omit technical details of this procedure here, and present only those findings that are psychologically relevant.

It is characteristic of accidents, also of fires, that they are rather rare and unexpected events. Therefore people often underestimate the probability of their occurrence, and behave according to this. From Figure 1, it is evident, that the personnel and buyers share a rather optimistic view of the possibility of fire in the shop centre. Estimations of the probability of a fire outburst for two time periods ("this year" and "in ten years") were almost identical, as between the groups as for both time periods. The latter indicates obvious difficulties in estimating the probability of rare events.

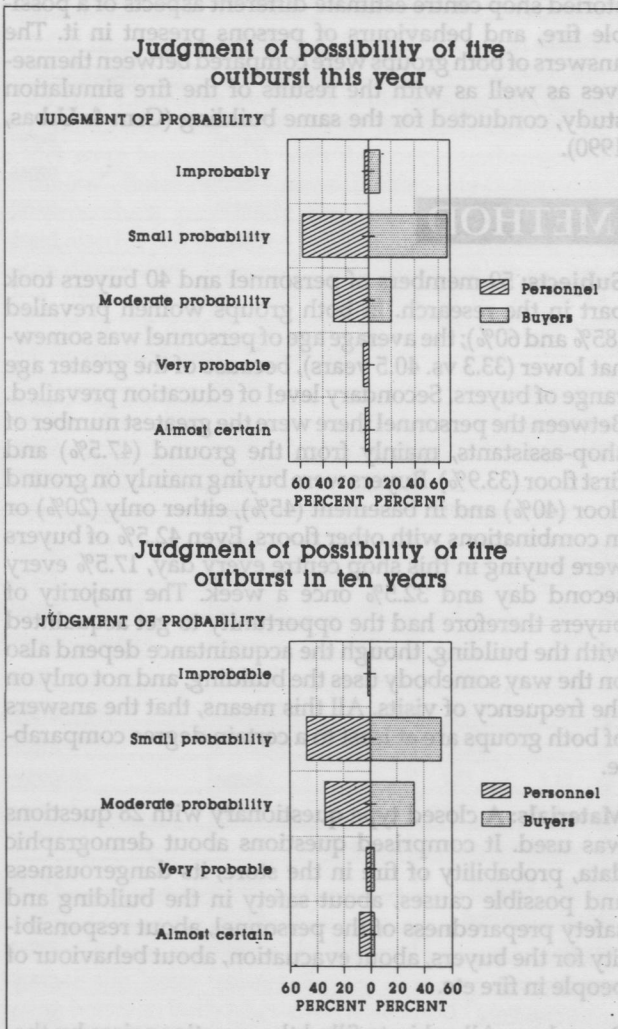


fig 1

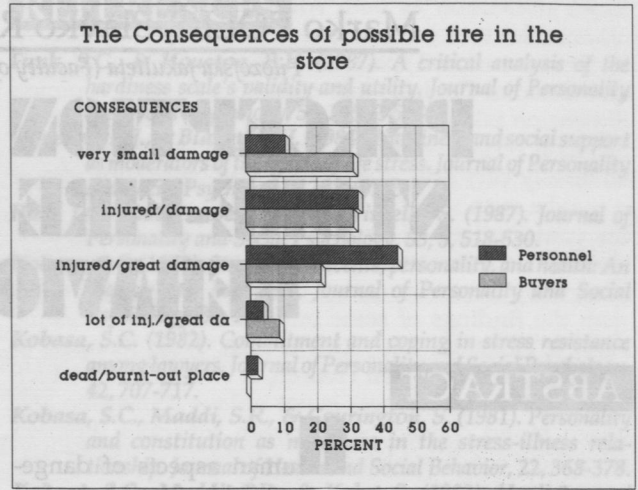


fig 2

Perhaps even more important is the estimation of possible consequences of fire. Also in this case the estimations of both groups, especially the buyers, were rather optimistic. If any, according to their opinion, mainly material damage would appear. Compared with the results of the simulation study this opinion could not stand. It reflects either real ignorance of the danger (what is probable), or is the consequence of different mechanisms of cognitive dissonance.

