PSYCHOLOGICAL PROFILING OF SERIAL ARSON OFFENSES
An Assessment of Skills and Accuracy

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Although criminal psychological profiling is frequently cited as being applicable to arson offenses, little empirical research exists to substantiate this claim. This study sought to build on previous studies conducted by Kocsis, Irwin, Hayes, and Nunn (2000) by examining the accuracy of professional profilers with others in constructing a profile of a serial arsonist in response to case information presented. The professional profilers produced the most accurate profiles, followed by a group of university science students. Senior detectives and fire investigators tended to perform the worst and never better than a control group that had no specific information about the crime and could do little more than guess. The results offer some insight into the requisite skills for effective profiling. The key factor appears to be a capacity for objective and logical analysis—a characteristic shared by science students and professional profilers.

Keywords: criminal psychological profiling accuracy; serial arson

Criminal psychological profiling has been adopted by law enforcement agencies throughout the world despite little empirical research that objectively examines its accuracy or the skills needed
to effectively profile (Oleson, 1996). Indeed, the majority of literature relating to the evaluation of profiling has generally relied on anecdotal accounts of profiling success stories (e.g., Britton, 1997; Douglas & Oleshaker, 1996; Ressler & Shachtman, 1992) or internal evaluations that report organizational satisfaction with the services provided by profilers (e.g., Copson, 1995; Jackson, Van Koppen, & Herbrink, 1993).

Only a small number of studies have empirically examined the skills required for effective, that is, accurate profiling. Accuracy in the current study has been equated with the number of items correctly identified by the respondent as pertinent to the examined crime. [It must be clearly noted however, that the phrase “items correctly identified” denotes information that is empirically and objectively measured as accurate and does not refer to any standard related to the “perception” of accuracy. For a full discussion of the issues relating to the perception of accuracy in profiles readers are strongly recommended to refer to Kocsis and Hayes (2004) and Kocsis et al., (in press, a & b).]

The first study relevant to the current research was conducted by Kocsis, Irwin, Hayes, and Nunn (2000) and compared various groups of participants in a simulated profiling exercise. The exercise involved a previously resolved homicide case accompanied by a questionnaire designed to elicit a description of the probable offender. As the case in question was previously solved, the responses to the questionnaire could be objectively scored for accuracy because the offender was already known.

The selection of the sampled groups for the study was based on the hypothesis proposed by Hazelwood, Ressler, Depue, and Douglas (1995) regarding the requisite skills for effective profiling. The skills identified by Hazelwood et al. (1995) consisted of experience in the investigation of crime, some understanding of human behavior and motivation, a capacity for logical and objective reasoning, and intuition. Participants who represented each of these skills were selected. A sample of police officers was obtained to reflect investigative experience, psychologists for understanding human behavior, university science sophomores for logical and objective reasoning, and psychics for intuition (see Kocsis et al., 2000 for sampling rationale behind psychics). In addition to these four groups, a sample of professional profilers was obtained as well as a control group consisting of partici-
pants with no particular skills, who were not provided with any case information and who simply completed the questionnaire by guessing at the answers.

Kocsis et al. (2000) found that professional profilers outperformed all the nonprofiler groups with regard to the overall accuracy of their predictions. The results among the four skills-based groups, however, were unanticipated. Foremost was the poor performance of the sampled police officers, which was surpassed by the psychologists and the science students despite Hazelwood et al. (1995) nominating investigative experience as the quintessential skill for effective profiling. After the profilers, psychologists were found to be the next most effective group followed by science students. No significant differences emerged between the psychologist group and the group of science students. The psychics were surpassed by all other groups in predicting the offender, and their efforts yielded no greater accuracy than a control group of participants who relied on guesswork and/or the social stereotype of a “typical murderer.” This suggests that intuition has little relevance to accurate profiling.

The broader theoretical implication to emerge from this study is that rather than investigative experience being important to accurate profiling, it would appear that an understanding of human behavior or a capacity for logical reasoning—skills typically found among psychologists and science students—may be the key source of a professional profiler’s expertise.

