DOI: 10.29751/JRDP.202506_16(1).0002

台灣青少年犯罪防治研究期刊

第十六卷第一期 2025，23-48 頁

【研究論文】

The Establishment Study for Taiwan Arson Static Recidivism Risk Assessment Scale

Sheng-Yi Hong[1] Min-Chieh Lin[2]

Abstract

Arson often causes heavy loss of life and property, which requires active prevention by all countries. So far, there is no risk assessment scale for use. The purpose of this study is to establish a static recidivism risk assessment scale for arsonists. In this study, 226 participants were collected from the database in Taiwan Fire Department among 4.5 years, with an average tracking period of 12.3 years. It was found the recidivism rate is 17.7% and six risk variables were significantly associated to it. They included criminal diversity, past experience of playing with fire, mental disorder, number of arson, habit of staying at the scene, and history of drug abuse. The ROC (Responsive Operative Characteristic) values of the Risk Assessment Scale for the one-year, five-year and ten-year follow-up periods were calculated to be 0.785, 0.912 and 0.965, respectively. It is a high predictive validity scale.

Keywords: arson, arsonist, recidivism, risk assessment

[1] Deputy Battalion Chief, Third Disaster Rescue and Emergency Medical Service Corps, Kaohsiung City Fire Department, Taiwan

[2] Corresponding Author, Professor, Department & Graduate Institute of Criminology, National Chung Cheng University, Taiwan

台灣縱火者靜態再犯風險評估量表之建立研究

洪聖儀[3]、林明傑[4]

摘要

縱火往往造成重大的人命與財產損失，因此各國皆需積極防範。然而目前尚無針對縱火犯的風險評估量表可供使用。本研究旨在建立一套靜態縱火犯再犯風險評估量表。本研究從台灣消防署的資料庫中蒐集了 226 名研究對象，時間跨度為 4.5 年，平均追蹤期間為 12.3 年。研究結果發現，再犯率為 17.7%，並有六項風險變項與再犯顯著相關，分別為：犯罪多樣性、過去玩火經驗、精神疾患、縱火次數、滯留現場的習慣，以及藥物濫用史。該風險評估量表在一年的、五年的與十年的追蹤期間中，其預測效度 ROC 值分別為 0.785、0.912 與 0.965，屬於高預測效度之量表。

[3] 高雄市政府消防局（第三救災救護大隊）副大隊長
[4] 通訊作者，國立中正大學犯罪防治學系暨研究所教授

DOI: 10.29751/JRDP.202506_16(1).0002

Arson is a crime issue that all countries in the world must always concern deeply with a cautious and serious attitude. Dr. Henry C. Lee , an internationally well-known forensic expert, said: "Arson has become one of the most expensive crimes in the world. About 1/3 of building fires are caused by arson, and the losses caused by arson each year exceed 5.5 billion US dollars. Arson killed about 1,000 people and injured about 20,000 people" (Taiwan Fire Department, 2005). The United States and Canada are the most serious fire problems in global cities (Quinsey, Harris, Rice, & Cormier, 1998), and arson in New Zealand, the United Kingdom Countries such as the Netherlands, the Netherlands and Denmark have also ranked among the top three fire causes for a long time (Geller, 1992).

Therefore, the purpose of the study is to establish a localized arson recidivism prediction tool in Taiwan. According to domestic and foreign literature to select relevant factors related to arson recidivism, and verify it with Taiwan's previous arson criminals to establish a scale suitable for Taiwan's arson recidivism risk assessment. It will be an excellent tool to assist domestic judicial, correctional, police, and fire personnel to conduct preliminary screening to assess the recidivism risk of each arsonist quickly, and classify them into high, medium and low risk, and design and plan out a more effective mode of judicial treatment and clinical treatment to reduce the rate of recidivism and harm in the future.

Motivation of Arsonists

The danger of arson recidivism is closely related to its motives. Scholars Sakheim and others have concluded the following conclusions through empirical research: people who set fires with curiosity motives are only low-risk; people who set fires because of emotional problems to seek help or attract attention have moderate high risk; arsonists for the purpose of rebelling against authority and revenge to vent their hatred may have a combination of antisocial tendencies are high risk; continuous arsonists for pleasure-seeking and mental distress are extremely dangerous (Sakheim, Osborn, & Abrams, 1991). A recent Finnish medical team conducted a 26-year longitudinal follow-up study of male arsonists and found that their arson behavior was associated with high mortality, especially those with suicide records, psychiatric comorbidities and alcohol use disorder treatment (Thomson, Tiihonen, Miettunen, Virkkunen, & Lindberg, 2015). Taiwan scholars had conducted empirical research on adult arsonists, and believed that the motives of arson, such as annihilating evidence, pursuing excitement, having no special reason, responding to hallucinations, seeking benefits, wanting to destroy, and attracting attention of higher risk of recidivism (Huang Junyi, Lin Bangjie, 2005). From the above discussion, it can be confirmed

that the motives of arson are diverse and complex. Therefore, the new generation of risk assessment scale uses statistics as an important tool in risk management methods. Through quantitative analysis, it can calculate offenders and offending characteristics, and can predict the possibility of offenders re-offending in the future. Through the precise actuarial process, inmates or parolees with low, medium and high levels of recidivism risk groups can be classified, and corresponding corrective measures can be given to achieve the goal of making good use of social resources and improving government efficiency. The United States and Canada have developed risk assessment tools for sex offenders, which are designed based on this concept, and are worthy of reference for our research.

