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# **Functional consistency across two behavioural modalities: fire-setting and self-harm in female special hospital patients**

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## ABSTRACT

**Background:** Fire-setting and self-harm behaviours among women in high security special hospitals may be understood using Shye's Action System Theory (AST). Within this framework, four functional modes are recognised: 'adaptive', 'expressive', 'integrative', and 'conservative'.

**Aims:** To test for relationships between different forms of fire-setting and self-harm behaviours and AST modes among women in special hospital, and for consistency within modes across the two behaviours.

**Method:** Clinical case files of female special hospital patients evidencing both fire-setting and self-harm behaviours (n=50) were analysed for content, focusing on incident associated characteristics. 29 fire-setting and 22 self-harm variables were analysed using Smallest Space Analysis (SSA). Chi-Square and Spearman's rho  $\rho$  analyses were used to determine functional consistency across behavioural modes.

**Results:** Most women showed one predominant AST mode in fire-setting (n=39) and self-harm (n=35). Significant positive correlations were found between integrative and adaptive modes of functioning. The lack of correlation between conservative and expressive modes reflects the differing behaviours used in each activity. Despite this, significant cross tabulations revealed that each woman had parallel fire-setting and self-harm styles.

**Discussion:** Findings suggest that, for some women, setting fires and self harm fulfil a similar underlying function. Support is given to the action system framework as a way of furthering understanding of damaging behaviours, whether self- or other-inflicted.

## INTRODUCTION

Special Hospitals provide treatment and care for individuals with a mental disorder, detained under the Mental Health Act (1983), and deemed to require conditions of high security. Despite high ratios of males to females, it has been suggested that particular attention needs to be given to the treatment requirements of women in this environment. In comparison to men, a significant number of female patients have an index offence of arson (Lumsden et al., 1996; Coid et al., 2000). High rates of self-harm have also been recognised amongst female patients, for example Bland et al., found that 94% of women at Broadmoor hospital self-harmed (1999). The current paper investigates the hypothesis that the high correlation between self harming and fire setting behaviours in female patients may reflect a common [functional](#) pathway.

Both fire-setting and self-harm are considered to encompass various motivations. For example, interpersonal motives such as revenge are commonly cited for acts of fire setting (Harris and Rice, 1996). Intra-psychological and social factors are also considered important in the aetiology of self-harm (Coid et al., 1992). Additionally, the communicative aspects of both fire-setting (Geller, 1992) and self-harm (Gardner and Cowdry, 1985) are well recognised.

The importance of both intrapsychic and interpersonal aspects of both behaviours draws attention to the dynamic interplay between the person and their psycho-social environment, and thus the possibility of adopting a systemic framework to model the different forms and functions of [the behaviours](#). The theoretical basis for this work is derived from Action System Theory (AST, Shye, 1985). Shye proposes that in order to

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model a system it is necessary to consider the source and target of actions as well as their location (1985). The combination of a) internal or external sources of action, with, b) individual or environment as targets of action gives rise to four basic modes of functioning. These are labelled 'adaptive', 'expressive', 'integrative', and 'conservative' (1985) and are summarised in Table i.

*Table i about here*

AST has successfully been applied to various forms of criminal activity (e.g. Fritzon et al., 2001; Fritzon & Brun, 2005). In expansion of these works, the current paper focuses on both criminal and non-criminal behaviour. Co-morbid fire-setters and self-harmers will be expected to operate in a way that indicates a dominant theme to their activities that accords with one of the hypothesised modes outlined in Table i.

### *Integrative Mode*

In this mode adjustments take place within the system, so that an action has an internal basis and is also directed at changing an internal state (Shye, 1985). Previous research (Canter and Fritzon, 1998; Fritzon et al., 2001) found that integrative arsonists set fire to themselves or to objects placed around them, in an act of suicide. Fritzon et al., suggest that this "psychological integrativity might become more pathological in individuals with some level of emotional disturbance" (2001: 659). Significant proportions of fire-setters have been identified as having some form of mental illness (Harris and Rice, 1996; Jacobson et al., 1986).

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Comparatively, Brown et al. (2002) found that borderline personality disordered women who engaged in self-harm saw their actions as self-punitive distraction and Low and colleagues' found that the mental mechanism of dissociation linked experiences of childhood abuse with self-harm (2000). In such circumstances, it has been found that women particularly target their breasts and genitals (Bland et al., 1999).

### *Expressive Mode*

In the expressive mode, the individual demonstrates internal psychological aspects to the external world. Expressive fire-setting involves either a pathological fascination for fire or a psychological state resulting from an emotive trigger and results in emotionally significant targets (Canter & Fritzon, 1998; Fritzon et al., 2001). Several studies have found that women are more likely to set fire to emotionally significant properties, such as their own home (Tennent et al., 1971; Bourget & Bradford, 1989). The expressive mode also accords with Geller's (1992) notion of 'communicative arson', i.e. using fire to express a desire or need. Geller (1984) found that patients used fire-setting to a) return to hospital b) prevent placement to a 'less restrictive' setting, or c) express dissatisfaction with current treatment.

Similarly self-harm has been understood as a communicative act aimed at achieving change that is deemed as impossible using more traditional means (Gardner and Cowdry, 1985; Collins, 1996). Some self-harmers describe their actions as defiance and attention seeking (Bennum, 1984; Liebowitz, 1987). Kernberg considers the act of self-harm to be an unconscious effort to gain control by inducing guilt in others (1987).