Kocsis, Hayes, and Irwin (2002) conducted a follow-up study using the same questionnaire and case. The focus of this study was to examine in greater detail the relevance of investigative experience to profiling. Three groups of police participants were obtained for the study: senior detectives, trainee detectives, and recruits, who respectively represented a high, medium, or low level of investigative experience. In addition, a fourth group was identified within the sample of senior detectives—homicide detectives—who represented senior investigators with particular experience in the investigation of homicide cases. To serve as a contrast to these police groups, another random sample of university science students was obtained, as well as another control group that had no formally identifiable skills and who simply guessed their responses to the questionnaire without the aid of any case information.
The findings from this study were congruent with the earlier results of Kocsis et al. (2000). The science students surpassed all of the police groups, and there was a negative correlation between investigative experience and profiling accuracy. Generally, the higher the degree of investigative experience, the less accurate the respondent’s profile. Indeed, among the police participants, police recruits were found to be the most accurate. Both of these studies that involved participants performing the same profiling task suggest that investigative experience is not a key factor in the production of accurate psychological profiles, however skills associated with logical, objective analysis may well be. It should, however, be noted that the issue of the applicability of profiling to all types of crime has yet to be empirically examined (Pinizzotto & Finkel, 1990).

Research into the technique of profiling has predominantly focused on crimes of sexual violence, such as murder and rape (e.g., Canter & Heritage, 1988; Kocsis, Cooksey, & Irwin, 2002; Kocsis, Irwin, & Cooksey, 2002; Ressler, Douglas, & Burgess, 1988). In comparison to the body of research relating to sexual offenses, only a handful of studies have explored its use for crimes such as arson (e.g., Canter & Fritzon, 1998; Icove & Estepp, 1987; Kocsis & Cooksey, 2002; Rider, 1980). Notwithstanding the comparative dearth of literature, psychological profiling is frequently cited as being applicable to the investigation of arson offenses (e.g., Holmes & Holmes, 1996; Rossmo, 1997; Vorpagel, 1982). To date there does not appear to be published, empirically based research that exclusively examines the accuracy of psychological profiling with respect to arson offenses. This issue seems especially pertinent when one considers that the effectiveness of profiling techniques has been found to be affected by the crime modality being assessed (Kocsis, Cooksey, Irwin, & Allen, 2002; Kocsis & Irwin, 1997; Pinizzotto & Finkel, 1990).

The general design of the current study attempted to replicate and extend the findings of the previous research studies by Kocsis et al. (2000) and Kocsis, Hayes, et al. (2002) on homicide, this time using a previously resolved arson case. A number of minor innovations were incorporated to assist in considering the broader theoretical implications of this research for our understanding of profiling.

One criticism arising from the previous research conducted by Kocsis and colleagues (Kocsis et al., 2000; Kocsis, Hayes, & Irwin,
was that the case utilized in both of the previous studies only dealt with a single offense, and consequently, the crime in question may not have adequately lent itself to being “profilable.” Indeed, the few studies that have sought to assess profiling have not used serial offense case material. There is some support for this criticism when one considers that the vast majority of literature suggests that profiling is most applicable to serial or recidivistic crimes (Douglas, Ressler, Burgess, & Hartman, 1986; Pinizzotto, 1984; Vorpapel, 1982), as behavioral patterns inherent to an offender are most likely to become apparent only when a series of similar offenses have occurred and can be observed. The current study made use of a series of offenses in an attempt to optimize the behavioral cues discernable from the case material that was the subject of the profiling exercise. It was considered that this would also serve to maximize the performance of the sampled groups.

Previous studies conducted (Kocsis et al., 2000; Kocsis, Hayes, et al., 2002) sought to assess the skills necessary for effective profiling. The two key themes to emerge from these studies relate to the importance of logical and objective analysis and, conversely, the apparent unimportance of investigative experience. Clearly the incorporation of another sample of university science students was warranted to explore whether the previous results were merely artifacts of the previous test instrument.

