University of Huddersfield Repository

Sarangi, Sudhanshu, Canter, David V. and Youngs, Donna E.

Themes of radicalisation revealed though the personal constructs of Jihadi terrorists

Original Citation

Sarangi, Sudhanshu, Canter, David V. and Youngs, Donna E. (2013) Themes of radicalisation revealed though the personal constructs of Jihadi terrorists. Personal construct theory and practice, 10 (2013). pp. 40-60. ISSN 1613-5091

This version is available at http://eprints.hud.ac.uk/18287/

The University Repository is a digital collection of the research output of the University, available on Open Access. Copyright and Moral Rights for the items on this site are retained by the individual author and/or other copyright owners. Users may access full items free of charge; copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational or not-for-profit purposes without prior permission or charge, provided:

- The authors, title and full bibliographic details is credited in any copy;
- A hyperlink and/or URL is included for the original metadata page; and
- The content is not changed in any way.

For more information, including our policy and submission procedure, please contact the Repository Team at: E.mailbox@hud.ac.uk.

http://eprints.hud.ac.uk/

THEMES OF RADICALISATION REVEALED THROUGH THE PERSONAL CONSTRUCTS OF JIHADI TERRORISTS

Sudhanshu Sarangi *, David Canter, Donna Youngs ****

* University of Liverpool, Liverpool, UK, ** International Research Centre for Investigative Psychology, University of Huddersfield, Huddersfield, UK

To contribute to an understanding of the individual psychologies that characterise people who carry out acts of terrorism, four distinct themes are proposed that can each dominate Islamic terrorist's conceptualisations of his/her own actions: Islamic Jihad, Political Jihad, Social and Criminal. These themes are illustrated from interviews with people convicted of Jihadi-related acts of terrorism within India. The interviews utilised Kelly's Repertory Grid procedure, thus allowing the Personal Construct System of the interviewees to be explored in association with their accounts of their lives. These case studies provide rare insights from the terrorists themselves, indicating important similarities across individuals as well as distinct differences in the structure of their thinking that inform considerations of radicalisation and approaches to facilitating disengagement.

Keywords: Terrorism, repertory grid, jihad, radicalisation

INTRODUCTION

Many different explanations have been offered for what leads a person into terrorism (for reviews see Atran, 2003: Dalgaard-Nielsen, 2010; Hutson, Long & Page, 2009; McCauley and Moskalenko, 2008; Ranstrop, 2009; Silke, 2008). These explanations can be broadly categorised as individual, social, ideological and political.

Individual explanations emphasise an individual's choice that has roots in his or her unique, personal experiences. In their model of Jihadi radicalisation in the Middle East, Hutson, Long and Page (2009) articulate a 'Personal Dynamic' form of radicalisation, discussing internal processes such as locus of control (Rotter, 1954), learned helplessness (Seligman, 1975) and self-efficacy (Bandura, 1997). In relation to Chechnya, Speckhard and Akhmedova (2005) concluded on the basis of interviews with the family members of the 34 Chechen terrorists involved in Moscow's Dubrovka theatre attack, that all of them had suffered from personal loss and the trauma of losing someone near to them. It was concluded that ideological factors may be *post hoc* justifications for essentially personal, traumatic experiences.

Pape (2005) has criticised such personal explanations on the grounds that "egoistic and anomic motives are insufficient; altruistic motives, either alone or in conjunction with others, play an important role" (p.184). This perspective gives emphasis to explanations that are broadly ideological. Atran (2003) supports this by drawing on "Interviews with surviving Hamas bombers and captured Al-Qaida operatives [to] suggest that ideology and grievance are factors for both groups but relative weights and consequences may differ" (p.1538). Central to this is what Houston, Long and Page (2009; p21) refer to as the "single narrative of global jihad", the positioning of contemporary Muslim politics by al Qaeda as a worldwide ideological battle.

A third set of explanations relate to social factors which has been paraphrased by Kruglanski, Chen, Dechesne, Fishman and Orchek (2009) as "social duty and obligations whether internalized or induced by peer pressure" (page 333). Such explanations are highlighted in the

writings of Bloom (2005), Goodwin (2006), Gambetta (2005) and Merrari (2007) and have their roots in the social psychology of group processes. They build upon the many studies that show the power of normative values induced by group membership, and the role of social approval/disapproval in influencing a person's attitudes and actions. Relatedly, in the context of political radicalisation, McCauley and Moskalenko (2008) emphasise the importance of group identification in relation to ten of the twelve radicalisation mechanisms they advance.

Kruglanski et al (2009) have suggested the umbrella term 'a quest for personal significance' to aggregate the three broad motives 'ideological, personal and social' proposed by various researchers. They see terrorist attacks, especially suicidal bombings, as a restoration of personal significance. The inevitability of death, reducing a person to a 'speck of dust', is transcended by a socially glorified death, with the promise of death as a transition to a position in heaven. This quest for significance "could encourage a 'collective switch' to a terrorism-justifying ideology" (Kruglanski et al, 2009, p.353).

Moghaddam (2005) identifies the lack of democratic and peaceful forms of redress and the associated frustration as the root cause for radicalisation. These connect with explanations emphasising socio-economic-political 'root causes' for various forms of terrorism, including unemployment and relative deprivation (Gurr, 1970). This general perspective is elaborated in the writings of Kepel (2004), Khosrokhavar (2005) and Roy (2004) discussing in particular the radicalisation of young Muslims in the West. A limitation of these explanations is that there is no way of differentiating the very small minority who decide to join terrorism and the majority who avoid it.

Whilst there can be little doubt that each of these explanations has some validity as Silke (2008) notes, "even the best available research on this subject is almost all based on secondary analysis of data, more specifically of archival records" (p101). For example, Kruglanski et al (2009) developed their powerful concept of 'quest for significance' mainly through examination of video clips of the last 'Will and Testament' of suicide bombers. These videos were a justification for the actions the person was about to carry out, with the clear objective of demonstrating the significance of that action. The psychological conceptual system that led to the action can only be hinted at in an activity aimed at creating a public image.

Bloom (2009) argued the limits of many of the sources of data used in explanations of terrorism lies in their being taken from 'highly politicized Israeli or Pro-Israeli sources' which draw mostly on propaganda material created by terrorist organisations. Such information is not made available within a careful research context and has overt public relations objectives. So although material drawn on is doubtless endorsed by the leaders of terrorist groups it throws only a little light on the psychology of the foot-soldiers who carry out their instructions.