Risk Assessment of Arsonists

Crime prediction is a new trend for criminal justice in the 21st century to face various types of crimes, expecting to provide specific and feasible crime prevention strategies for criminal justice through scientific development. For a long time, the effectiveness of institutional treatment has been criticized, and the past mode of criminal correction treatment has evolved through actuarial risk assessment to control crime. A rapid, accurate and feasible recidivism risk prediction scale will be established, which will provide a reference for judicial and correctional agencies to evaluate the effectiveness of punishment or treatment and reduce arson recidivism.

Three generations of risk assessment

Canadian scholar Bonta (1996) divided risk assessment into three generations. The first generation is the clinical staff predicting the potential future violent behavior based on their clinical experience, and its disadvantage is that it is mostly based on the subjective and unsystematic knowledge of the clinical staff; while the second and third generations are based on statistics and use actuarial methods for risk assessment. Among them, the second generation of risk assessment is to predict future recidivism by combining a number of static risk factors that are statistically significantly correlated with recidivism as a scale. Static factors refer to historical factors that are significantly related to the predicted target, such as victim characteristics, offense methods, and criminal history. The third generation considers the criminogenic need or called dynamic factors, which refers to the dynamic factors related to recidivism, such as the attitude of behavior including former offense and future offense, and the current adaptability of the working, relationship, and family.

Canadian correctional scholars Andrews and Bonta (1998) proposed the "social learning theory" of criminal behavior, which proposed to integrate some important dynamic and static risk factors as an evaluation tool for predicting recidivism and

DOI: 10.29751/JRDP.202506_16(1).0002

providing treatment in the future. Based on the results of four meta-analysis, they also testified the second-generation actuarial risk assessment is much more accurate than the first-generation risk assessment. The offenders are classified according to the risk levels as a consideration in the decision of parole.

The United States and Canada are the most advanced countries in the world for treating sexual offenders. They had developed sexual offender risk assessment scale and implemented judicial and clinical treatment accordingly. Taking Canada as an example, the recidivism risk assessment scale for offenders or inmates has been developed since 1993：VRAG (Violence Risk Appraisal Guide, Quinsey, Harris, Rice, & Cormier, 1998), SORAG (Sex Offender Risk Appraisal Guide, Quinsey et al, 1998), Static-99 Scale (Hanson & Thornton, 1999), above all are static factor scales; Minnesota states of the United States revised the Sex Offender Screening Assessment Scale MnSOST-R in 1999 (Epperson, 1999) including static and dynamic factor is the one with the higher prediction correlation coefficient (r can reach 0.45) in the risk assessment scale. The current research trend is towards the development of dynamic risk factors (including dynamic stability and acute risk factors). For example, SONAR(Sex Offender Need Assessment Rating, Hanson & Harris, 2000), and SOTNPS(Sex Offender Treatment Need and Progress Scale, McGrath & Cumming, 2003). Both are scales of dynamic factors, the principle of which is to use statistical actuarial methods to find out the factors related to recidivism, and aggregate them to form high predictive accurate recidivism risk assessment scale.

This paper intends to use the actuarial model to predict the recidivism of arson. In the case of recidivism, Taiwan has not yet published any literature on recidivism research on former arson offenders. It is expected that the arson recidivism risk assessment scale can be constructed in this study for better arson re-offense prevention based on objectivity, validity and convenience.