Despite the consistent results of the research by Kocsis and colleagues (Kocsis et al., 2000; Kocsis, Hayes, et al., 2002), some, especially within the law enforcement community, remain convinced about the quintessential importance of investigative experience for effective profiling. One anonymous commentator of previous research interpreted Hazelwood et al.’s (1995) contention as referring to some specialized factor inherent to investigative experience. It was argued that it is not merely investigative experience as measured by time or number of crimes investigated that is of importance. Rather, it is experience directly related to the crime being examined for profiling purposes, which is meant by “investigative experience.” Simply put, it has been suggested that to effectively profile a homicide case, it is not merely experience as a police officer that is pertinent, or even investigative experience in general, but specific experience in the investigation of homicide. This qualification is not readily apparent in
Hazelwood et al.’s assertion concerning the importance of investiga-
tive experience, however it does nonetheless present a plausible and therefore worthwhile hypothesis for the current study. Perhaps the police officers in the studies by Kocsis and colleagues (Kocsis et al., 2000; Kocsis, Hayes, et al., 2002) were representative of experienced investigators but were not necessarily experienced in the specific type of crime being profiled. To some degree Kocsis, Hayes, and Irwin (2002) addressed this contingency in their study by including a homi-
cide detectives subgroup within the senior police category. The results of that study, however, did not support the qualified experience argu-
ment. Instead, the performance of the homicide detectives was gener-
ally worse than that of the other groups.

To further explore the importance of investigative experience, two additional variations were incorporated into the current study. The first involved utilizing another sample of police detectives, however this time, all officers in the sample had specialized training in the investigation of arson, thus attending to the argument that investiga-
tive experience is a specialized factor rather than a generalized or purely quantitative factor. The second variation was to introduce a hybrid group of personnel who possessed specialized investigative experiences with respect to arson offences and some formal education and training akin to that typically encountered in science students. Such a combination arguably exists in the form of trained fire investi-
gators employed by fire brigade agencies. Fire investigators are per-
sonnel who often receive considerable specialized training in what is termed cause-and-origin investigation. This training draws heavily on the disciplines and incumbent theories and principles of physics and chemistry to enable investigators to examine burn patterns, assess the likely point of ignition, and establish whether the fire is of a delib-
erate or accidental nature (Dehaan, 1991). Such investigators examine the crime scene, but only to the extent of the cause and initial location of the fire. Unlike police, fire investigators in Australia do not investigate suspect(s) to an offense.

In adopting the research methodology previously employed by Kocsis and colleagues (Kocsis et al., 2000; Kocsis, Hayes, et al., 2002) with modification to empirically test the robustness of the prior stud-
ies, the current study sought to identify the skills and validity of profil-
ing. Toward this end, and in line with previous research, samples of
professional profilers, police detectives, fire investigators, science students, and a control group of participants given no information about the case were compared and assessed in terms of their respective abilities to accurately profile the offender of an arson offense series. It is expected that the findings of the current study will assist in improving our theoretical knowledge and practical understanding of the usefulness and validity of criminal psychological profiling.

METHOD

PARTICIPANTS

The police detective group contained 13 participants (12 males and 1 female) ranging in age from 29 to 50 years ($M = 37.23; SD = 5.59$). All members of this group were current police detectives engaged in active operational duties. In addition, all participants were either operating in a specialist police arson investigation unit or were detectives who were well experienced in investigating arson offenses.

The fire-investigator group contained 12 males ranging in age from 33 to 54 years ($M = 43.17; SD = 7.89$). All members of this group were current operational fire brigade officers and experienced firefighters. These officers, however, were attached to an arson crime scene examination unit or squad and had been specifically trained in the chemical and physical principles of fire cause-and-origin detection (principally involving study in the areas of forensic chemistry and physics). Although trained in arson crime scene examination, these individuals did not have experience as police investigators.

The control group was composed of 47 participants (16 males and 31 females) ranging in age from 17 to 75 years ($M = 34.38; SD = 16.49$) who were students at a local community technical and further education (TAFE) college in Australia. They were enrolled in various degree programs concerning basic computer literacy. These participants did not have any prior experience in police or fire brigade investigation procedures and did not have tertiary qualifications in this area. As such, they did not possess any formal skills or knowledge relevant to the task beyond their secondary education.
The group of professional profilers was composed of 3 males ranging in age from 43 to 58 years ($M = 51.33; SD = 7.63$) who identified themselves as engaged in the practice of constructing profiles for criminal investigative purposes. Unfortunately, unlike other disciplines, “profiling” is not one that is subject to regulatory controls in the way that doctors, lawyers, plumbers, and the like are with mechanisms for monitoring the standard of professional practice offered by practitioners within the discipline and the prescription of, inter alia, minimum qualifications for gaining entry to the profession or trade (Coleman & Kocsis, 2000). Consequently, selection for this group was based on each individual having a professional reputation in the public domain as providing profiling services and/or research in the area of criminal psychological profiles. To secure the participation of these profilers, confidentiality was assured. Although their levels of qualification varied, all possessed a tertiary qualification as a minimum qualification and had been consulted by a law enforcement agency for the purpose of constructing a psychological profile in the course of a criminal investigation. Numerous invitations were dispatched to potential participants, however the actual participation rate was unfortunately very low. The three professional profilers who participated in this particular study were all well-regarded, senior members of the forensic mental health profession who satisfied the conditions of the experiment.