It is consequently of value to consider two critical issues in order to further develop the psychology of terrorism. Firstly, there is a need for a conceptual framework that embraces a number of different possible personal conceptualisations, allowing for differentiation among terrorists in terms of their individual pathways, whilst still recognising central processes within which these themes operate. Secondly, a methodology is needed for gathering empirical data, in this highly politicised and emotive area, that connect directly with the world-view of terrorists; data which have not been distorted by the need to present a particular face to the world, or to justify or exonerate violent actions.

PERSONAL CONSTRUCT PSYCHOLOGY AND THE REPERTORY GRID

The value of obtaining information directly from a terrorist himself is illustrated by the recent account of radicalisation into an al Qaeda-affiliated Tunisian network (Vidino, 2011). However, such terrorist narratives can be enhanced from more formal psychological responses drawn from personal construct psychology, responding to Taylor and Horgan's (2007) call for research on the 'decisional contexts' of individuals.

The basis of personal construct psychology is Kelly's (1955/1991) proposal that a person's actions are based on judgements of the similarity or dissimilarity between entities, such as people, things or events, what Kelly calls 'elements'. The conceptualisations of these comparisons are called 'constructs'. Constructs are altered, rejected or reinforced by real life experience. The most important 'elements' in a person's life are key other people. So the constructs assigned to these people and how the elements are distinguished from each other are proposed by Kelly (1955/1991) to be the central route into understanding a person's construct system.

Kelly (1955/1991) developed the 'Repertory Grid' technique as a method for exploring personal construct systems that shape people's actions. The repertory grid is an exploration of an individual's construct system in a way that minimises the scope for introducing biases stemming from the researcher's assumptions. It is a widely used procedure. Fransella, Bell, and Bannister (2004, pp 168-229) listed more than 240 published research papers that have used the repertory grid method in contexts as diverse as clinical settings, child abuse, market research and looking at the way people construe animals.

The present study elaborated the personal construct systems of convicted terrorists. This will allow cross reference to psychological explanations derived from other data sources and test the applicability of the individual, social, ideological and political theories that have been offered. It further enables comparisons to be made between individuals in order to determine if each theory may be more appropriate for one person than for another.

METHOD

Forty-nine men (13 Pakistani and 36 Indians) involved in high profile terrorist crimes in India were asked to provide a narrative life story account. The narrative life story method, discussed by McAdams (1993), is based on the assumption that narrating a life story is a normal human activity and through the narrative accounts people reveal who they are, who they want to be and provide justification, meaning and efficacy to their lives. It also provided a basis for developing rapport with interviewees facilitating the use of the more psychologically intensive repertory grid. The life story account provides detailed background information of utility in elaborating the meaning of the grid responses.

The interviews were conducted in private with each person on his own in prisons visited by the International Committee of the Red Cross and with individuals who had full access to due process of law. Interviewees signed informed consent forms in the knowledge that they were free to decline answering any question or to bring the interview to a close at any point. It was made clear to respondents that participating in the interview or not carried no implications for their future inside or outside the prison. Complete confidentiality was maintained by anonymising all reference to the names of the participants and any other specific reference that may reveal their identity.

All interviews were carried out in the language that the interviewee was most comfortable with. This was usually Hindi, often in the Urdu variant, but in a few cases was Punjabi and in one case was English. They were all tape recorded with the agreement of the participant and the authorities. The tapes were transcribed and the transcriptions translated into English for analysis with cross-reference to the audio recordings when the transcripts were unclear.

REPERTORY GRID

The first stage of the repertory grid procedure involved asking each participant to name persons/entities who he considered had played a significant role in his life. These significant persons/entities became elements for preparation of the grid. For example they could be 'my father', 'the judiciary', 'the person who encouraged me to join the terrorist group'. Three self-elements were added to the elements supplied by the participants. They are 'me as I was before involvement in Jihad', 'me as I became after involvement' and 'me as I would like to be'. All the elicited elements were written on cards. Using

the well-established method of triads (Fransella et al., 2004), three elements were selected at random and presented to the respondent. The participant was then required to describe an important way in which he thought two of the elements were similar to each other and different from the third. This criterion became a construct. He was asked to supply the polar opposite of the construct, producing a bi-polar construct such as 'spiritual-material', or 'wishes the well-being of others-full of hatred'.

In the next stage a grid was prepared by placing the respondent's elements in columns and his constructs in rows. The participant was then asked to rate each of the elements on each of the constructs using a scale of 1 to 5, such that a score of 5 meant a high level of similarity with the construct and a score of 1 meant a high level of similarity with the polar opposite. The participant was informed that he could give intermediate scores of 2, 3 or 4 representing the degree to which a person could be characterised by the construct.

There are many ways of analysing repertory grids but one of the most powerful is to use a special variant of Principal Component Analysis (Fransella et al., 2004). This determines the two major axes underlying the judgements inherent in the grid, known as the principal components.

SELECTION OF CASE STUDIES

Initial exploration of the 49 cases showed that there tended to be a dominant conceptualisation for each individual. Examples were therefore sought to relate to the dominant theories outlined above. These examples covered the full range present across the 49 individuals.

An individual who had a dominant Islamic ideology was selected to illustrate the form this construct system took. The political perspective emphasised in so many studies was also clearly present in a number of examples, allowing a typical one to be selected. Individuals whose construct systems related to their social contacts were also apparent, allowing a representative case to be identified. However, no examples could be found of the very personal, construct systems proposed by Speckhard and Akhmedova (2005). A somewhat unexpected construct theme did emerge that is not reflected in the explanations explored above. This is the relationship to criminal activity. Gupta, Horgan and Schmid (2009) do draw attention to the overlap of organised crime and terrorism, but the possibility of criminality being a dominant aspect of a terrorist's construct system has not been highlighted in general explanations. This case therefore provides an interesting insight into some terrorist psychology and as will be seen offers a new perspective on Kruglanski et al.'s (2009) 'quest for personal significance'.

For clarity, the present sample were not part of what might be better termed 'insurgency'. The respondents were part of informal terrorist networks, not highly organised guerrilla movements. They therefore did not have access to the range of criminal activities that have been consciously developed to fund militaristic campaigns. This individual, and a few others of those interviewed, started as a criminal gang leader and used his influence within the criminal underworld to connect with terrorist groups. He therefore illustrates an aspect of terrorism not often explored.

CASE 1: THE ISLAMIC JIHAD MJ 27 [1]

Background

MJ 27 belonged to a well-to-do family in Kashmir. He was an average student and a keen sportsman. He studied in a prestigious college and then worked for a major international organisation. He was convicted of one of the most high profile attacks in India, having provided logistic support for the attack.