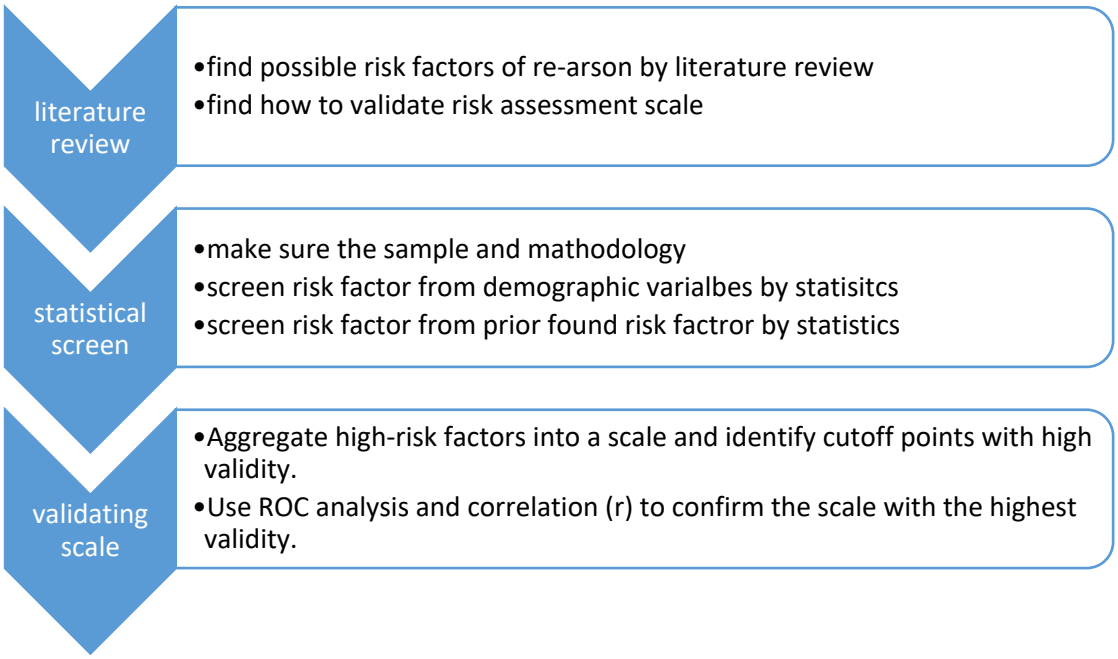
METHODS

Study Structure

Based on the methodology of Static-99 developed by Hanson & Thornton (1999), we developed a three-step of this study as shown in Graph 1. The first step was literature review on possible risk factor on re-arson and methodology of static risk assessment scale. The second step is to screen each possible risk factor and the re-arson or not has a significant relationship, and then the third is to form a risk assessment scale with a highest vialidity.

Participants

In this study, 226 participants were selected from the database in Taiwan Fire Department among 4.5 years over all in Taiwan, with an average tracking period of 12.3 years.



Graph 1 The Study Structure of this Researsch

Statistics

X^2 and Pearson r were used to test the association and correlation between risk variables and arson recidivism, respectively.

Hanson (1997) pointed out that correlation coefficient r (Pearson's r) and the area under the ROC curve (also called AUC) can be used to describe the accuracy of the risk assessment scale. This study would induce the two way for accuracy.

RESULTS

After checking each case, a total of 40 of them committed arson more than once after being released from prison. It is estimated that the recidivism rate of arsonists in my country is 17.7%.

Demographic variables

(1) Gender

This study tracked 226 arson ex-offenders, including 198 males (87.6%) and 28

DOI: 10.29751/JRDP.202506_16(1).0002

females (12.4%). It can be seen that the domestic arson criminals are still dominated by men (about 90%), and women only make up a minority, which is roughly consistent with the survey results of domestic and foreign related arson criminals.

(2) Age

The study tracked 226 arson offenders with an average age of 34.7 years old and a standard deviation of 11.7 years old. The age of crime was concentrated between 23 and 46.4 years old (68%), with the oldest being 73 years old and the youngest being 13 years old (Table 1).

(3) Education level

Among the 226 arson offenders in this study, 16 were elementary school (7.1%), 90 were middle school (39.8%), 111 (49.1%) were senior high school (or vocational), and 111 were junior college or above. 9 (4%). Among them, the total education level of middle school and high school (vocational) is as high as 89% (Table 1).

Table 1 Gender and Education levels of the samples

Gender	**N (%)**	**Education level**	**N (%)**
Male	198 (87.6%)	Primary school	16 (7.1%)
Female	28 (12.4%)	Junior high school	90 (39.8%)
		Senior high/vocation	111 (49.1%)
		college	9 (4%)
total	226 (100%)		226 (100%)

Risk variables

We collected 11 risk variables of arson recidivism, which mainly take each evaluation item as the independent variable. During the average tracking period of 12.3 years, the difference between the dependent variables of whether there is arson recidivism behavior or not .The results of correlation analysis (including chi-square and association analysis) are used to present the correlation between independent variables and dependent variables. Preliminary analysis found that there are six items that may be related to the recidivism of arson, namely "criminal diversity", "experience of playing with fire in the past", "mental disorder", "number of arson", "habit of staying at the scene" and "drug abuse". 6 questions such as "foreign

participants", so the variables of these 6 questions are selected for subsequent weighting and analysis.

(1) Diversity of crimes

Chi-square analysis showed $\chi 2=12.34$, $p=.015$ ($<.05$), reaching the level of significant association. Correlation coefficient $r=.208$, $p=.002$ ($<.01$), showed a positive correlation.

(2) Past experience of playing with fire

Chi-square analysis showed $\chi 2=17.04$, $p=.000$ ($<.001$), reaching the level of significant association. Correlation coefficient showed $r= .265$, $p = .000$ ($<.01$), indicating a positive correlation.

(3) Mental disorders

Chi-square analysis showed $\chi 2=7.16$, $p=.007$ ($<.001$), which reaching the level of significant association. Correlation coefficient showed $r= .178$, $p = .007$ ($<.01$), indicating a positive correlation. It is shown that if arson cases are mentally abnormal, the proportion of arsonists in the future is significantly higher than that of arsonists with normal mentality.

(4) Number of arson attacks (excluding this case)

Chi-square analysis results $\chi 2=219.2$, $p=.000$ ($<.001$), reaching the level of significant association. Correlation coefficient $r= .809$, $p = .000$ ($<.01$), indicating a positive correlation.

(5) Habits of staying on site

Chi-square analysis results $\chi 2=13.93$, $p=.000$ ($<.001$), reaching the level of significant association. Correlation coefficient $r= .248$, $p = .000$ ($< .01$), indicating a positive correlation. It shows that if arsonists have the habit of staying at the scene to watch the fire, the proportion of repeat arsonists in the future will be significantly greater than those who have no habit of staying at the fire scene.

(6) Use of arson

Chi-square analysis showed that $\chi 2=1.37$, $p=.242$ ($>.05$), which did not reach a significant level. It showed no difference in recidivism performance whether or not the arsonist used solvent.