Finally, the science-student group was composed of Australian university sophomores completing a Bachelor of Science with a major in chemistry. This group contained 21 participants (14 males and 7 females) ranging in age from 18 to 39 years ($M = 24.42; SD = 6.07$). Readers are advised to refer to Kocsis et al. (2000) for a full discussion of the rationale behind the selection of science sophomores. Although it is recognized that science students are not exclusively representative of skills of logical and objective reasoning, they were considered for the purpose of the current study to be representative of a logistically viable homogenous group. Such participants are by their education and training encouraged to objectively and critically analyze data. None of these participants had any experience in criminal investigation, the profiling of crimes, or scientific crime scene examination of arson offenses.
MATERIALS

The current study entailed the completion of a questionnaire consisting of several parts. The first section of the questionnaire contained a case description involving an offender who intentionally set fire to property on 13 separate occasions and which was presented to participants as a series of arson offenses (for the author’s definition of serial offense, please refer to Kocsis & Irwin, 1998). The case material supplied was composed of a crime scene schematic diagram, incident reports detailing all events, and forensic results concerning each of the fires. The schematic diagram illustrated, in plan arrangement, the core location of the structures targeted by the arsonist. The incident reports supplied to participants reported the findings of the investigating officers and the observations of witnesses and attending fire brigade personnel. Also included were the findings of forensic reports for each incident describing the manner in which the fires were most likely initiated, including the presence and use of accelerants and the presence or absence of physical forensic evidence, such as fingerprints, hair samples, shoe prints, and so on. The case involving this arsonist was randomly selected from the data pool of cases used in the study by Kocsis and Cooksey (2002), which examined the behavior patterns and offender characteristics of serial arsonists. In addition, 13 captioned photographs relating to the five largest fires were included as part of the case materials supplied. The photos of the various crime scenes depicted, inter alia, such factors as ignition method, the extent of damage to each of the structures, possible avenues of approach (showing how access to these structures may have been gained), and potential visibility (i.e., the degree of seclusion afforded the perpetrator by the surroundings as represented schematically by the plan and crime scene photographs). This section of the questionnaire contained all relevant information that was available and used by investigators to link the offenses and, ultimately, identify the offender responsible.

The second section was a 33-item multiple-choice questionnaire that required the participants to respond to questions about the physical characteristics of the offender, cognitions relevant to the offense, behaviors associated with the offense, and personal history of the offender. Responses to this section defined the respondent’s profile of the offender. The specific questions contained in the questionnaire can
be found in the Appendix. The instructions on the questionnaire requested the participants to indicate their predictions regarding the offender’s characteristics by circling the appropriate answer from among the options offered. They were instructed to choose the option closest to their belief, however if their preferred answer was not among the choices, or if they did not know the answer, they were asked to guess. The third section of the questionnaire (not shown in the Appendix here) contained a form requesting participants to sign a declaration acknowledging that they were not personally familiar with the facts of the case.

PROCEDURE

The administration of the questionnaire was undertaken in two ways. One was via a group administration, where the questionnaire was handed out to groups of participants who had gathered in large rooms, such as lecture theaters, classrooms, and briefing rooms. The other method entailed the questionnaire being individually disseminated to participants by their commanding officer or via the mail with instructions to complete the questionnaire in a take-home fashion and return it by mail to the researcher. For both methods, the administrator explained the objective of the study in general terms and the procedure for completing each of the forms. The administrator was also available to clarify any issue concerning the procedure of responding to the questionnaire. No clarification, however, was provided relating to the case material. Participants were asked not to discuss the case information with anyone, and they were asked to complete the questionnaire independently, without assistance. Participation was strictly voluntary, and no time limit was imposed on participants in completing the profiling task. [It must be clearly noted however, that the phrase “items correctly identified” denotes information that is empirically and objectively measured as accurate and does not refer to any standard related to the “perception” of accuracy. For a full discussion of the issues relating to the perception of accuracy in profiles readers are strongly recommended to refer to Kocsis and Hayes (2004) and Kocsis et al., (in press, a & b).] In both administration modes, participants were clearly instructed not to utilize any resources (reference
materials such as books, articles, Internet, and so on) and were to complete the survey in a single session. Regrettably, because of logistical constraints relating to the diverse locations of some participants, a uniform administration procedure was simply not viable.