MJ 27's Account

MJ 27 describes the atmosphere at home as "*not so religious, not so conservative, but usual Mus-*

[1] In all the accounts of these four individuals some non-crucial details have been changed to maintain anonymity and other details have been made more ambiguous.

lim family. We were modern Muslims…not fanatic….you can say moderate". He defines fanatic to mean that "*they will say that they are right and others are not"*. MJ 27 described himself as stubborn from childhood. "*If I wanted to do something I did it, otherwise not"*. He also claimed that he was selfish and self-centred.

MJ 27 says that he was spiritual from childhood. "*My attitude as a child was the same as it is now. The approach to my life, thinking of higher things was there in my childhood also"*. He recounts looking at the sky for hours forgetting that the tea was getting cold. He says with "*exposure and studies"* he matured, but his approach to life was always an attempt to search for a higher life and that was "inborn", a matter of personal nature.

At University MJ 27 started to engage his mind, "*The discussion was invigorating and I was attracted to the intellectual atmosphere"*. He reacted more and more philosophically at a "metaphysical level", a term that he used often during the interview.

> *From my childhood I used to look at the stars and wonder. But after coming to University I became more conscious of the other world. With maturity and education one becomes more aware…. I remember God always. So it was more to do with maturity or becoming more aware rather than becoming fanatical. But the awareness of God was always there when I was 13 or 30. That was a personal issue…. You can say I am a person who has a loving relationship with God…. I see everything on earth as creation of God…*

He was always aware of '*life Hereafter'*, but he had become more acutely aware of it. "*It becomes very evident when you go through the reality of life. Consciously and practically we become more aware of life after life"*. In Islam, MJ 27 discovered his philosophy for life:

> "*Allah was a major influence. Then since I am a Muslim it was Islamic ideology….If you have studied life keenly you will always find some force behind it, behind the whole establishment irrespective of religion, caste and creed. It is important to recognise this force and what this force tells you, as per your ideology since you belong to a particular group or community. I know what Islamic Ideology tells me. Because the recognition of the force is very important to me. It was always there. But I became increasingly more aware. If you read your books you will understand all these. That there is some force who is behind all these but people never recognise this force. Those who don't recognise this, commit mistakes*."

MJ 27 "*got the answer to it in Sayeed Qutub"*. He paraphrased Qutub in the following terms "*God's laws are superior because they are for this world as well as the world hereafter" and if there is conflict between God's laws and manmade laws "one is justified to violate manmade laws"*. He became "*more inclined to natural laws laid down by God*". The inclination for God's laws as laid down in the Sharia gave him 'peace'. He explained that the source of his thinking lies in "*the Koran, reading and understanding of Koran and doing practical work as per God's laws*". He was categorical "*no one influenced except Sharia. That is prophet's laws"*. According to MJ27, the practical work included Jihad. Jihad is a logical outcome of his understanding of the Koran and the commitment to God's laws.

For MJ 27 then Jihad was an extension, to quote, of his "metaphysical-*self"*. It was part of an Islamic ideology, which he was committed to as a Muslim. This clearly extreme, religious ideology reflects the dominant explanation for Jihadi terrorism.

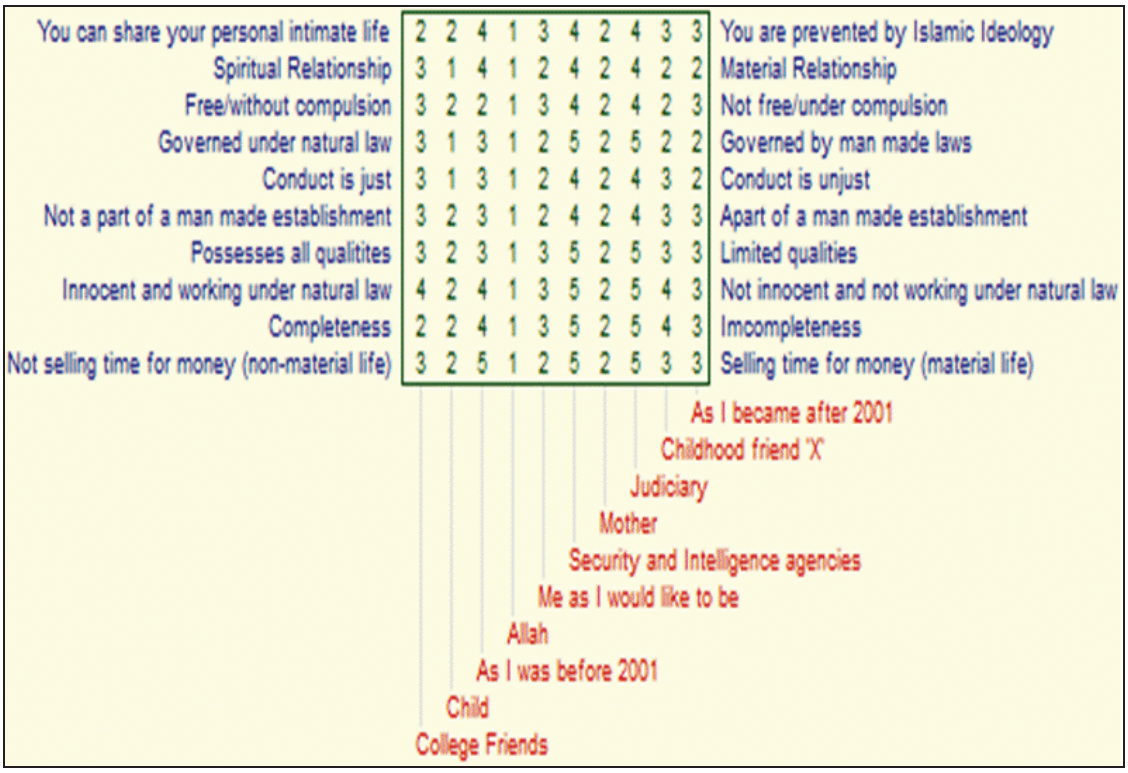

Figure 1: *Repertory Grid of MJ 27*

Principal components analysis of repertory grid

The ideological emphasis can be understood further in the details of his repertory grid in Figure 1. The seven elicited elements are Mother, Childhood friend 'X', College Friends, his own Child, Allah, the Judiciary as he experienced then and Security Agencies. The numbers indicate how readily the constructs listed at the sides relate to the elements listed at the bottom. The 5 indicates the highest possible relationship to the element pole at the right[2] and the 1 to the element pole at the left with the other numbers indicating degree of relationship along this scale.