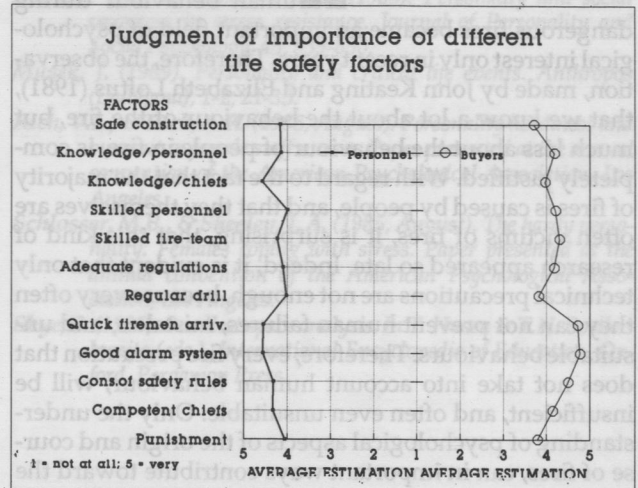


fig 3

Judgment of importance of different fire safety factors ranges in the interval of approximately one point, estimations of personnel being even more homogeneous. This incapability of better discrimination probably reflects the lack of knowledge about roles of different factors, what is understandable for laymen. In spite of small differences, the importance of external factors (chiefs, firemen arrival, good alarm system, but not in such degree also of the safe construction) was emphasised. This was perhaps the consequence of the tendency to put the responsibility on someone else.

All, but a few correlations between the just mentioned estimations were highly significant, though the structure of two dimensional SSA solution was not the same for both groups. This means that fire safety factors are in the same cognitive space, but somewhat differently organised for two groups. While personnel took more into account some hierarchical and formal factors, in buyers' solution, more similar function factors were grouped together. In a way results reflect different positions and roles of both groups.

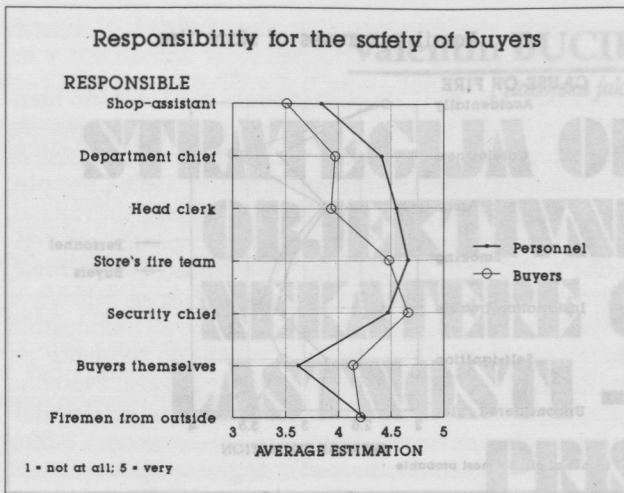


fig 4

Responsibility for the safety of the buyers present an important aspect of behaviour during fire. Although both groups estimated the responsibility of all mentioned rather highly (personnel more than buyers), again the emphasis on the responsibility of either competent (fire team, security chief) or chiefs (head clerk, department chief) was obvious. But vagueness of responsibility and unclear competence could mean, that during real fire buyers would be more or less left to themselves, and only exceptionally to the help of the personnel.

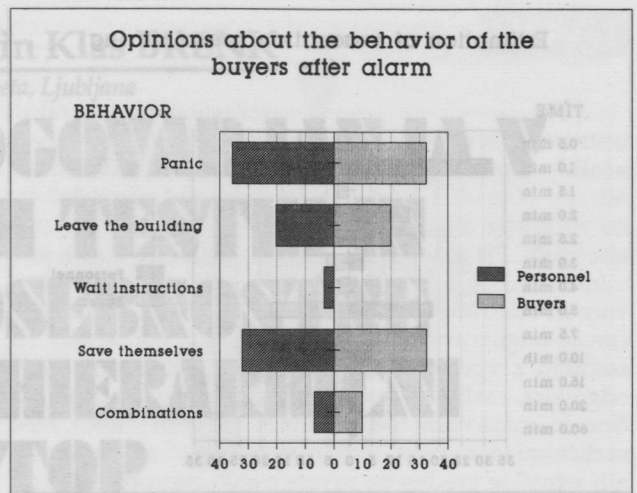


fig 6

Correlations between estimations of the degree of responsibility were highly significant, and SSA solutions for both groups rather similar, with differences dependent on the different roles of both groups again.