A minor variation on this procedure was required for the control group. As these individuals were not given the full case report, they were asked to respond to the questionnaire in a way that corresponded with their views regarding “a typical serial arsonist.” The purpose of this group was to provide a control or baseline indication of what type of profile could be generated via the questionnaire in the absence of any specific case material and by relying on guesswork and stereotypical conceptions concerning a serial arsonist.

RESULTS

The approach adopted for the analysis was similar to the analysis undertaken in previous research (Kocsis et al., 2000; Kocsis, 2003b; Kocsis, Hayes, et al., 2002) and focused on two issues. The first being whether the four groups differed in the accuracy of their profiles and whether any differences could be discerned with respect to the four submeasures of information about the offender. The second being how each of the groups compared to the control group of participants who responded to the questionnaire without any knowledge of the details of the case except that it involved a serial arson.

The correct responses to the profiling task were previously obtained from the case file. The researcher previously developed the questionnaire with the assistance of the case file that provided details of the responsible offender. (Of course, the participants did not have access to these parts of the case file.) As the case had been solved previously, it was possible to determine with certainty the actual characteristics of the offender and compare those to the answers given by the participants in the current study. To quantify the number of questions correctly answered, each participant was assigned a score for each of the four accuracy submeasures (i.e., physical features, cognitive processes, offense behaviors, and social history and habits) as well as a summed total score. The physical features submeasure described
physical characteristics of the offender, such as height, build, and so on and included ethnicity and gender. The cognitive processes submeasure dealt with attributes relating to the offender’s motivations and responses concerning the crime and included such things as the perpetrator(s) sense of familiarity with the crime scene and so on. The offense behavior submeasure described behavioral attributes that may have occurred prior, during, or after the crime. Finally, the social history and habits submeasure described the background history of the offender and included such things as the offender’s marital status, education, and so on. The items that composed each of the submeasures appear in the Appendix.

To test for differences between the groups, a Poisson regression model rather than a more traditional analysis of variance was used. The nature of the data, in the form of counts, makes analysis of variance less appropriate for the following reasons: (a) with count data,
the mean and the variance tend to be correlated. As can be seen in Table 1, there was a relationship between the mean count for a group and its variance. Thus, the Poisson distribution of error appears to be better suited than the normal distribution; (b) similarly, because many of the counts tended to be small and were constrained to be above 0, it can be assumed that the normality assumption required for analysis of variance was violated. Poisson regression models count, and thus incorporate the fact that a count cannot be less than 0 in the analysis, and thus that the distribution of errors is not normal; (c) analysis of variance presumes homogeneity of variance, and its performance can be undermined when homogeneity of variance is combined with large differences in sample size. This is an especially important consideration when comparing the four groups to the control, as the $t$ distribution (or its $F$ counterpart when comparing two groups) is inadequate when variance equality is combined with discrepancies in group sample size (Boneau, 1960; Murphy, 1976). For a thorough description of Poisson regression beyond the brief explanation provided, it is recommended that readers consult a text on the topic of linear regression models such as Dobson (2002).