The repertory grid was analysed using a variant of principal components analysis to determine the two major axes (or principal components) integral to the grid. For graphical presentation the elements are plotted as points in relation to these components. The lengths of the lines on the plots and the position of the points represent the actual ratings. As Jankowicz (2004) explains:

> *The angle between any two construct lines reflects the extent to which the constructs are correlated, the smaller the angle, the more similar are the ratings. The angle between a group of construct lines and the lines representing the components reflects the extent to which the component can be taken to represent the grouping of constructs in question; the smaller the angle, the greater the extent* (p.130).

By convention the X-axis represents the first component (accounting for the maximum percentage of variance) and the y-axis represents the second component (accounting for the next

[2] The interviews were conducted in Urdu, which reads from right to left. So for the actual Grid completion the highest value was to the left. In order to process the grids through the PCA software these were reversed and those final versions are presented here.

highest percentage of variance). The X-axis and the Y-axis being at right angles represent zero correlation (Jankowicz, 2004, p. 131).

The advantage of a PCA is that it reduces the information on the relationship of constructs and elements to its key, latent constituents, which can then be examined to identify their underlying meaning. Such a reduction of the potential complexity of a grid to a small number of constructs is possible because usually there is a common underlying psychological meaning to the constructs, which reflects the dominant themes of a person's cognitive processes. These themes energise the respondents' personal narratives in relation to the key individuals in their lives (as recently explored by Youngs and Canter, 2012). They thus provide an insight to the respondents' unfolding perspectives on their lives.

The graphical representation of MJ 27's Grid is given in Figure 2.

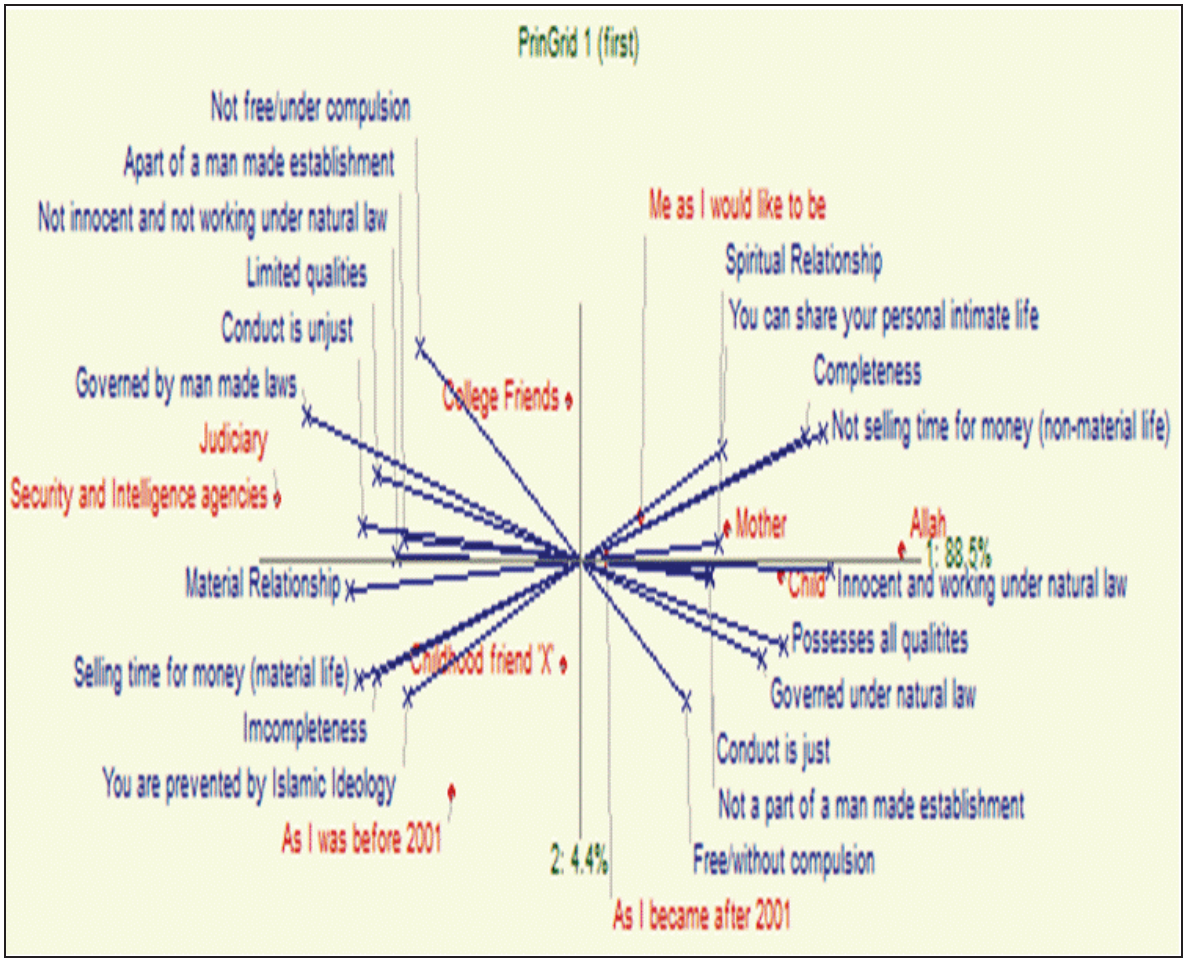

Figure 2: *Principal Component Analysis Plot of Repertory Grid of MJ 27*

The Principal Component Analysis Plot at Figure 2 shows that the X-axis (First Component) accounts for 88.5% of the variance. This is a large amount of variance showing that this is a strong, extremely dominant central theme. It represents a clear Islamic Jihad theme as illustrate by Mother, Child and Allah being located very close to the X-axis with Allah, on the X-axis, thus clearly defining it. The elements Judiciary, Security and Intelligence Agencies, self before, childhood friend 'X', College friends are on the opposite side to Mother, Child and Allah.

Furthermore, MJ27's total acceptance of his position within this religious concept is shown by 'me after' and 'me as I would like to be' being on the same side as Allah, Mother and Child. MJ 27 believes that he is a religious person, who is pious and has carried out an Islamic duty. He also construes himself as abiding by natural law, a euphemism for God's laws, and he is consequently innocent, even if he may have broken any man-made laws.

The closeness of the two elements of self after involvement in Jihad and ideal self show that this individual has no desire to change. His self concept is integrated with his view of Allah and therefore it is unlikely that he would be open to disengagement.

This individual thus illustrates the way in which the Islamic theme is internalised and becomes a dominant part of a person's construct system. It relies on an unbending focus on a literal and fundamentalist interpretation of Islam that can be traced back at least to the 13th century, as Sarangi and Canter (2007) have explained, to the writings of medieval jurists like Taqi al-Din Ahmad ibn Taymiyya (1263-1328). In this articulation the Islamic way of life is presented as superior to all other ways of life and God's laws as superior to man-made laws.