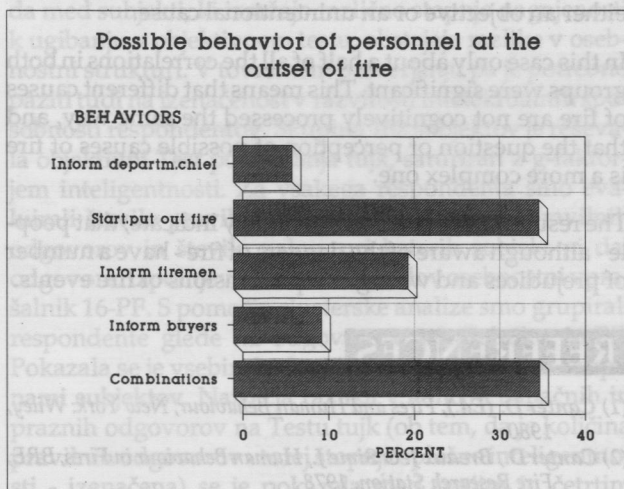


fig 5

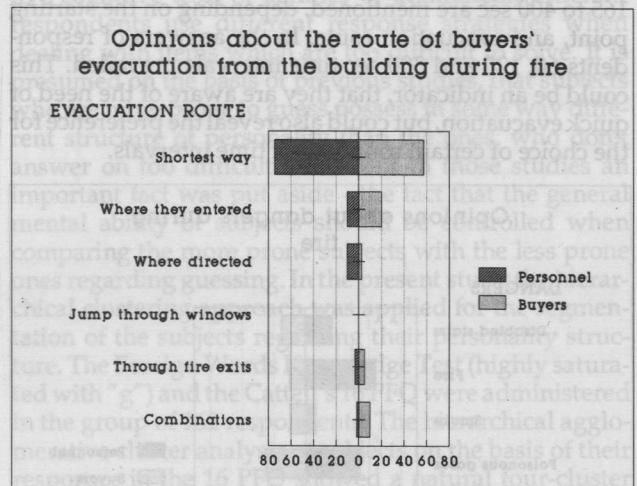
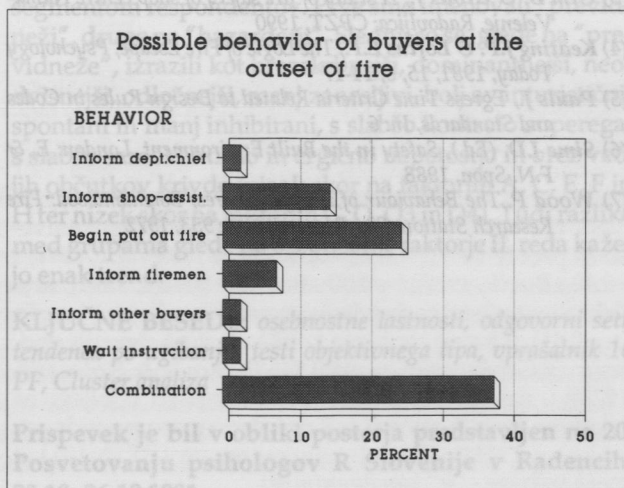


fig 7

And what would respondents do at the outburst of fire? Prevailing choices were to start putting out the fire, and the combination of different activities (putting out the fire, informing). Taken all together only about 20% of personnel would inform buyers about the danger. This could be understandable and acceptable with regard to the existence of the central warning system, of course if it works and its use is known.

This lack of informing was perhaps due also to the fear of panic. Buyers, as well as personnel believed that warning about the outset of fire could cause panic. This is one of the most frequent fears, but fortunately an unjustified one. Wood's (1980) research of 1000 fires in England showed, that the majority of the affected persons behaved adequately, and only about 5% in a way that increased their risk. Unsuitable behaviour mainly rises from the lack of knowledge and skill, and is not caused by panic. Panic in general is rare and is more an excuse for the irresponsibility of responsible.