To compare the four groups to each other (i.e., police, students, profilers, and fire investigators), a Poisson regression model was run to predict the number of questions answered correctly from three dummy variables coding group membership, using the student group as the reference group. The test of significance is based on a comparison of the likelihood of the model including only a regression constant with one that includes the three dummy variables. This difference follows a chi-squared distribution on three degrees of freedom if the null hypothesis that the groups have the same mean is true. As can be seen in Table 1, the four groups differed significantly on the total number of questions correct, however no differences were found between the four submeasures (i.e., physical features, cognitive processes, offense behaviors, and social history and habits) about the offense or offender, although differences on the social history and habits measure were marginally significant ($p = .06$). Post hoc comparisons of the means were conducted by rerunning the regression and changing the reference group as appropriate to code the contrast of interest. To compensate for multiple tests, a Bonferroni/Holm correction was applied to
the \( p \) values (Darlington, 1990; Holm, 1979). This analysis demonstrated that overall, profilers answered more questions correctly than police detectives (total accuracy measure). Although the omnibus test for differences in social history and habits just missed significance, a post hoc analysis of this measure showed that profilers also answered more questions correctly than the police detectives about the social history and habits of the offender. No other comparisons were found to be significant.

The current study sought to investigate whether any of the groups demonstrated accuracy above and beyond what would be expected if the respondents merely answered the questionnaire relying on a stereotype of the typical serial arsonist. This investigation again made use of a Poisson regression model. On this occasion, four dummy variables were used to code the five groups, using the control group as the reference. The individual coefficients from the regression model and their tests of significance quantify and test the difference between each group mean and the control. To correct for multiple comparisons, a Bonferroni/Holm correction was applied to the resulting \( p \) values. The results of the current study as reported in Table 1, appear consistent with earlier findings (Kocsis et al., 2000; Kocsis, Hayes, et al., 2002) in that professional profilers and science students answered more questions correctly than the group given no information about the case. This was true on the total accuracy measure and the social history and habits measure. No other groups statistically outperformed the control group. From a purely descriptive perspective, consideration needs to be given to the consistency of the results across all measures. The professional profilers answered more questions correctly on all but one measure of accuracy examined (this being the submeasure of offense behaviors), while the science students consistently ranked second to the profilers with the exception of the offense behaviors submeasure in which they excelled. It is important to note, however, that the performance of the profilers was not statistically distinct from the science students across any of the measures. However, professional profilers were statistically better than the police detectives on the total accuracy measure and social history and habits submeasure. Of all four groups, the performance of the fire investigators and police detectives was no better than the control group who relied on the social stereotype to construct the profile.
DISCUSSION

Although the limitations of the small sample of professional profilers is acknowledged, the results nonetheless represent another modicum of empirically based research that examines the ability of professional profilers to accurately identify the characteristics of an unknown offender relative to other groups. The results suggest, much similar to the previous research (Kocsis et al., 2000), that professional profilers tend to perform in superior fashion to other groups in accurately describing the characteristics of an unknown criminal offender. Although profiling has been assumed to be applicable to serial or recidivistic crime and crimes of arson, such assumptions were not, previous to the current study, empirically tested. The findings of the current study serve in a modest way, therefore, to address this paucity and provide some empirical support for the effectiveness of psychological profiling in serial offenses, and more specifically, the assessment of serial arson offenses.

A noteworthy feature of the current results is their consistency with the previous findings of Kocsis et al. (2000) and Kocsis, Hayes, et al. (2002), in spite of having used a new case concerning a different type of crime (arson rather than homicide). From a methodological perspective, this is of special importance, as the current results run counter to the proposition that earlier findings may have been attributable to some artifact inherent in the case material that was used in those earlier studies. Nonetheless replication of the current study would be useful to finally discount the contention by some that idiosyncratic features unique to the case material utilized in the current study, or that previously of Kocsis and colleagues (Kocsis et al., 2000; Kocsis, Hayes, et al., 2002), may account for the observed patterns.

The results of the current study concerning the inherent skills required for accurate profiling are consistent with the outcomes previously observed in the Kocsis et al. (2000) and Kocsis, Hayes, et al. (2002) studies: Science students perform comparatively well in the simulated-profiling experiments. A pattern that emerges from this and previous studies is that among the nonprofiler groups, the most accurate participants are science students. This outcome is consistent with the possibility (although by no means does it conclusively establish) that logical and objective reasoning is an important requisite skill for
effective profiling. Although anything akin to objective or logical reasoning was not measured in the current study, science students in the current study were identified a priori on the grounds that they would most likely be representative of such abilities.¹

Conversely, and again consistent with the findings of Kocsis et al. (2000) and Kocsis, Hayes, et al. (2002), the current results did not support the hypothesis of Hazelwood et al. (1995) concerning the quintessential importance of investigative experience, or its qualified variation concerning the nature of that investigative experience. Neither the police detectives nor the fire investigators were found to significantly outperform the control group of participants that merely guessed or relied on the social stereotype of a serial arsonist when responding to the questionnaire; the science students, however, did. These results suggest that prior experience in criminal investigations is not a necessary skill for effective criminal psychological profiling. Indeed, the results found that the profilers (none of whom in the current study had any experience as either law enforcement or fire-brigade investigators) also significantly outperformed the police detectives, thus providing a measure of support for the value of professional profilers in investigations involving serial arson.