(7) Whether drinking alcohol before arson

Chi-square analysis showed that $\chi 2=0.274$, $p=.600$ ($>.05$), which did not reach a significant level. It showed no difference in recidivism performance whether or not the arsonist drank before the arson.

DOI: 10.29751/JRDP.202506_16(1).0002

(8) A history of drug abuse

Chi-square analysis resulted $\chi 2=7.12$, p=.008 (<.001), reaching the level of significant association. Correlation coefficient r = .177, p = .007 (<.01), indicating a positive correlation. . It shows that if arsonists have a history of drug abuse, the proportion of future arson offenders is significantly higher than that of those without a history of drug abuse.

(9) The age of the first offender is less than 18 years old

Chi-square analysis showed that $\chi 2=2.85$, p=.091 (>.05), which did not reach a significant level. It showed that there was no difference in recidivism performance regardless of whether the arsonist was younger than 18 years old or not.

(10) The motive for arson is hatred and revenge

Chi-square analysis showed that $\chi 2=0.366$, p=.545 (>.05), which did not reach a significant level. It showed no difference in recidivism performance regardless of whether the arsonist was motivated by hate or revenge.

(11) Drunk driving record

Chi-square analysis showed that $\chi 2=2.554$, p=.11 (>.05), which did not reach the significant level. It showed that there was no difference in recidivism performance regardless of whether the arsonist had a drink-driving record or not.

Table 2 Summary of the analysis of each risk variables (with a follow-up period of 12.3 years)

Item **ROC=.978**	**options**	**%**	**recidivism**		**X^2** **(p value)**	**r** **(p value)**
			N	%		
1. criminal diversity	0	36.7	6	7.2	X^2=12.34 (.015*)	**.208 (.002**)**
	1	25.2	11	19.3		
	2	21.2	13	27.1		
	3	8.8	4	20		
	4 & above	8	6	33.3		
2. past experience of playing with fire	No	71.7	19	11.7	X^2=17.04 (.000***)	**.265 (.000***)**
	Yes	28.3	21	32.8		
3. mental disorder	No	78.3	25	14.1	X^2=7.16 (.007**)	**.178 (.007**)**
	Yes	21.7	15	30.6		
4. number of past arson	0	82.3	1	0.5	X^2=219.2 (.000***)	**.809 (.000***)**
	1	11	25	100		
	2	3.1	7	100		
	3	1.8	4	100		
	4 & above	1.8	4	100		
5. habit of staying on the scene	No	58.8	13	9.8	X^2=13.93 (.000***)	**.248 (.000***)**
	Yes	41.2	27	29		
6.using solvent	No	49.1	23	20.7	X^2=1.37 (.242)	**.078 (.244)**
	Yes	50.9	17	14.8		
7.drink before arson	No	69	29	18.6	X^2=0.274 (.600)	**.035 (.602)**
	Yes	31	11	15.7		
8. previous record of drug abuse	No	85.5	29	14.9	X^2=7.12 (.008**)	**.177 (.007**)**
	Yes	14.2	11	34.4		
9 first crime under age18	No	89.9	33	16.3	X^2=2.85 (.091)	**.112 (.092)**
	Yes	10.2	7	30.4		
10.movtivated by revenge or hate	No	64.2	24	16.6	X^2=0.366 (.545)	**.040 (.547)**
	Yes	35.8	16	19.8		
11.Drunk driving	No	81.4	29	15.8	X^2=2.554 (.110)	**.106 (.111)**
	Yes	**18.6**	**11**	**24.2**		

Note. *means p＜.05，**means p＜.01，***means p<.001

DOI: 10.29751/JRDP.202506_16(1).0002

The Nuffield weighting method is based on the presence or absence of a risk factor for arson to compare the recidivism rate. If it is 5% higher than the average recidivism rate, it is weighted by 1, and every 5% less than the average recidivism rate is weighted by -1 (Nuffield, 1982). The total score of the static scale and the recidivism rate of Nuffield's method are shown in Table 3. According to the difference in the recidivism rate of each score, the scores are classified according to the degree of danger. The recidivism rate of -7 to 10 points is below 8%, while the recidivism rate of 12 to 18 points is about 12% to 36% (18 points). The recidivism rate of those who score is slightly lower, and the recidivism rate for those with more than 19 points is almost more than 66%, so the difference in recidivism rate change is used as the classification of the degree of recidivism risk. During the 12.3-year follow-up period, the low-risk group with a score of -7 to 10 had a recidivism rate of 4.8%, the medium-risk group with a score of 12 to 18 had a recidivism rate of 23.8%, and the high-risk group with a score of 19 and above achieved a recidivism rate of 82.4%. This method can preliminarily classify arson offenders as low, medium and high risk types, and predict the possibility of re-offending arson, which can be used for reference by police, fire and corrections units.