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### *Conservative Mode*

This mode refers to the way in which the individual relates to events that originate externally and are internally assimilated. Fritzon et al., found conservative fire-setting occurred following an event (s) “involving another person, which results in the arsonist feeling the need to take revenge for a real or imagined wrong-doing” (2001:666). Thus, whilst the principal source is external, the aim of the action is to rectify the emotional state generated by the external incident. A number of studies have identified that motives for fire-setting are revenge, hatred or jealousy (Tennant et al., 1971; Pettitway, 1987; Bourget and Bradford, 1989). Harris and Rice hypothesise that some people set fires to gain revenge because they are unable to express anger towards their victims directly (1996).

In the context of self-harm, writers draw attention to the notion that anger and aggression meant for others can be turned against the self (McKerracher et al., 1968; Liebowitz, 1987). Research has found that 10-32% of self-harmers report anger towards others leading up to acts of self-harm (Gardner and Gardner, 1975; Roy, 1978; Bennum, 1983). Simpson (1976) draws attention to the association between poor verbal ability, particularly with difficulties expressing needs and emotions, and self-harm. Anxiety relief has been cited as a reason for self-harm in between 35% (Roy, 1978) and 86% (Gardner and Gardner, 1975) of women.

### *Adaptive Mode*

In this mode, the individual responds to the external environment by making adjustments to the environment. Adaptive functioning involves taking advantage of environmental opportunities where the actual target is less important than the desire to modify it.



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Previous research found that adaptive fire-setters used fire to cover up evidence of another crime, e.g. burglary (Canter and Fritzon, 1998; Fritzon et al., 2001). Given the mentally disordered nature of the current sample, adaptive functioning is not anticipated to be especially evident. This reasoning is supported by literature distinguishing between non-psychologically motivated (profit, crime concealment, or to facilitate another crime) and psychologically motivated (an underlying psychological disturbance is assumed) arson (Blumberg, 1981; Jackson, 1994).

Considering self-harm, Dockley (2001) suggests incarcerated women use self-harm as a means of 'environmental coping' with feelings of helplessness and frustration. Shea found male self-harmers particularly hypersensitive to environmental stressors and intensely responsive to frustration (1993). As self-harm, is by definition, an act which comprises some internal facet, it may be appropriate to consider the adaptive mode as a response to surroundings in order to elicit environmental change, even though the act itself is not directly altering the environment. Again, due to the extreme degree of psychological disturbance in the current sample, adaptive self-harm functioning is not expected to be markedly evidenced.

## **Method**

### *Sample*

The sample comprised 50 female special hospital patients with evidence of fire-setting and self-harm behaviour. The age of participants ranged from 23-66 years of age, with a mean

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age of 34 years. The majority of women were diagnosed with Psychosis (n=34) and/or Borderline Personality Disorder (PD) (n=32) and/or Antisocial Personality Disorder (PD) (n=22).

### *Data Collection*

Clinical case files of women with an index offence of arson and incident(s) of self-harm were content analysed by extracting incident related actions in accordance with AST. Content analysis is the inductive classification of open-ended material (Krippendorff, 1980) and has been used to analyse police records (e.g. Canter & Fritzon, 1998; Fritzon et al., 2001; Almond et al., 2005). The case files contained psychological, social service and psychiatric reports, including patient interviews. Records containing accounts from several professionals may threaten the reliability and validity of data (Canter and Alison, 2003). In an attempt to overcome this, only patient actions consistently referred to and agreed upon by all professionals were extracted for analysis. With this in place, the richness of multi-professional *and* patient perspectives was considered to offer an interesting expansion to previous research. In the case of the fire setting actions, invariably the account of the patient's index offence gave the most consistent information and as patient's self harming incidents that had taken place whilst in hospital were systematically recorded, these were analysed.

The resultant sets of 29 fire-setting and 22 self-harm variables reflected different aspects of integrative, expressive, conservative and adaptive modes (see tables ii and iii). Due to practical constraints, it was not possible to conduct inter-rater reliability tests. However, only dichotomous variables that allowed a clear decision of their presence or

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absence were included.

### *Data Analysis*

Analysis aimed to identify themes relating to AST within the two sets of behaviours. A data matrix was produced by coding variables as either present (1) or absent (0) in each incident. Each behavioural data set was then subjected to a multi-dimensional scaling (MDS) technique, Smallest Space Analysis (SSA) (Lingoes and Guttman, 1973), which tests the relationship each variable has to every other variable across all cases. A Jaccard coefficient of association which only takes account of positive co-occurrence was used (Canter and Heritage, 1990). A visual summary of the relationships in the association matrix depicts the distances between the variables in the space as their ranked correlations, so that the shorter the distance between two variables, the higher their inter-correlation. The coefficient of alienation provides a measure of this fit, with smaller values indicating a better solution.

In order to establish consistency between fire-setting and self-harm behaviours, each participant was assigned to an action system mode where possible. The proportion of behaviours for each person per mode was calculated and a participant assigned to a mode if their set of behaviours was 1.5 times higher than other modes. Previous studies recognise the stringency of this particular classification method (e.g. Salfati, 2000). Chi-Square statistical analysis was then used to test the consistency between modes of fire-setting and modes of self-harm in each individual and individual scores on each of the two sets of the four scales were also correlated using Spearman's rho  $\rho$ .