A finding that also emerged from the results was group differences in the type of information that profilers could accurately predict. Although no significant results were found on items concerning cognitive processes or offense behaviors of the offender, the professional profilers were found to have accurately predicted a significantly higher number of physical features and features concerning the offender’s social history and habits compared to the control group. These findings do not entirely correspond with earlier findings arising in the context of homicide (Kocsis et al., 2000). In the previous study referred to, every group examined (except the psychics) performed better than the control group on the accurate identification of physical characteristics. In addition, the sample sizes in that study were larger, so the failure to replicate that finding may be attributable only to differences in power between the two studies. The earlier study found that science students were the only ones who were more accurate in the identification of the social history and habits of the offender. That finding was replicated here, although in the current study, the profilers
also outperformed the control group. Perfect replication is difficult to achieve; however, even if the sample sizes and power were equivalent, as in the two studies, there is no reason to assume that all types of crime are amenable to profiling. It is important for the reader to keep in mind, however, that these results say nothing about the capabilities of police detectives or fire investigators in the performance of their duties generally. Nor do these results serve as evidence of the likely capabilities of science students performing the tasks of police detectives or fire investigators. These results are only representative of the comparative efforts of the various sampled groups in constructing a criminal psychological profile of an unknown serial arson offender. As Geberth (1996) and Stevens (1997) clearly indicated, criminal psychological profiling is a specialized forensic technique that most police officers do not routinely engage in or receive formal training for. As such, it may come as no surprise to many that the police officers did no better than the control group. It would seem that this is indicative of a lack of specific training or experience in the task assigned to them. The science students used, however, similarly lacked specific training or experience in profiling, and yet in three consecutive studies were found to have been surprisingly good at the profiling task presented. For this reason, replication is encouraged to explore these findings and to improve our understanding of what science students bring to the task of criminal psychological profiling; in particular the mental processes involved in arriving at their conclusions and formulating a profile. The current study only examined the outcomes of profiling but did not explore the underlying processes involved in constructing a profile. Ultimately the results of such an investigation would serve to advance the practice of profiling.

**APPENDIX**

**Offender-Characteristics Questionnaire**

Instructions: This questionnaire systematically surveys the principal characteristics of the offender who committed these crimes. For each item indicate your prediction of the offender’s characteristics by circling the appropriate number. If you think you know the correct answer, but your answer is not among the options, choose the option that is closest to your answer. If you are unsure of the correct answer, simply guess at it. Make sure you complete each and every item.
Physical Characteristics

1. The offender is (1) male; (2) female.
2. The offender is aged (1) 1-12 years; (2) 13-17; (3) 18-25; (4) 26-35; (5) 36-45; (6) 46-55; (7) over 56 years.
3. The offender’s ethnic background is (1) Anglo-Saxon; (2) Mediterranean; (3) European; (4) Middle Eastern; (5) Asian; (6) Aboriginal; (7) African-American; (8) Other.
4. The offender’s general build: (1) thin; (2) average; (3) solid/muscular; (4) fat.
5. The offender’s height: (1) very short; (2) short; (3) average; (4) tall; (5) very tall.
6. The offender’s hair color: (1) fair; (2) red; (3) brown; (4) black; (5) grey; (6) none/bald.
7. The offender’s hair style: (1) none/bald; (2) very short; (3) short straight; (4) short curly; (5) long straight; (6) long curly.
8. Presence of facial hair: (1) none/clean shaven; (2) marked stubble; (3) moustache; (4) short beard; (5) long/full beard.