Table 3　Totals and their Recidivism Rate in Risk Assessment Scale

total（Nuffield method）	Re-arson／totals of score	Recidivism rate（%）（average tracking 12.3 years）	Risk level	Recidivism rate of each level
-7~-2	0／26	0		
-1~2	1／32	3.1	Low	4.8%
3~8	3／38	7.9		
10	2／29	6.9		
12	5／39	12.8		
15	8／22	19.5	mediu m	23.8%
16	4／11	36.4		
18	3／12	25		
19	6／9	66.6	high	82.4%
20~30	8／8	100		

Table 4　Correlation analysis of 6 items related to arson recidivism factors

		criminal diversity	mental disorder	past playing fire	staying on the scene	drink before arson	number of past arson
criminal	Pearson r	1	-.212**	.104	-.141*	.380**	.124
diversity	p (2-tail)		.001	.120	.034	.000	.063
	N	226	226	226	226	226	226
mental	Pearson r	-.212**	1	.074	-.106	-.090	.204**
disorder	p (2-tail)	.001		.265	.114	.175	.002
	N	226	226	226	226	226	226
past	Pearson r	.104	.074	1	-.093	.055	.242**
playing	p (2-tail)	.120	.265		.163	.414	.000
fire	N	226	226	226	226	226	226
staying	Pearson r	-.141*	-.106	-.093	1	-.073	-.258**
on the	p (2-tail)	.034	.114	.163		.274	.000
scene	N	226	226	226	226	226	226
drink	Pearson r	.380**	-.090	.055	-.073	1	.211**
before	p (2-tail)	.000	.175	.414	.274		.001
arson	N	226	226	226	226	226	226
number	Pearson r	.124	.204**	.242**	-.258**	.211**	1
of past	p (2-tail)	.063	.002	.000	.000	.001	
arson	N	226	226	226	226	226	226

＊p＜.05　＊＊p＜.001　＊＊＊p＜.001

The static recidivism risk assessment scale

In this study, the method and process of analyzing and testing the relationship between these risk factors and recidivism during the one-year, five-year and ten-year follow-up period are the same as the steps established by the average observation of 12.3 years, and the six effective predictors are respectively implemented. After chi-square and correlation analysis, a summary table of recidivism risk factors existing in each time period was organized. The scoring method of the static assessment scale score is also based on the Nuffield weighting method. The scores and the results of recidivism and arson in each period were cross-analyzed, and the point where the recidivism rate changed greatly was selected as the cut-off point, and the categories of recidivism danger were defined, and the ROC values were 0.785, 0.912 and 0.965,

DOI: 10.29751/JRDP.202506_16(1).0002

respectively. See Tables 4-1-14 and 4-1-15 for the static recidivism risk assessment scale for arsonists in Taiwan.

Table 5　Taiwan Arson Static Recidivism Risk Assessment Scale

Item	Time	1 year（12 months）	5 years（60 months）	10 years（120 months）
	average recidivism rate	1.3%	6.2%	14.2%
1. criminal diversity	1 time	[ ] 0	[ ] 0	[ ]-1
	2-3 times	[ ]+1	[ ]+2	[ ]+3
	4 and above		[ ]+6	[ ]+6
2. past experience of playing with fire	No	[ ] 0	[ ] 0	[ ] 0
	Yes	[ ]+2	[ ]+2	[ ]+2
3. mental disorder	No			[ ] 0
	Yes			[ ]+2
4. the number of past arson	1 time	[ ] 0	[ ] 0	[ ]-3
	2-3 times	[ ]+16	[ ]+16	[ ]+16
	4 and above		[ ]+16	[ ]+16
5. habit of staying on the scene	No		[ ]-2	
	Yes		[ ]+2	
6. previous record of drug abuse	No	[ ] 0	[ ] -1	[ ] -2
	Yes	[ ]+2	[ ] +3	[ ]+5
Totals				

Note. The space left empty means no significance on relationship. This table was kept its vertical line.

Table 6　Page 2 of the scale (risk levels and recidivism rates for 1, 5, & 10 years)

Time		1 year （12 months）		5 years （60 months）		10 years （120 months）	
Totals of scales							
Range		0～18		-3~21		-7～30	
Cut-off of levels & average recidivism rate	Low risk	[ ] 0~6	1.2%	[ ] -3~4	4.7%	[ ] -7~10	5.1%
	Middle risk	[ ] 7~10	12.5%	[ ] 6-15	15.8%	[ ] 12~21	28.6%
	High risk	[ ] 12~18		[ ] 16-21	30.4%	[ ] 22-30	40.2%
Predictive validity	r	.238		.328		.312	
	ROC	.785		.912		.965	

Note. The space left empty means no significance on relationship. This table was kept its vertical line.

CONCLUSIONS AND SUGGESTIONS

Conclusion

1. This study screened 6 predictors that were significantly associated with recidivism from 10 variables. The 6 risk predictors were the number of arson, past experience of playing with fire, mental disorder, habit of staying on the scene, criminal diversity, and previous record of drug abuse.
2. In this study, the 1-year, 5-year and 10-year static recidivism risk assessment scales were established using the Nuffield weighting method for the six effective predictors analyzed during the 1-year, 5-year and 10-year follow-up periods, respectively. The ROC values of predictive validity were 0.785, 0.912 and 0.965, respectively.

DOI: 10.29751/JRDP.202506_16(1).0002

Suggestions

1.After completing the first static recidivism risk assessment scale for arsonists, it is expected that judicial, correctional, police, and fire personnel will be able to conduct preliminary screening to quickly assess the recidivism risk of each arsonist, and use the scale to assess the recidivism risk of each arsonist. After high, medium, and low risk are rated , more effective judicial treatment and clinical treatment models can be designed and planned in the future to reduce the recidivism rate and injury.