## Results

### *SSA of Fire-Setting Behaviour*

A three-dimensional SSA of the fire-setting incidents had a Guttman-Lingoes coefficient of alienation (Borg and Lingoes, 1987) of 0.16. The coefficient of alienation ranges from 0 (indicating a perfect fit) to 1. Generally, a coefficient of less than .20 is considered an acceptable degree of fit (Donald, 1995). Figure 1 shows the projection of the first two vectors of the three dimensional space. Each variable depicts a fire-setting scene action ( defined in Table 2). The closer two variables are together the more likely it is that these actions co-occur in an incident.

*Figure 1 about here with Table ii below*

### *Themes of fire-setting*

The SSA in Figure 1 shows how the actions of fire-setters can be distinguished in accordance with the particular mode of functioning that they represent. As the distances between the points reflect their likelihood of co-occurring, a regional split is a strong indication that the points within a spatial region are strongly interrelated and related to a common psychological process. When considering the actions further away from the centre of the SSA space, thematic regions can also be identified. The partitioning of the SSA space supports the hypothesis that that items relating to the source and target of the fire-setting behaviour group together to form regions that indicate an underlying conceptual similarity corresponding to four modes of action systems framework.

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### *Integrative Mode*

Integrative functioning comprises of actions that are directed internally from an internal source. The SSA depicts this as self-originating and self-directed destruction using fire. The integrative variables are: suicide attempt, person-private (own home), anxiety, negative event and depression. Integrative functioning then consists of individuals setting fire to themselves in an act of suicide, driven by an anxious or depressive emotional state. There is no external targeting of objects or persons (indicated by the person-private variable) following internal triggers. Reliability analysis found that this variable set has an alpha of .52, indicating a moderate level of internal consistency.

### *Expressive Mode*

This mode of functioning is an external acting out of internal psychological processes. The expressive variable set are: drug (and/or) alcohol misuse, physical aggression, verbal aggression, remain, threat, excitement, non-specific, significant date and object-private (e.g. private area within hospital). The antecedents verbal aggression, physical aggression and threat indicate forms of emotional acting out and remaining or returning to the scene suggest a possible reinforcing effect of fire. It is interesting that the variable excitement is within this region, supporting Canter and Fritzon's (1998) findings that expressive fire-setting involves some intrinsic fascination with fire as well as an emotional release. Reliability analysis identified an alpha coefficient of .53, indicating a moderate level of internal consistency.

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### *Conservative Mode*

The conservative mode relates to the way an individual mediates events that occur outside and have an effect internally. The variables describing the conservative form are: psychosis, planned, previous arson, lives endangered, targeted, person-public (e.g. known residential or public building), violence/argument, victim known, victim partner and spree. The variables victim partner, victim known and violence/argument alongside the variables planned, targeted and lives endangered reflect the intentional, retaliatory nature of conservative fire-setting. Also, the variable spree (coded if the individual set more than one fire within 24 hours) suggests that the individual is highly aroused with intent to destroy the source of this rage, often, as mentioned a partner, or ex-partner. Reliability analysis revealed an alpha coefficient of .64 indicating a good level of internal consistency.

### *Adaptive Mode*

The adaptive mode describes the way in which a person interacts with external events by modifying their surroundings. The variables that comprise this mode are: protest, residential change, alert, serial and object-public (car, business). This region describes a series of fire-setting acts (over weeks/months) in the form of a protest in order to elicit a change in the individual's residential arrangement. Thus rather than the modification of the environment for crime concealment (Canter and Fritzon, 1998; Fritzon et al., 2001), this adaptive functioning is geared towards the change of environment and indicated by the variable 'alert', the offender is seeking public awareness of their remonstrance. This set of items has the lowest alpha coefficient of .42.

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*Figure ii about here*

### ***Frequencies of Fire-setting items***

Figure ii shows the frequency pattern of the items in the fire-setting SSA. The high frequency variables, situated toward the centre of the plot, can be seen to be as essential features of fire-setting, whilst the lower frequency variables, progressively emanating from the centre outwards, capture individual variation. Therefore most incidents involve women with active mental health problems (depression 58%, psychosis 54%), who remain at the scene (72%), use verbal (52%) and physical (48%) aggression and set alight to occupied residences (60%) in which lives are endangered (48%). The particularly high proportion of women remaining at the crime scene and setting fires to occupied residences can be compared to previous research in which only 46% of the predominately male sample remained at the crime scene and 42% set fire to habited residential properties (Canter and Fritzon, 1998).

### ***SSA of Self-Harm Behaviour***

The results of the three-dimensional SSA of self-harm scene actions are shown in Figure iii. This solution had a Guttman-Lingoes coefficient of alienation of 0.14 indicating a good fit. Figure 2 shows the projection of the first two vectors of the three dimensional space. Each variable depicts a self-harm incident action (see Table iii).

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*Figure iii about here with Table iii below*

### *Themes of Self-harm*

The SSA in Figure iii shows how the self-harm actions can be distinguished in accordance with the particular mode of functioning that they represent. As with the analysis of fire-setting behaviours, the four action system modes are identifiable in the SSA space.