CASE 2: THE POLITICAL JIHAD MJ 1

Background

MJ1 belonged to a poor family and was brought up in the slums of Mumbai. His family originally belonged to the northern state of Uttar Pradesh. MJ 1 had eight siblings. He went to a Government school but dropped out because of what he described as memory problems. MJ 1, with associates, committed simultaneous bombings that killed more than 40 persons and injured more than 100.

MJ 1's Account

Injustice was a central theme in MJ1's account. He emphasised his opposition to any form of injustice:

> *"From the very beginning I did not like injustice or took any unjust decision. If children fought they came to me for a decision on who was wrong. Children believed in my sense of judgment and fair play. I never made any unjust decision. It was not in my nature to harm anyone or do any injustice…. We have to be just and stand up for justice."*

MJ1 was clear that his offence had "*nothing to do with Islam. This is political - response to atrocities and struggle against the dominance of the Hindus"*. He argued that Hindu communal forces seek hegemony and commit atrocities on Muslims. According to MJ 1, the Indian investigating and intelligence agencies fail to protect the Muslims from being killed and raped by Hindu groups seeking hegemony:

> *"You see if you catch hold of a bird in your hand, the bird will also try its best to escape from your control. You cannot keep human beings under control by keeping them under arrest for a long period without any fault. The time would come when they would try their best to get freedom from captivity."*

For MJ1, the hegemony of Hindu parties also manifested in the violence in Gujarat or demolition of the Babri Mosque. This was part of a larger narrative where the non-Muslim world is presented as against Muslims. In his view, the 9/11 WTC attack was a conspiracy against Mus-

lims, "*Media carry the version of authorities. You don't get to know the truth… Why all the Jews were on leave that day?*" This response, interestingly, shows how propaganda and conspiracy theories germinate between these individuals, especially in prison. In high security prisons, terror convicts have the opportunities to discuss these issues and come up with many of these ideas. It is often difficult to differentiate between what was acquired before going to prison and what is acquired during prison as well as by going through the court process of argumentations and cross-examination.

Violent reaction can be justified as a legitimate political response to this. According to MJ1, Muslims have to fight against injustice and the choice of method is individual. As he put it, "*Gandhi preferred.... non-violence and some others preferred to implement the principle of tit-for-tat. If one uses power against you then you should also use power against him…. To achieve the goal different people adopt different methods."*

MJ 1's readiness to commit the offences occurred during a "*small period*" that he changed. "*Gujarat was bad. I was very angry about the injustice"*. MJ1 declined to admit the full events of the conspiracy commenting only that "*I jumped into a running vehicle*". He was however clear that the decision was his own. "*In my life I did not give much importance to others. I followed what was right and rejected what was wrong*".

MJ1's involvement also had nothing to do with perceived community support. "*No one is thinking about support of the community".* No one in his family or surroundings had any inkling of his intention and preparations. "*This was the thing on which a curtain was always there, it was not visible from outside easily".* His family members knew nothing until he was arrested. So, the inspiration did not come from family or from anyone else since he kept everything away from them. No one knew about it except individuals within the terror network and it was very much his personal decision. "*This is political. There will be reaction. This has nothing to do with Islam".* So, although he belongs to an Islamist organisation, banned by the UN, he is, in effect, saying the enemy has brought it on itself, it is not the fault of Islam.

Repertory grid and principal components analysis

The clearly political stance is shown directly in MJ 1's Grid presented in Figure 3 and the PCA in Figure 4.

The seven elicited elements are Father, Mother, Love 'X', Co-accused 'Y', Co-accused 'Z', Hindu Communal Leader 'H' and Hindu Friend 'F'. The PCA Plot at Figure 4 shows that the X-axis (first component) accounts for 97.8% of the variance. A remarkably total component showing that constructs dealing with sacrifice for the good of others are central. MJ1 uses a single factor in a highly rigid fashion and to the total exclusion of any alternative discriminating criteria.

In the principal components analysis plot, Father, Mother, Hindu Friend 'F', 'me as I would like to be', 'me as I was before' and 'me as I was after' are on one side and Co-accused 'Z', Hindu communal Leader 'H', Co-accused 'Y' are on the opposite side in a clear two-way division. This reflects the 'in-group versus out-group', us and them, theme that commonly characterises group identity. But here it is couched in terms that relate to politicisation and an 'extraordinary life'.

MJ1 sees no trajectory to his life with all his self-concepts being close together around his dominant belief that he is primarily concerned with the wellbeing of others. This reveals a man who considers himself always to have been fighting the good cause, as illustrated in his anecdotes from early childhood.