2. This study did not delve into the psychological state of the various types of arsonists, and only found the diversity of crimes, the presence or absence of revenge mentality, and the presence or absence of psychiatric diagnoses based on case file data. It is suggested that future research could clarify perceptions and shifts in fire and arson from childhood to adulthood in interviews with arsonists in order to implement the direction of early intervention, treatment and supervision in the future.

REFERENCES

Andrews, D. A., & Bonta, J. (1998). *The psychology of criminal conduct*. Cincinnati, OH: Anderson.

Bonta, J. (1996). *Risk-needs assessment and treatment. In A. T. Hartland (Ed.) Choosing correctional options that work: Defining the demand and evaluating the supply.(pp.18-32)*. Thousand Oaks, CA, US: Sage Publications, Inc, xviii, 275 pp.

Epperson, D. L., Kaul, J. D., Huot, S. J., Hesselton, D., Alexander, W., & Goldman, R. (1997). Minnesota Sex Offender Screening Tool - Revised [Online] available http://www.psychology.iastate.edu/faculty/epperson/mnsost_download.htm.

Huang, J. &Lin, P. (2005). The Prevalence and Recidivism Risk by Motives of Arson Inmates. Chinese Journal of Mental Health (in traditional Chinese)，47(1)，25-37。

Hanson, R. K., & Harris, A. (2000). The Sex Offender Need Assessment Rating (SONAR): A method for measuring change in Risk Levels. Ottawa, Canada: Department of the Solicitor General Canada. Retrieved from http://www.sgc.gc.ca/publications/corrections/200001b_e.asp_

Hanson, K. & Thornton, D. (1999). Static 99: Improving actuarial risk assessments for sex offenders. Ottawa, Canada: Department of the Solicitor General Canada. [Online] available http://www.sgc.gc.ca/publications/corrections/199902_e.pdf

Hanson, K. (1997). The development of a brief actuarial risk scale for sexual offense recidivism (Rapid Risk Assessment for Sex Offense Recidivism, RRASOR). Ottawa, Canada: Department of the Solicitor General Canada. Retrieved from http://www.sgc.gc.ca/EPub/corr/e199704/e199704.htm

Geller, J. L. (1992). Arson in review: From profit to pathology. The Psychiatric Clinics of North America, 15(3), 623-645.

McGrath, R., & Cumming, G. (2003). Sex Offender Treatment Need and Progress Scale. Washington, DC: Center for Sex Offender Management, US Department of Justice. Retrieved from http://www.csom.org/pubs/SexOffTreatScale.pdf.

Nuffiled, J. (1982). Parole decesion-making in Canada: *Research towards decision guidelines*. Ottawa: Solicitor General Canada.

Quinsey, V. L., Harris, G. T., Rice, M. E., & Cormier, C. A. (1998). *Violent offenders: Appraising and managing risk*. Washington, DC: American Psychological Association.

Taiwan Fire Department (2005). Annual Fire Investigation Annual Meeting Manual [in Chinese], 28, 29 November 2005.

Thomson, A., Tiihonen, J., Miettunen, J., Virkkunen, M. & Lindberg, N.(2015). Mortality of firesetters: A follow-up study of Finnish male firesetters who underwent a pretrial forensic examinationin 1973–1998. *Psychiatry Research,* 225, 638–642.

DOI: 10.29751/JRDP.202506_16(1).0002

Appendix 1 **Taiwan Arson Static Recidivism Risk Assessment Scale**

Item	Time	1 year（12 months）	5 years（60 months）	10 years（120 months）
	average recidivism rate	1.3%	6.2%	14.2%
1. criminal diversity	1 time	[ ] 0	[ ] 0	[ ]-1
	2-3 times	[ ]+1	[ ]+2	[ ]+3
	4 and above		[ ]+6	[ ]+6
2. past experience of playing with fire	No	[ ] 0	[ ] 0	[ ] 0
	Yes	[ ]+2	[ ]+2	[ ]+2
3. mental disorder	No			[ ] 0
	Yes			[ ]+2
4. the number of past arson	1 time	[ ] 0	[ ] 0	[ ]-3
	2-3 times	[ ]+16	[ ]+16	[ ]+16
	4 and above		[ ]+16	[ ]+16
5. habit of staying on the scene	No		[ ]-2	
	Yes		[ ]+2	
6. previous record of drug abuse	No	[ ] 0	[ ] -1	[ ] -2
	Yes	[ ]+2	[ ] +3	[ ]+5
Totals				

Note. The fields left empty means no significance on relationship. This table was kept its vertical line.

Page 2 of the scale (risk levels and recidivism rates for 1, 5, & 10 years)

Time		1 year （12 months）		5 years （60 months）		10 years （120 months）	
Totals of scales							
Range		0～18		-3~21		-7～30	
Cut-off of levels & average recidivism rate	Low risk	[ ] 0~6	1.2%	[ ] -3~4	4.7%	[ ] -7~10	5.1%
	Middle risk	[ ] 7~10	12.5%	[ ] 6-15	15.8%	[ ] 12~21	28.6%
	High risk	[ ] 12~18		[ ] 16-21	30.4%	[ ] 22-30	40.2%
Predictive validity	r	.238		.328		.312	
	ROC	.785		.912		.965	

Note. The space left empty means no significance on relationship. This table was kept its vertical line.