### *Integrative Mode*

The integrative mode can be understood as a cycle of internalisation since the harm directed at the self, also originates from an internal source, with the variables: vary form, insert, hit self, self anger, serial, genital location and planned. Together these variables suggest that self-harm arises from a state of self-anger which is generally targeted at hidden areas of the body (genital, insert). There would seem to be a highly ingrained, private and ritualistic element to the self-harm, indicated by the 'planned' variable and the areas of the body targeted. The presence of varying form is interesting and suggests that integrative self-harmers may use other forms of self-injury as well. This is likely to be burning and head-banging as they are nearest to the integrative region. Comparative to fire-setting, this is not a literal act of suicide/para-suicide, but self-punishment of emotionally significant bodily areas. Reliability tests revealed a Cronbach's alpha of .70 indicating a high level of internal consistency.



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### *Expressive Mode*

As hypothesised, this is the region of the SSA that contains variables relating to the acting out of internal forces and pressures, in the form of a communicative gesture. The expressive mode consists of verbal aggression, physical aggression, report, threat and significant dates. As with expressive fire-setting, verbal and physical aggression, threat and report suggest that an external effect is sought. Interestingly, both expressive modes in fire-setting and self-harm contain the variable significant dates. It would seem that the feelings associated with significant dates (such as birthdays, anniversaries of deaths and sentencing) are manifesting through fire-setting or self-harming in order to get some kind of response. The internal consistency within this item set is moderate with a Cronbach's alpha of .52.

### *Conservative Mode*

The variables representing the conservative form of self-harm are: depression, distance, tense, burns, headbang, argument other and anxiety. The idea that the direction of the behaviour is to alter an intra-psychological aspect is particularly demonstrated by distancing self from others. It would seem that arguments with others elicit a process of internalisation, rather than one of open expression, which leads to feelings of depression and anxiety/tension. It is these feelings of angst that are sought to be re-addressed by means of self-burning and head-banging. This variable set has relatively good internal consistency with a Cronbach's alpha of .60.

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### *Adaptive mode*

The variables that make up the adaptive mode of functioning are: residential change, frustration and other anger. Similarly to adaptive fire-setting, these behaviours are concerned with eliciting environment change encompassing feelings of anger and frustration. Considering the context of the self-harm incidents (i.e. that they take place within the hospital), it is conceivable that patients are aware of the unchangeable nature of special hospital detainment. Thus adaptive self-harm can be seen as a form of control when it is perceived there is no control over external events (Leibling et al., 1997). Gardner and Cowdry (1985) point out that anger at others may also result from a perceived failure on someone's part to respond in a 'supportive' or caring way. Reliability analysis revealed a low Cronbach's alpha of .46.

Insert figure iiiii about here

### *Frequencies of self-harm items*

Figure iiiii demonstrates that a self-harm incident is commonly represented by depression (72%), verbal (72%) and physical (66%) aggression, anger at others (68%) and tension (66%) in which the person distances themselves from others prior to or after self-harming (52%). Whilst burning self is not a majority behaviour (occurring in 44% of incidents), it is interesting to note that it is most common type of self-harm amongst this sample of fire-setters. Also the commonly occurring item, anger at others, is about twice as prevalent to the rates that have been reported in previous studies (Gardner and Gardner, 1975; Roy, 1978; Bennum, 1983). It is evident that there are some items, characteristic of most

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incidents that are common to fire-setting *and* self-harm: depression, physical aggression and verbal aggression. Also, residential change has comparable incident rates in fire-setting (26%) and self-harm (28%).

### ***Functional consistency between fire-setting and self-harm behaviours***

In order to investigate the correspondence between fire-setting and self-harm modes, individual's scores of each of the four scales were calculated. The fire-setting scores in each scale were then correlated with the self-harm scores in each scale. This was done using Spearman's rho  $\rho$ , a non-parametric, ordinal level measure of correlation, which ranks the values on each variable. A significant positive correlation was found between adaptive fire-setting and adaptive self-harm ( $r = .37$ ;  $p < 0.01$ ). A statistically significant positive correlation was also found between integrative fire-setting and integrative self-harm ( $r = .37$ ;  $P < 0.01$ ). However, no significant correlations were found between fire-setting and self-harm in the conservative modes ( $r = -.03$ ; ns) and expressive modes ( $r = .03$ ; ns).

Whilst the SSA analysis shows a conceptually similar underlying function in conservative and expressive self-harm/fire-setting modes, when considering individual variables, it is apparent that they are distinct, especially within the conservative mode. Conservative fire-setting contains variables such as victim known, victim partner, lives endangered and previous arson which could not be used to describe self-harm. However, in consideration of those variables common to both fire setting and self harm (i.e. those present across both behaviours in corresponding regions), significant positive correlations are found for significant dates ( $r = .33$ ;  $p < 0.05$ ); threat ( $r = .54$ ;  $p < 0.01$ ), physical aggression

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( $r=.61$ ;  $p<0.01$ ) and verbal aggression ( $r=.56$ ;  $p<0.01$ ). Also, the lack of correlations among the scale scores for conservative and expressive self harm/fire setting could be accounted for by considering the different psychosocial contexts and triggers for these behaviours, i.e. community versus hospital setting.