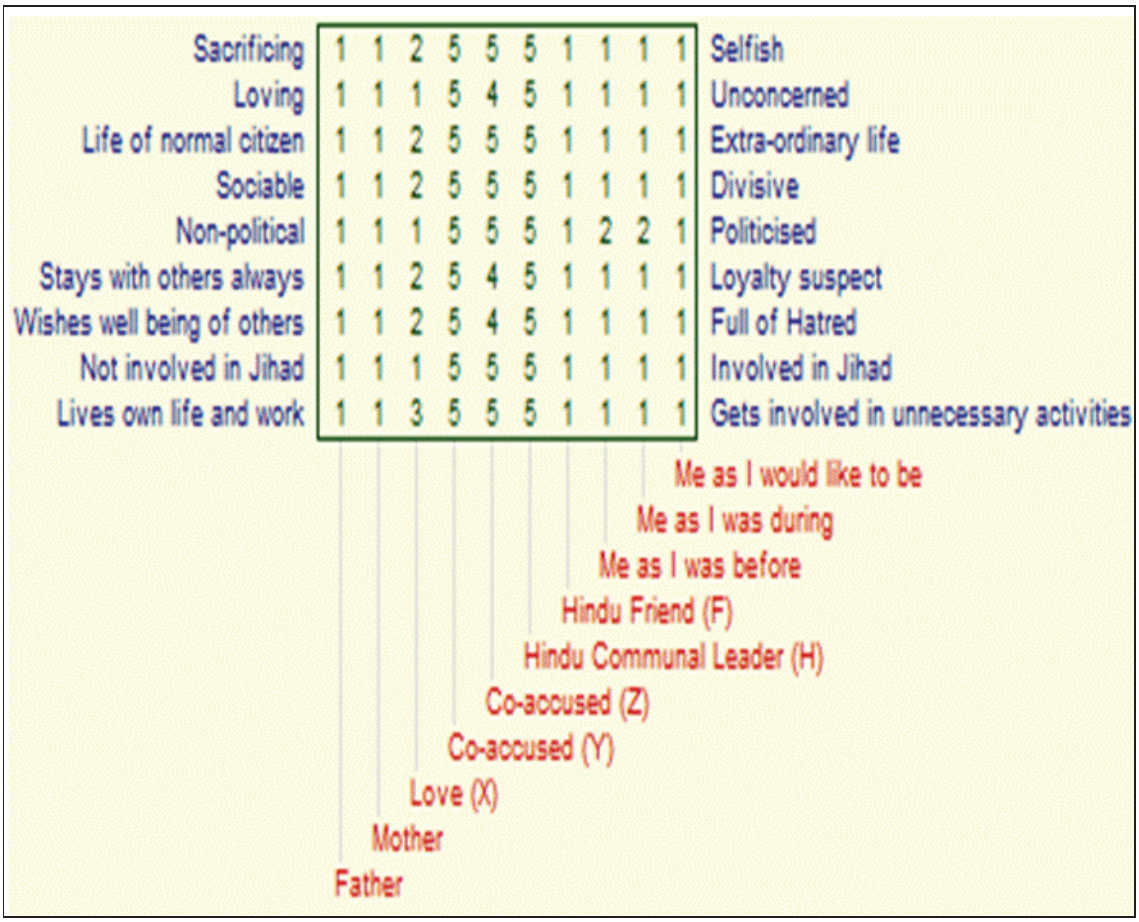

Figure 3: *Repertory Grid of MJ 1*

This conceptual system gives emphasis to political grievance then with terrorism viewed as a legitimate tool for meeting these demands. The focus is not necessarily religious or one that adheres to the objective of establishing Sharia law in the entire world. The concerns are more immediate and deal with issues in this world and not the hereafter, with the main emphasis being the atrocities inflicted on Muslims. There is a belief that the geo-political situation in the world is against Muslims who are seen as not having any democratic way of stopping these atrocities and unable to fight the hegemonic powers through conventional wars. So, the solutions lie in taking revenge through terror strikes and asymmetrical war so that the enemy can be stopped, intimidated and forced to change anti-Muslim policies.

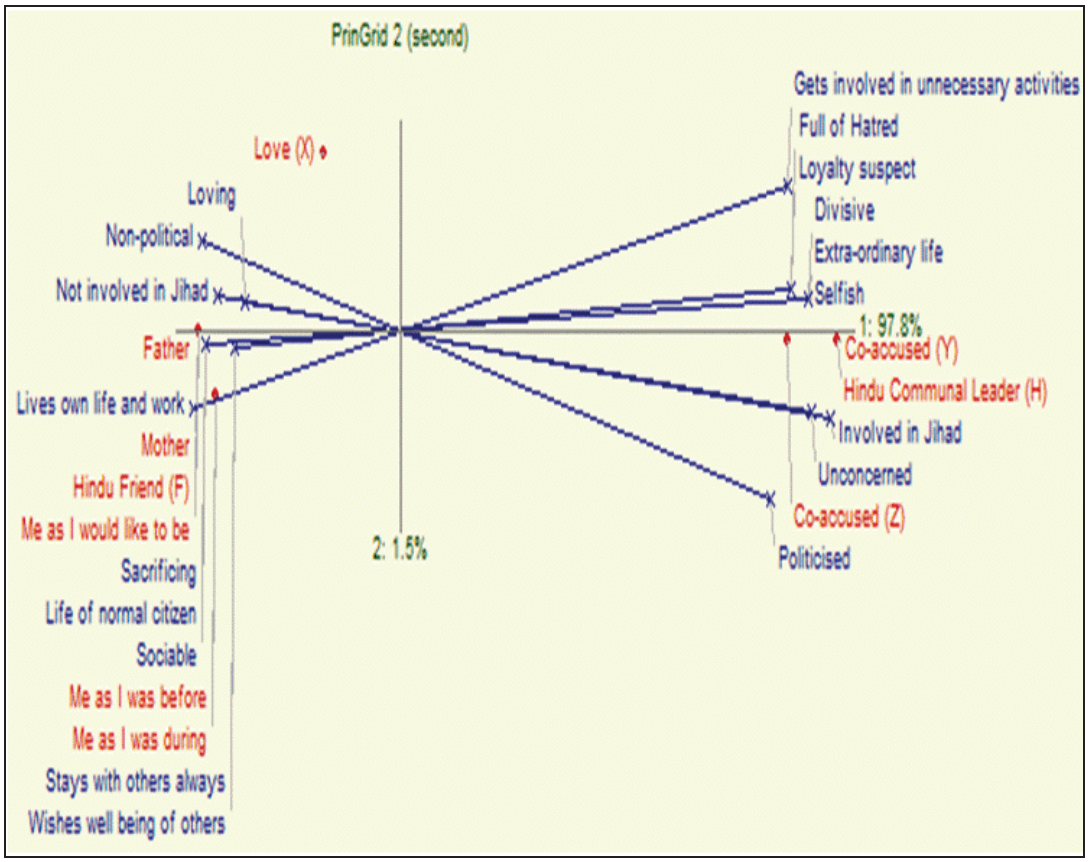

Figure 4: *Principal Component Analysis Plot of Repertory Grid of MJ 1*

CASE 3: THE SOCIAL INFLUENCE MJ 37

Background

MJ 37 did not have a very religious upbringing, though he performed Namaz sometimes as a child although not five times a day as mandated. MJ 37 crossed over to Pakistan from Kashmir at the age of 16, when he was studying in Class VIII, to fight for the Hizbul Mujahideen. He lost interest in studies while he was in Class VII and one day, while in Class VIII, he did not return from school. He ran away from home without telling anyone. He was aware that if his family members got to know what he was thinking he would not be allowed to leave home. *"If, by some means, my people had got to know that I was planning to sneak away to Pakistan, they would not have allowed me to venture out of the house".* None of his family members or relatives had joined the Mujahideen.

MJ 37's Account

Central to Mj37's account is his claim that all young men of his age wanted to become Mujaheeds. As he explained,

> *"I do not know whether it was the sight of the gun or something else that stimulated my mind. I decided to be a militant. All the*

> *young boys of my age thought like that…Even during my childhood, I had the desire to be a Mujaheed".*

MJ 37 was clear that no one forced him. He wanted to be a Mujaheed and that is what he did as soon as he was able to establish contact with a terror network that helped him to cross over and join a terror camp.