DOI: 10.29751/JRDP.202506_16(1).0002

台灣縱火者靜態再犯風險評估量表之建立研究

長摘要

前言

縱火往往造成生命財產重大損失。然而經司法處遇的縱火犯常仍常惡習未改而再犯縱火，國內外至今尚無相關風險評估量表供防治之用。

研究方法

本研究採統計研究法來建立「台灣地區縱火犯靜態再犯風險評估量表」。以台灣四年半間之縱火犯共 226 名為樣本，平均追蹤期間 12.3 年，再用以潛在之高風險靜態項目以卡方與相關分析篩選出高風險項目並集合成一量表。

研究變項

1.依變項

本文研究的依變項是「有無再犯縱火犯罪」是。

2.預測變項

(1)犯罪多元性(再犯縱火以外刑案)

由於過去研究(Zamble & Quinsey, 2001)均顯示與再犯高低有關，此題項追蹤縱火加害人過去全部的刑案記錄來計算(不包括縱火罪)，包括傷害、竊盜、強盜搶奪、毒品、強暴脅迫等其他罪行。

(2)昔日玩火經驗

國內外學者實證研究亦指出過去縱火行為是再犯的最佳單一預測指標（Kennedy et al., 2006、黃軍義，2006)。

(3)精神異常

國內外研究均指出縱火犯患有精神異常（psychiatric morbidity）的比率較其他重大犯罪者高，且常在實務看到。

(4)縱火次數(不含本案)

縱火者常由過去玩火或放火的經驗獲得樂趣與滿足，終究無法自拔而屢次再犯。

(5)逗留現場習慣

縱火者經常可以從開始放火及當時觀看損害的程度而得到快感的經驗。

(6)使用縱火劑

汽油為容易取得之易燃物且價格低廉，往往成為縱火犯之首選。

(7)縱火前是否飲酒

因縱火行為與酒精、大麻濫用有被疑有相關，值得探究。

(8)是否伴隨藥物濫用

吸毒嚴重者會疑神疑鬼、妄想與產生幻覺等現象，在此異常精神狀態易做衝動行為，值得探究。

(9)首犯年齡是否低於 18 歲

成年之前的早發縱火行為被視為再犯的良好預測指標。

(10)縱火動機是否為仇恨報復

本研究將縱火動機分類為仇恨報復、感情糾紛、圖利詐財、債務糾紛、無聊好玩、精神異常、掩飾犯行及其他（含自殺、不詳）等八項。其中仇恨報復之縱火動機經國內、外學者研究發現均占四成以上，為最常見之縱火動機（廖訓誠，1995、Holmes, 1996、林志信，2010）。

（11)酒駕前科

縱火再犯及酒後危險駕駛均屬於低自我控制之表現，值得探究其相關性。

DOI: 10.29751/JRDP.202506_16(1).0002

研究結果

縱火犯 226 名中平均追蹤期間為 12.3 年，再犯縱火者共 40 名，再犯率為 17.7%，研究對象以男性為主（占 90%），平均年齡 34.7 歲；教育程度以國中、高中(職)為主；犯案地點集中都市化較高區域；縱火再犯間隔時間逐次縮短。

研究發現十一項有測試風險項目中有六項與再犯達顯著相關：犯罪多樣性、過去玩火經驗、精神疾患、縱火次數、滯留現場的習慣，以及藥物濫用史。

Nuffield 加權法是計算顯著的預測因子中，該變項次類別相對應的再犯率與追蹤期的平均再犯率（做為基準率）之間的差異，然後以每加減 5%換算成加減 1 加權分，亦即公式：

$$\frac{\text{評估變項次類別的再犯率} - \text{追蹤期的平均再犯率}}{5\%}$$

將統計篩選出來的六個評估題項，如表 1，依照其次類別在卡方分析時所表現的百分比數值作 Nuffield 加權的換算，結果整理在表 2。

表 1　各危險預測因子分析結果摘要表(以 12.3 年為追蹤期)

變數 ROC=.978	子項	%	有再犯		卡方 (P 值)	r 相關 (P 值)	關聯係數 Somer’s d
			人數	%			
1.犯罪多元性（有無再犯縱火以外刑案）	0 次	36.7	6	7.2	X^2=12.34 (.015*)	.208 (.002**)	d=.179 (.001**)
	1 次	25.2	11	19.3			
	2 次	21.2	13	27.1			
	3 次	8.8	4	20			
	4 次以上	8	6	33.3			
2.昔日玩火經驗	否	71.7	19	11.7	X^2=17.04 (.000***)	.265 (.000***)	d=.271 (.000***)
	是	28.3	21	32.8			
3.精神異常	正常	78.3	25	14.1	X^2=7.16 (.007**)	.178 (.007**)	d=.177 (.002*)
	異常	21.7	15	30.6			
4.縱火次數（不含本案）	0 次	82.3	1	0.5	X^2=219.2 (.000***)	.809 (.000***)	d=.157 (.000***)
	1 次	11	25	100			
	2 次	3.1	7	100			
	3 次	1.8	4	100			
	4 次以上	1.8	4	100			
5.逗留現場習慣	否	58.8	13	9.8	X^2=13.93 (.000***)	.248 (.000***)	d=-.24 (.000***)
	是	41.2	27	29			
6.使用縱火劑	否	49.1	23	20.7	X^2=1.37 (.242)	.078 (.244)	d=.075 (.242)
	是	50.9	17	14.8			
7.縱火前飲酒	否	69	29	18.6	X^2=0.274 (.600)	.035 (.602)	d=.034 (.591)
	是	31	11	15.7			
8.藥物濫用前科	否	85.5	29	14.9	X^2=7.12 (.008**)	.177 (.007**)	d=-.177 (.034*)
	是	14.2	11	34.4			
9.犯罪生涯首犯年齡是否成年（低於 18 歲）	否	89.9	33	16.3	X^2=2.85 (.091)	.112 (.092)	d=.109 (.166)
	是	10.2	7	30.4			
10.縱火動機是否為仇恨報復	否	64.2	24	16.6	X^2=0.366 (.545)	.040 (.547)	d=.039 (.553)
	是	35.8	16	19.8			
11.酒駕紀錄	否	81.4	29	15.8	X^2=2.554 (.110)	.106 (.111)	d=.106 (.58)
	是	18.6	11	24.2			