A second test of consistency was used to determine whether individuals whose behaviour could be classified as belonging predominantly to one mode would have the same classification across the two behaviours. The proportion of variables present for each mode was calculated (see method). 39 women were classified as having one particular mode of fire-setting and 35 as one mode of self-harm. Table iii describes in more detail the number of women within each mode for fire-setting and self-harm. It is noteworthy that the lowest proportion of women are adaptive in their functioning. As was hypothesised this may reflect the psychologically disturbed nature of the sample, however, it is interesting to note that a similar proportion of the Finnish sample of arsonists studied by Hakkanen et al., (2004) were also classified as adaptive (8%).

*Table iii about here*

Table iii also shows that the cross tabulations were significant across all four modes of functioning. This is probably because whilst the correlations tests consistency across variables, the cross tabulation method tests consistency across the women themselves. Due to the number of variables present within each of the SSA regions, it would be possible for two individuals classified as, for example, conservative self-harmers to use slightly different forms of behaviour but nevertheless for these behaviours to indicate a dominant

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theme, conservative in its function. Therefore this method of testing functional consistency recognises that different behaviours can have a similar underlying conceptual meaning and it is this meaning found to be consistent across the two behaviours.

## **Conclusion**

The first aim of the study was to discover whether AST could model fire-setting and self-harm actions of women in a special hospital. This was achieved by using SSA to map items relating to the source and target of fire-setting and self-harm behaviours. The results showed that groupings could be identified that formed regions indicating an underlying conceptual similarity corresponding to AST.

The second aim was to test for consistency between fire-setting and self-harm behaviours. Chi-Square analysis revealed a consistency in adaptive and integrative modes of fire-setting and self-harm, suggesting that there is an underlying psychological process connecting fire-setting and self-harm behaviours. The absence of a significant correlation between conservative and adaptive fire-setting/self-harm modes can be explained by the disparate manifestations of this particular mode within each type of behaviour.

In consideration of previous fire-setting findings (Canter and Fritzon, 1998; Fritzon et al., 2001) the current study manages to replicate the majority of findings: the integrative mode comprises a suicidal act; the expressive mode involves acting out of psychological pressures; the conservative mode is used to alter an angry/frustrated inner state seen to be caused by another. However, the adaptive regions differ considerably. Fritzon et al., (2001) found that adaptive fire-setting involved crime concealment, whereas the current study found a metaphorical rather than literal environmental change. As discussed, this

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can perhaps be understood when considering the mentally disordered nature of the current sample.

There are some variables that differ in terms of modal locality between current findings and previous works. Firstly, the lives endangered ('livdang') variable has been previously located in the integrative region (Canter and Fritzon, 1998; Fritzon et al., 2001), whereas it was found within the conservative region in the present research. However in a recent study by Almond et al. (2005) lives endangered was located on the border of the conservative region. Future analysis may benefit from further defining this variable to consider whether the lives being endangered were that of the offender themselves or others. Secondly, 'serial' was found in the expressive region in previous research but in the adaptive region in the current study. However, serial fire-setting was found on the border of the adaptive region in Almond et al.'s recent analysis (2005). This suggests that serial fire-setting may be classified as adaptive or expressive depending on the other actions occurring in conjunction with it. Finally, the variable 'threat' was found in the conservative region in Fritzon's research, whereas in the current work it was identified in the expressive region. Conceivably threat might be seen as expressive behaviour or part of a revengeful repertoire depending on the mental state of the offender.

Theoretically the action system approach does seem able to account for the highly heterogeneous factors that can be associated with behaviours. As outlined, various perspectives draw attention to different pathways that give rise to both fire-setting and self-harm. The current approach with a focus on the behavioural aspects of these different functions attempts to offer coherence to, rather than a replacement of, such varying perspectives.

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These findings have potential use for therapeutic, preventative and risk-assessment domains. In an integrative mode of functioning, the focus of treatment would be the person's self-destructive cycle. It is likely that a person classified as integrative may perceive language as inadequate or difficult. Therapeutic work therefore should concentrate on the individuals' difficulty in verbalising emotions and needs. If fire-setting and self-harm are used principally as a means of communicating emotions (expressive), then the objective of treatment would be to elicit more functional ways of communicating emotions. Treatment may also address the secondary gains of the behaviour through changing environmental re-inforcers. Group therapy may be help maintaining a milieu where destructive behaviour is not valued but positive change is.

If self-harm and fire-setting is used primarily as a means of coping with negative feelings thought to be induced by others, the objective of treatment would be to explore alternative ways of managing these emotions. A form of anger management, in which anger is first identified and clarified as such, could be used to explore alternative behaviours. In conservative fire-setters in particular, issues concerning heightened interpersonal sensitivity and perceived rejection could be explored. Adaptive treatment could concentrate on acknowledging the impact that external circumstances have and learning to express frustrations in a constructive way.