> *"It was my own decision",* asserts MJ 37 and said "*perhaps, it was in my mind and probably it was there in the atmosphere…All young men had the same idea. They thought alike…..I was not very clear why I should set off for Pakistan. But, nonetheless, I was determined to go."*

MJ 37 became regular in performing Namaz only after crossing over to Pakistan and joining a terror training camp. While in school the children were made to perform Namaz and taught to recite the Koran. Despite having elementary knowledge of Islam he had learnt that the *"Mujaheeds were following the ways of Allah*", Jihad was an Islamic duty and martyrdom is to be celebrated. A martyr "by virtue of his martyrdom, earns the right to dwell in paradise for all times to come". Beyond these broad principles his knowledge of Islam was rather elementary. He had learnt from the prevailing atmosphere that the Indian security forces were occupying Kashmir and committing atrocities on Muslims. Therefore, as a Muslim, it was his duty to join the Jihad. *"I thought becoming a Mujaheed was the right thing to do*".

MJ 37 decided to join Hizbul Mujaheedin (HM) as "*they were the most active".* Upon joining the organisation he received military training aimed at turning him into a fighter. He learnt about handling weapons and acquired elementary knowledge of explosives. But, slowly he became disillusioned and wanted to escape. He found *"that all the young men did not swear by Jihad…quite a few … sought power*". He also found that the Chief of HM was using a luxury car. *"The ordinary Mujaheed goes there to fight. He finds it very disgusting to see such blatant display of luxury amidst general ruin and misery*". He felt such luxury was "*not in sync with claims of fighting it out till the last drop of your blood".*

MJ37 realised that he had taken an "*immature"* decision. But escaping from a terror organisation was not easy. He was caught trying to escape and given a physical beating. He was told that he needs to find someone who will do the job assigned to him. Right from his childhood he dreamt of becoming a Mujaheed. "*People thought well of the Mujaheed"*. But, he was disillusioned. "*I felt a sense of regret over the prevailing circumstances"*. But, he had to continue for six years as he feared *"Hizbul cadres would liquidate me if I moved out".* At 16 he became a fighter and at 21 he was disengaged.

The psychological details of this are revealed further in his grid shown in Figure 5 and the PCA of it in Figure 6.

Repertory grid and principal components analysis

As seen in Figure 5 the seven elicited elements are Parents, person-who helped him to disengage 'F', 'Salauddin (Chief of Hizbul Mujaheedden), Uncle 'Y', Motivator 'X', Guide who took him to Pakistan 'Z', Amir of the organisation (who trained him). These are discrete individuals of direct social significance to him.

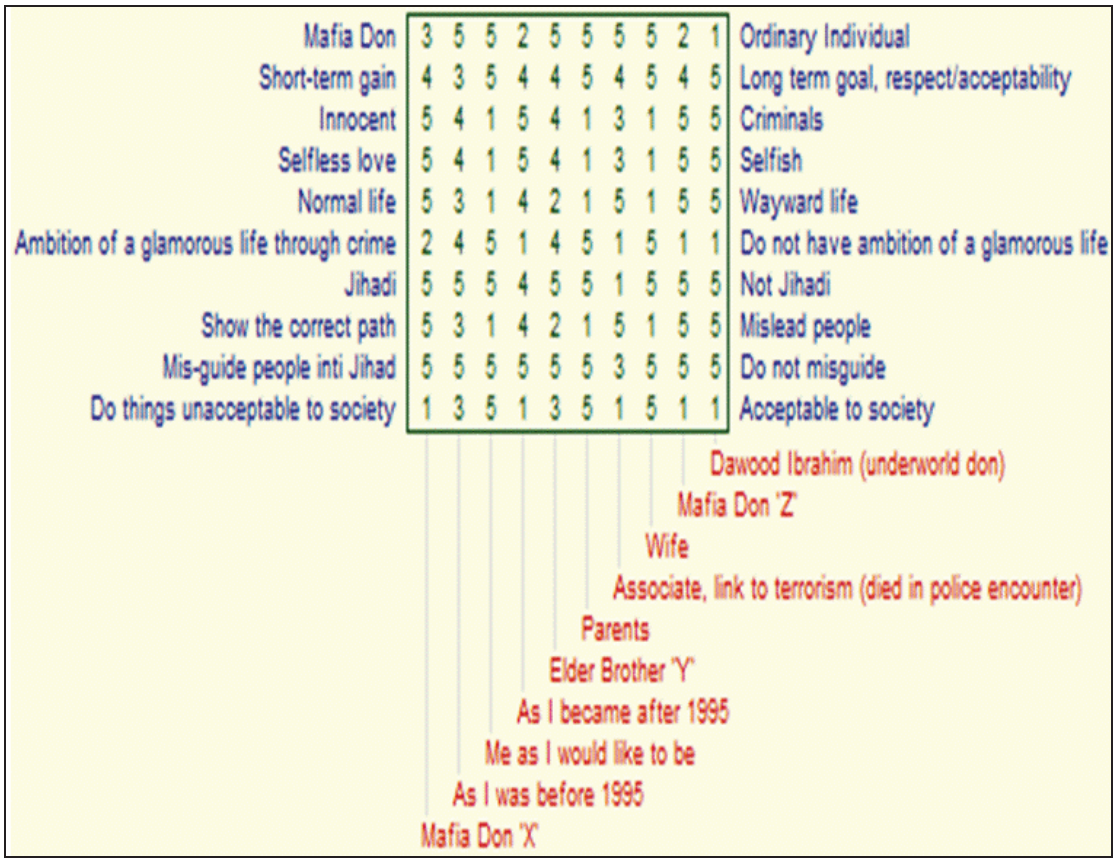

Figure 5: *Repertory Grid of MJ 37*

The PCA Plot at Figure 6 shows that the X-axis accounts for 86.8% of the variance. Motivator 'X', Salahudeen, Guide 'Z' and Amir of the organisation are on one side and the non-terrorist elements are on the other side. The constructs also have a direct personal relevance to him. He distinguishes between people who are mindful of his personal interest, give him good advice and do not train him to be a Jihadi. He wants to live in peace without any grand ambitions. He distinguishes between people who are not after power and not even aware of the world of Mujahideen and those who want to drag others into terrorism.

The self before and the ideal self relate to non-terrorist constructs, although he has never seen himself as totally committed to Jihad. This accords with a person who wishes to disengage from terrorism as he describes himself having tried to do. That is understandable from the perspective of someone whose initial involvement related to social pressures and rather unclear ideas. Once the influential individuals were seen not to live up to the constructs he expected then his commitment to them and their cause diminished.

The social theme is more characteristic of societies in the midst of conflict where terrorists often emerge as role models and there is an understanding that becoming a terrorist will give power, influence and social recognition. These individuals can be affected by peer pressure and notions of social obligation. MJ 37 demonstrates the absence of religious or political constructs or any clear idea of what would ultimately be achieved by their terrorist actions.