The question of evacuation routes is of great importance for the safety of buyers. In spite of the prevalence of the evidently logical answer "by the shortest way", it is more probable that buyers would try to leave the building

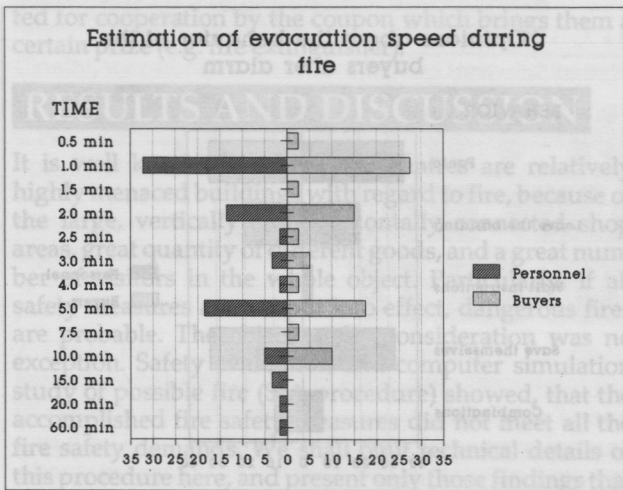


fig 8

where they entered it. Only, if the shortest way is clear, or people are directed toward it, they would use it.

Of equal importance as the evacuation route is also the time of evacuation. In the simulation study times from 165 to 400 sec are mentioned, depending on the starting point, and evacuation route. In the answers of respondents 60, 120 and 300 sec time intervals prevailed. This could be an indicator, that they are aware of the need of quick evacuation, but could also reveal the preference for the choice of certain rounded off time intervals.

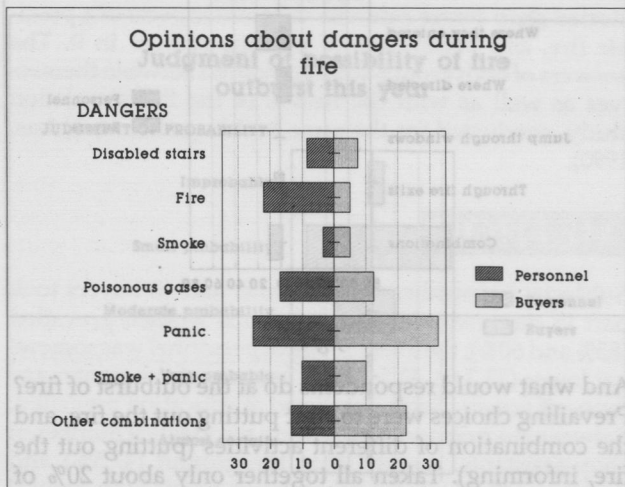


fig 9

Opinions of both groups about the nature of dangers during the fire somewhat differed. Similar was only the prevailing choice of panic as the main danger. Comparison with the findings of the simulation study indicated, that respondents are not aware enough of the dangers of stairs wreckage, anyhow they understand this possible answer (wreck of the stairs vs. disabled passage, the latter presents the main danger). Let us also mention,

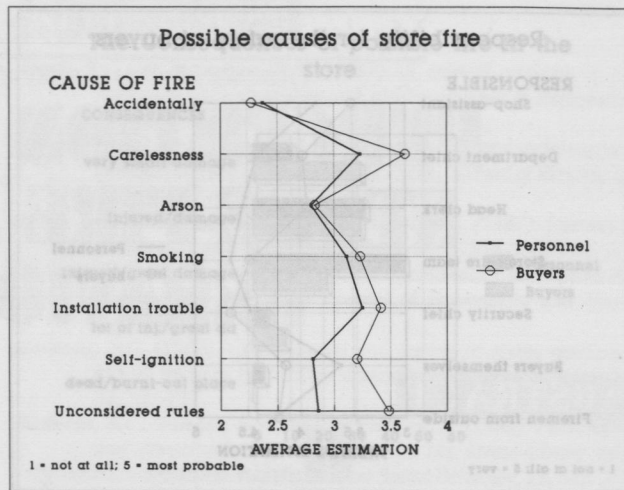


fig 10

that fire research studies indicate, that the majority of victims die because of suffocation or poisoning (poisonous gases), and not simply because of extensive burns.

And what could cause the outburst of fire? Judgments of both groups were rather similar, the difference was only in the degree. Namely, buyers estimate almost all possible causes of fire as more probable. While carelessness, installation trouble and smoking prevailed in the answers of personnel, buyers added unconsidered rules and self-ignition. Rather low were the estimations of an accidental fire and arson. It seems as if fire must have had either an objective or an unintentional cause.

In this case only about a half of all the correlations in both groups were significant. This means that different causes of fire are not cognitively processed the same way, and that the question of perception of possible causes of fire is a more complex one.

The results of our research obviously indicate, that people - although aware of the dangers of fire - have a number of prejudices and wrong comprehensions of fire events.

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