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Table i: Summary of Action System Modes of Functioning

| <b>Source of Action</b> | <b>Target of Action</b> | <i>Modes of Acting</i> |
|-------------------------|-------------------------|------------------------|
| Internal                | Internal                | <i>Integrative</i>     |
| Internal                | External                | <i>Expressive</i>      |
| External                | Internal                | <i>Conservative</i>    |
| External                | External                | <i>Adaptive</i>        |

## Functional consistency in fire-setting and self-harm

Table ii: Coding Dictionary: Fire-Setting Incident Variables

| Variable    | Description   | N   |
|-------------|---|-----|
| 1. Alert    | Individual alerts someone that they have set the fire e.g. calling the fire-brigade                                 | 11  |
| 2. Anxiety  | Anxiety is reported and/or psychiatric diagnosis of anxiety is existent at the time of the fire-setting.            | 12  |
| 3. Depres   | Depression is reported and/or a psychiatric diagnosis of depression is existent at the time of fire-setting         | 29  |
| 4. Excite   | Physical or emotional excitement prior to or at the scene of fire are described, i.e. adrenaline rush or a 'buzz'   | 18  |
| 5. Livdang  | Offender knew that the property was occupied at the time of the fire and made no attempt to alert the occupants.    | 24  |
| 6. Negev    | Significant personal event (e.g. death, separation) within less than a month prior to fire-setting                  | 24  |
| 7. Nonspec  | Fire occurs within month of argument/emotional trigger & there isn't obvious targeting of specific person/ property | 15  |
| 8. Objpriv  | Object-private targets e.g. private locations in hospitals, uninhabited buildings, e.g. shed, areas of waste land   | 5   |
| 9. Objpub   | Object-public targets e.g. public buildings/hospitals/institutions,   | 10  |
| 10. Perpriv | Person-private targets e.g. offender's own home   | 21% |
| 11. Perpub  | Person-public targets e.g. occupied residential property, hospital where evidence of specific targeting             | 30  |
| 12. Phygag  | Offender is physically aggressive to others within a reasonable time frame (before and/or after) fire-setting       | 24  |
| 13. Plan    | Materials brought to scene (e.g. petrol) or effort to avoid detection (e.g. wearing gloves)                         | 20  |
| 14. Prearso | Offender has set any fires prior to the current offence   | 12  |

## Functional consistency in fire-setting and self-harm

|             |   |    |
|-------------|---|----|
| 15. Protest | Person appears to be protesting against (perceived or imagined) social injustice, e.g. tribunal result  | 14 |
| 16. Psychos | Hallucinations, delusions or hearing voices are reported at time of fire-setting  | 27 |
| 17. Remain  | Remains/returns to scene whilst fire is burning or returns to same property to set another fire   | 38 |
| 18. Reschan | Offender reports that fire setting relates to wanting to change housing situation (community & institution)   | 13 |
| 19. Serial  | More than one fire is set with a gap of more than 24 hours. Weeks/months rather than years.   | 13 |
| 20. Sigdate | Setting of fire occurs around significant dates, e.g. birthdays, anniversaries  | 5  |
| 21. Spree   | More than one fire is set within 24 hours.  | 4  |
| 22. drug    | Individual recounts alcohol or drug consumption or witnesses stating that the individual appeared intoxicated   | 23 |
| 23. Suicid  | Fire appears to be a suicide attempt, i.e. setting alight to self   | 13 |
| 24. Target  | Specific property was chosen for a particular reason  | 22 |
| 25. Threat  | Threatening remarks about fire are made. Includes abstract remarks e.g. 'be careful you don't leave matches lying around, someone might get hold of them'                                 | 29 |
| 26. Verbag  | Offender is verbally aggressive to others within a reasonable time frame (before and/or after) fire-setting   | 26 |
| 27. Vicknow | Relates to targeting of known people. Includes institutions or governing bodies that offender involved with, e.g. a school attended or council owned property if she is a council tenant. | 17 |
| 28. Vicpart | Offender fires property belonging to (ex-) partner or someone close to her (ex-) partner  | 6  |
| 29. Violarg | Any violence or argument occurring within a reasonable time-frame (less than a month) prior to the arson  | 21 |

Table iii: Coding Dictionary: Self-Harm Incident Variables

| Variable     | Description  | N  |
|--------------|--|----|
| 1. Anxiety   | Anxiety is reported by the individual and/or a psychiatric diagnoses is existent at the time of self-harm                  | 20 |
| 2. Argothe   | Argument with another is reported by the individual or observed by staff 24hrs prior to self-harm acts                     | 11 |
| 3. Burns     | Burning of any part of body, including hair.   | 22 |
| 4. Depres    | Depression is reported and/or a psychiatric diagnosis of depression is existent at the time of self-harm                   | 36 |
| 5. Distanc   | Person is observed to distance themselves from others prior to/after self-harm. e.g., not partaking in communal activities | 26 |
| 6. Frustrate | Frustration is observed by staff, or reported by the individual prior to/ during self-harming                              | 18 |
| 7. Genital   | Mutilation of genitals or breasts  | 7  |
| 8. Headban   | Head-Banging against any object  | 15 |
| 9. Hitself   | Hitting, punching, pinching or slapping self   | 19 |
| 10. Insert   | Inserting objects into skin or bodily orifices   | 11 |
| 11. Othange  | Individual reports/observed by staff as angry towards others prior, during of after self-harm (within 24hrs)               | 34 |
| 12. Phyagg   | Person is physically aggressive to others before and/or after acts of self-harm (within 24hrs).                            | 33 |
| 13. Plan     | Evidence that self-harm acts are planned. e.g. collection, hiding /storing of self-harm implements                         | 6  |
| 14. Report   | Acts of self-harm are immediately or soon after reported to others, patients or staff (within 24hrs)                       | 17 |
| 15. Reschg   | Patient reports wanting to change current residence e.g. being moved from a particular ward or housing location            | 14 |