*代表 p＜.05，**表示 p＜.01，***表示 p＜.001

DOI: 10.29751/JRDP.202506_16(1).0002

表 2　Nuffield 加權法的靜態量表分數計算

評估題項		再犯率	Nuffield 法 加權分數
1.犯罪多元性	0 次	7.2%	+2
	1 次	19.3%	0
	2 次	27.1%	+2
	3 次	20%	0
	4 次以上	33.3%	+3
2.昔日玩火經驗	否	11.7%	-1
	是	32.8%	+3
3.精神異常	正常	14.1%	0
	異常	30.6%	+3
4.縱火次數(不含本數)	0 次	0.5%	-3
	1 次	100%	+16
	2 次	100%	+16
	3 次	100%	+16
	4 次以上	100%	+16
5.逗留現場習慣	否	9.8	-2
	是	29	+2
6.藥物濫用前科	否	14.9	-1
	是	34.4	+3
總分範圍			-7～30

以有無縱火再犯為依變項與縱火因子為自變項進行相關性分析(包含卡方、相關係數)，初步分析發現有 6 個題項與縱火再犯可能有所關聯，分別為犯罪多元性、昔日玩火經驗、精神異常、縱火次數、逗留現場習慣及藥物濫用前科，加權後，計算一年、五年及十年追蹤期間之危險評估量表 ROC 值分別為 0.785、0.912 及 0.965。如表 3、4、5。

表 3　Nuffield 法的靜態量表總分與再犯率

總分（Nuffield 法）	再犯人數／該得分的總人數	再犯率（%）（平均追蹤期 12.3 年）	危險類別	各危險類別的再犯率
-7~-2	0／26	0	低	4.8%
-1~2	1／32	3.1		
3~8	3／38	7.9		
10	2／29	6.9		
12	5／39	12.8	中	23.8%
15	8／22	19.5		
16	4／11	36.4		
18	3／12	25		
19	6／9	66.6	高	82.4%
20~30	8／8	100		

DOI: 10.29751/JRDP.202506_16(1).0002

結論

本論文根據研究結果，提出五項縱火防治對策包括重視早年家庭生活經驗、學校應擬定縱火應變對策、改善社會相關環境、消防政策應重視縱火議題研究及專業矯正制度以降低縱火再犯率，期望有效減少縱火者發生再犯，保障人民生命財產安全。

表4　量表第一頁(三觀察時段危險評估因子加權分數、再犯率與危險性計算)

評量的題項	時間	一年（12 個月）	五年（60 個月）	十年（120 個月）
	累積平均縱火再犯率	1.3%	6.2%	14.2%
1.犯罪多元性	一次	[　] 0	[　] 0	[　]-1
	二至三次	[　]+1	[　]+2	[　]+3
	四次以上		[　]+6	[　]+6
2.昔日玩火經驗	否	[　] 0	[　] 0	[　] 0
	有	[　]+2	[　]+2	[　]+2
3.精神異常	正常			[　] 0
	異常			[　]+2
4.縱火次數(不含本案)	一次	[　] 0	[　] 0	[　]-3
	二至三次	[　]+16	[　]+16	[　]+16
	四次以上		[　]+16	[　]+16
5.逗留現場習慣	否		[　]-2	
	有		[　]+2	
6.藥物濫用前科	否	[　] 0	[　] -1	[　] -2
	有	[　]+2	[　] +3	[　]+5
該案主之總分				

註：空格部分表示統計上不顯著，而不加權。

表5　所形成之量表第二頁(各追蹤時段之再犯危險分級與再犯率計算)

時間		一年（12 個月）		五年（60 個月）		十年（120 個月）	
該案主之總分							
量表總分數之全距		0～18		-3~21		-7～30	
再犯危險程度的切分點與平均再犯率	低危險	[ ] 0~6	1.2%	[ ] -3~4	4.7%	[ ] -7~10	5.1%
	中危險	[ ] 7~10	12.5%	[ ] 6-15	15.8%	[ ] 12~21	28.6%
	高危險	[ ] 12~18		[ ] 16-21	30.4%	[ ] 22-30	40.2%
預測準確度	相關 r	.238		.328		.312	
	ROC	.785		.912		.965	

註：空格部分表示統計上不顯著。