Cognitive processes

9. Prior to the offense, was the offender familiar with where any of the offenses took place? (1) yes, highly familiar; (2) yes, vaguely familiar; (3) no.
10. Did the offender feel comfortable in any of the areas where the offenses took place? (1) yes; (2) no.
11. Did the offender have any prior awareness, relation, or familiarity with the attacked structures? (1) yes; (2) no.
12. What was the primary motive for the offenses? (1) profit; (2) revenge; (3) excitement; (4) vandalism; (5) crime concealment; (6) political agenda; (7) other.
13. The offenses were (1) totally unplanned, spontaneous; (2) thought of previously but never actually planned; (3) some planning; (4) carefully planned.
14. Prior to any of the offenses did the offender have any type of fantasy regarding these fires? (1) yes; (2) no.
15. Did the offender experience any remorse about any of the offenses? (1) yes, a great deal; (2) yes, some; (3) no.

Offense behaviors

16. At the time of the offenses, did the offender live within a 5-km radius of the location of where any of the offenses took place? (1) yes; (2) no.
17. Did the offender take any precautions to protect his or her identity when committing these attacks? (1) yes; (2) no.
18. Was the offender present at any of the crime scenes when the fires were being extinguished? (1) yes; (2) no.
19. Did the offender take away any items from any of the crime scenes (theft, souvenir, etc.)? (1) yes; (2) no.
20. Did the offender engage in any form of sexual activity prior, during, or after igniting any of the fires? (1) yes; (2) no.
21. If the offender were apprehended and on police interview do you believe he or she would confess? (1) yes, would readily confess; (2) yes, however would require persuasion; (3) no, would not confess despite all persuasion and evidence presented against him or her.

Social history and habits

22. The offender’s current marital status: (1) single; (2) married; (3) de facto; (4) divorced.

23. The offender’s highest level of education: (1) completed primary school; (2) dropped out of high school; (3) completed high school; (4) completed technical college; (5) completed university degree.

24. The offender’s general employment history: (1) student, not yet employed; (2) mostly unemployed; (3) irregular, part-time employment; (4) regular work as a blue-collar worker; (5) regular semiskilled work; (6) regular skilled/white-collar worker.

25. The offender’s religious beliefs: (1) Protestant; (2) Catholic; (3) Greek Orthodox; (4) Jewish; (5) Muslim; (6) Buddhist; (7) Nil (atheist, agnostic); (8) Other.

26. Offender’s history of (romantic) relationships: (1) no prior relationships; (2) very few, brief, casual relationships; (3) a few, relatively long, casual relationships; (4) many short, casual relationships; (5) many long, casual relationships; (6) a few, relatively short, serious relationships; (7) a few, relatively long, serious relationships; (8) many short, serious relationships; (9) many long, serious relationships.

27. Offender’s history of (nonromantic) relationships: (1) no friends; (2) very few, brief, casual friendships; (3) a few, relatively long, casual friendships; (4) many short, casual friendships; (5) many long, casual friendships; (6) a few, relatively short, deep friendships; (7) a few, relatively long, deep friendships; (8) many short, deep friendships; (9) many long, deep friendships.

28. Did the offender ever serve in any of the armed forces? (1) yes; (2) no, but thought of it; (3) no.

29. The offender’s alcohol consumption: (1) nil; (2) low; (3) medium; (4) in binges; (5) high.

30. Do you believe the offender suffers from any form of mental illness/disorder? (1) yes; (2) no.

31. How old is the offender’s vehicle? (1) none owned; (2) 1-2 years old; (3) 3-5 years old; (4) 6-10 years old; (5) over 10 years old.

32. Condition and model of offender’s car: (1) does not apply; (2) “flashy” model in excellent condition; (3) conservative model in excellent condition; (4) “flashy” model in good condition; (5) conservative model in good condition; (6) “flashy” model in poor condition; (7) conservative model in poor condition.

33. Is the offender likely to have a criminal record for any type of previous offense(s)? (1) yes; (2) no.
NOTE

1. During the data collection for Kocsis, Hayes, and Irwin (2002), the Reasoning subscale of the Cattell 16 Personality Factors Inventory (16 PF) was administered to groups of science students, police recruits, and police detectives. The science students did score significantly higher on this scale than the other groups. To satisfy space limitations for publication, these results were not reported in the published form of that paper. Nonetheless, interested readers may refer to Kocsis (2003a) for further discussion of the attributes and performance of science students in similar profiling experiments.

REFERENCES

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