Functional consistency in fire-setting and self-harm

|             |   |    |
|-------------|---|----|
| 16. Selfang | Person reports that self-harm is a way of punishing or blaming self. May relate to person's index offence or own abuse                                  | 15 |
| 17. Serial  | Daily self-harm over a consecutive period of time is recorded (e.g. 5 days)   | 8  |
| 18. Sigdate | Self-harm increases or is more likely to occur around significant dates, e.g. birthdays, anniversaries  | 5  |
| 19. Tense   | Individual makes reference to needing tension relief prior to and during self-harm acts (within 24hrs)  | 33 |
| 20. Threat  | Individual threatens/warns others that they will self-harm (within 24hrs). Self-harm need not occur after threats                                       | 13 |
| 21. Vary    | Varying forms of self-harm are evident, either on the same occasion or across different occasions. For example, cutting genitals and then punching self | 14 |
| 22. Verbagg | Person is verbally aggressive to others before/after acts of self-harm (within 24hrs)   | 36 |

Table iii: Number of Women within each Action System Mode in Fire-setting and Self-harm and Chi-Square Correlations between each Mode

| <b>Action System Mode</b>              | Integrative self-harm<br><b>N=5</b>       | Expressive self-harm<br><b>N=11</b>                       | Conservative self-harm<br><b>N=12</b>                      | Adaptive self-harm<br><b>N=7</b>                            |
|--|---|---|--|---|
| Integrative Fire-setting<br><b>N=8</b> | $\chi^2=9.76$ ; df=1;<br><b>p=0.002**</b> | $\chi^2=2.03$ ; df=1;<br>p=0.15                           | $\chi^2=0.58$ ; df=1;<br>p=0.45                            | $\chi^2=1.32$ ; df=1;<br>p=0.25                             |
| Expressive<br><b>N=14</b>              | $\chi^2=2.38$ ; df=1;<br>P=0.12           | <b><math>\chi^2=5.36</math>; df=1;</b><br><b>P=0.02 *</b> | $\chi^2=0.01$ ; df=1;<br>p=0.94                            | $\chi^2=0.96$ ; df=1;<br>p=0.33                             |
| Conservative<br><b>N=13</b>            | $\chi^2=1.39$ ; df=1;<br>P=0.24           | $\chi^2=0.00$ ; df=1;<br>p=1.00                           | <b><math>\chi^2=7.51</math>; df=1;</b><br><b>P=0.006**</b> | $\chi^2=2.03$ ; df=1;<br>p=0.15                             |
| Adaptive<br><b>N=4</b>                 | $\chi^2=0.76$ ; df=1;<br>p=0.39           | $\chi^2=0.47$ ; df=1;<br>p=0.83                           | $\chi^2=2.40$ df=1;<br>p=1.22                              | <b><math>\chi^2=15.71</math>;df=1;</b><br><b>p= 0.001**</b> |

\*= significant < 0.05    \*\*= significant <0.01

Figure 1: SSA of fire-setting actions showing modal divisions

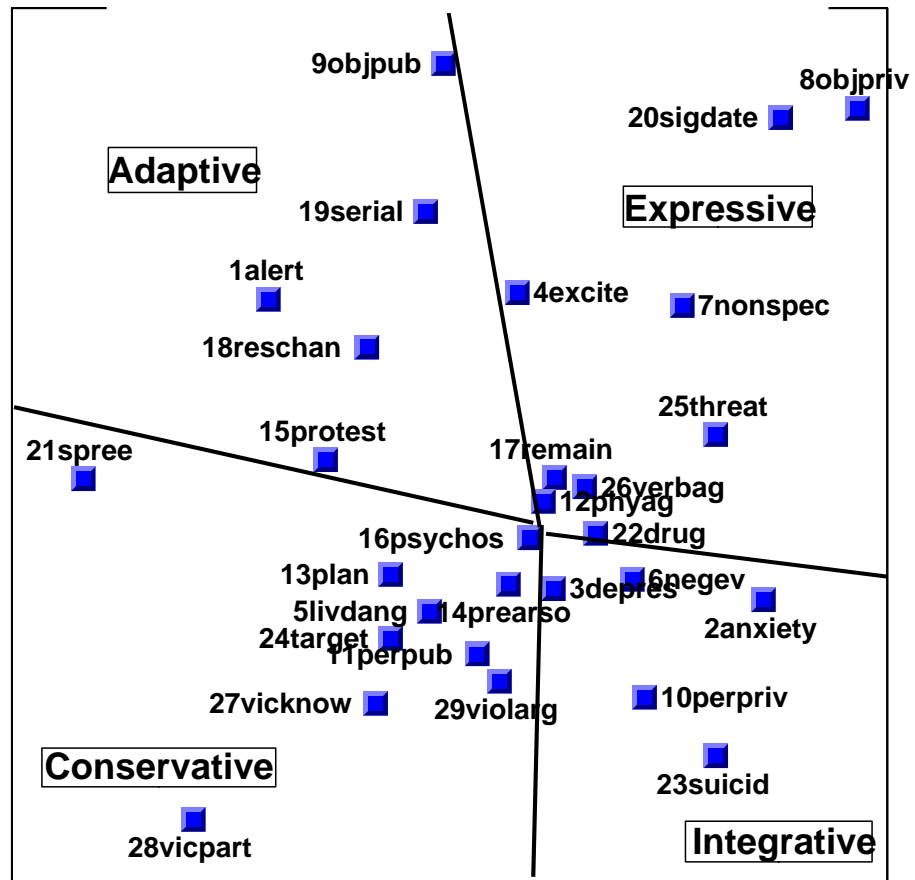


Figure 2: SSA of fire-setting actions showing frequencies of variables

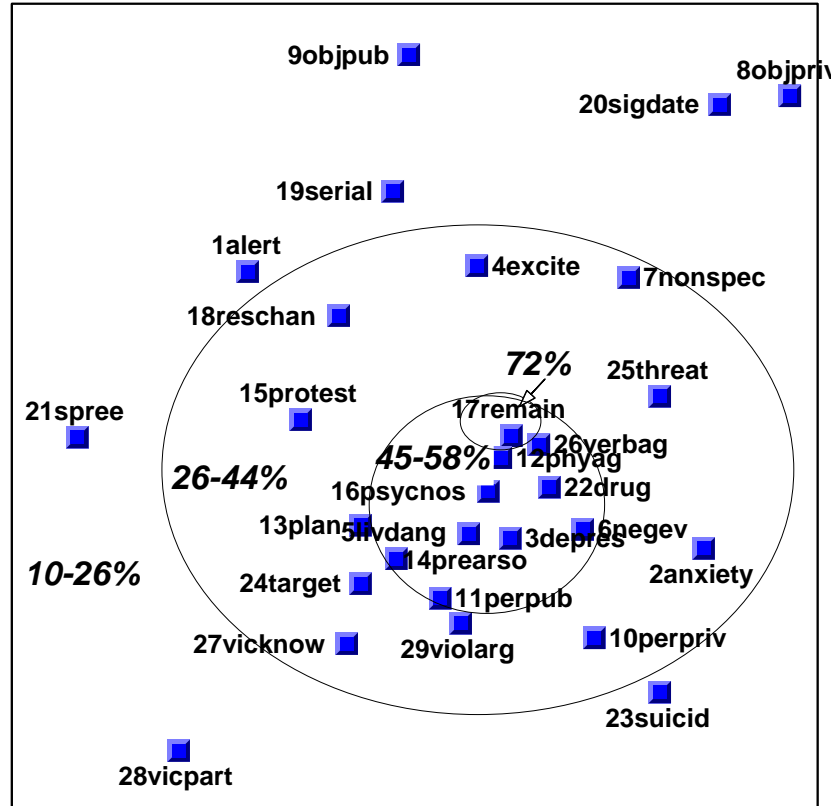




Figure 3: SSA of self-harm actions showing modal divisions

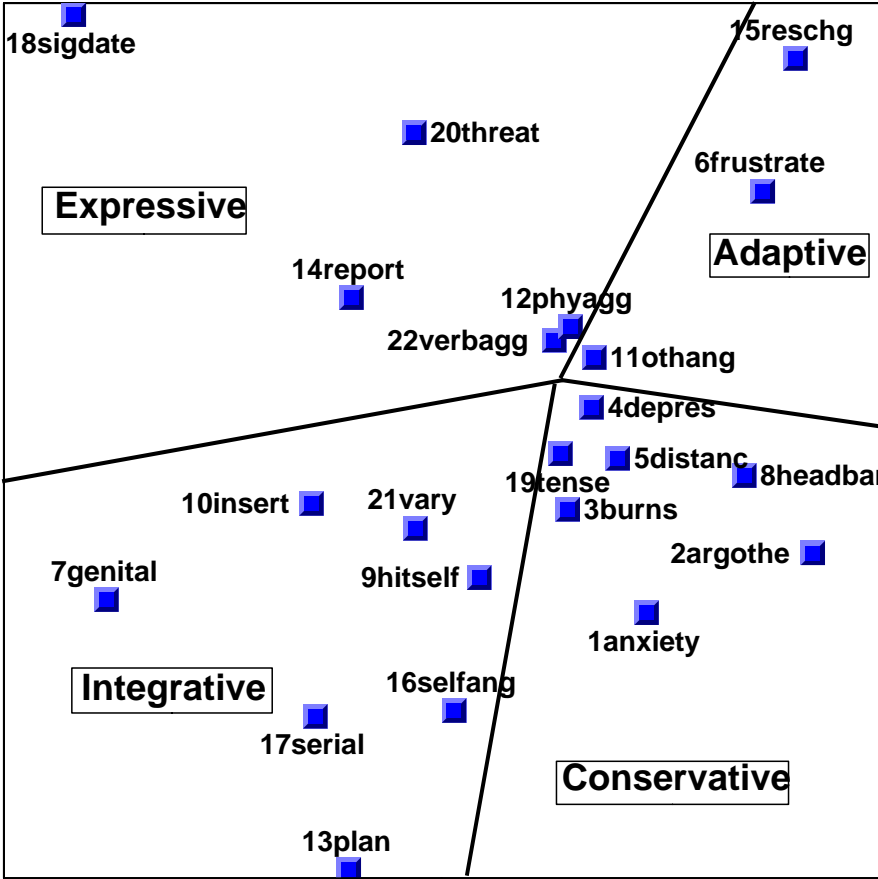


Figure 4: SSA of self harm actions showing frequencies of variables