CASE 4: THE CRIMINAL MJ 13

Background

MJ 13's father died while he was in Class VIII and he was brought up by his mother with the financial support of his five uncles. MJ 13 completed a Bachelor's Degree in Psychology and was admitted to a Law School to be a lawyer, much like his father who was a lawyer practicing Civil Law in the lower courts. But he soon gave up his study of the law preferring instead to become an associate of a criminal Gang chief DT, who introduced him to extortion and kidnapping for ransom.

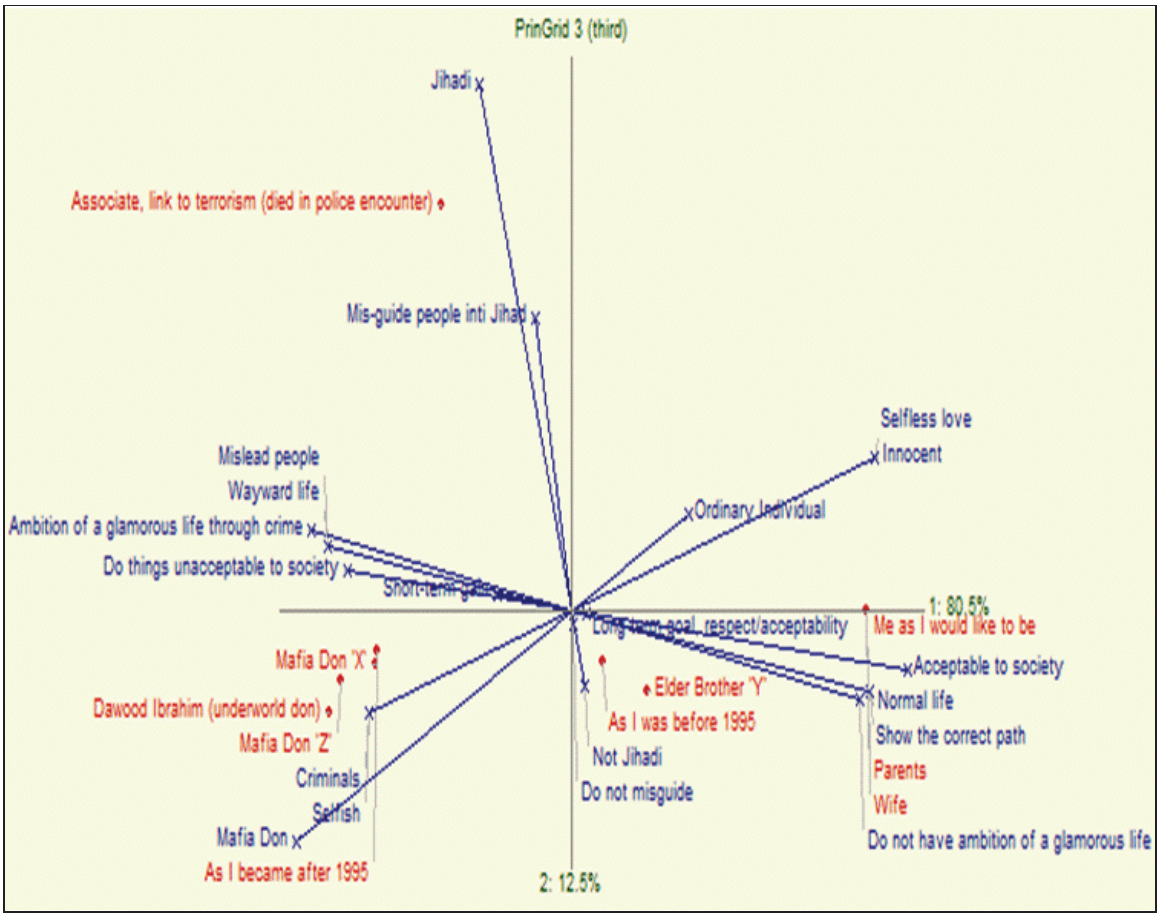

Figure 6: *Principal Component Analysis Plot of Repertory Grid of MJ 37*

He is typical of a very small number of individuals who drifted from criminality into terrorism. It should be noted that Islamist organisations are puritanical and do not accept any crime for personal gain. In fact, they want criminals to be given very harsh treatment. So, the marriage between Islamism and crime is rather uncomfortable and consequently rare. This person, thus, illustrates the possibility of crime and terrorism interacting, despite their ideological differences. He demonstrates that at the tactical levels terror organisations may make choices that are not consistent with their purist ideologies, entering a criminal network, which brought with it people and the logistics to commit crimes.

His subsequent crimes included ordering a major terrorist strike.

MJ 13's Account

MJ 13 reports being impressed by DT because he "*was very well known…He had a good number of followers.... He was just too powerful. I was mesmerised…I went through a change in my life. In my desire to enjoy power and the glamour of the underworld I went too far. I started committing crimes, though petty ones*."

After becoming an associate of DT he started living away from home for months rarely visiting home. MJ 13 accompanied DT to extort money from a businessman. By the time they reached the house of the businessman the police were waiting for them. In an exchange of fire DT was killed and MJ 13 was arrested and imprisoned. As MJ 13 said his present life started from then. In the prison he met ARK, who was facing trial for his involvement in terrorist activities. The prosecution failed to prove the charges against ARK and he was released from custody.

During his imprisonment MJ 13 came in contact with prominent Jihadi leaders. As MJ 13 said, "*Once I was released I thought there was no* point *in committing petty crimes. Now that I was in police records, I wanted to go for major crimes….I wanted recognition at any cost, even as a bad man. If you have to be bad, you must be the best among the bad men. You should reach the top of the field you select."* So, he migrated to a city in the Middle East and started organising a network for extortion and kidnapping in Indian cities.

The association developed in prison with Jihadis, ARK and others continued. The Jihadis gave him good quality weapons, particularly small arms that his gang needed for carrying out extortion and kidnapping. It also gave him a new Passport and address. He soon had a Pakistani Passport, purchased a flat in Islamabad and married a Pakistani girl, who also happened to be the sister of a Jihadi and a friend of ARK. He also interacted with people alleged to be top Jihadi leaders in Pakistan like Azim Cheema and professor Hafiz Sayeed. He had contact with Pakistan's Inter Service Intelligence, ISI, he visited terror camps, discussed political issues with Jihadi leaders and their interpretation of Islam. MJ 13 was well aware of the rhetoric, but claimed that he did not agree with Jihad. So although he did not accept Jihadi rhetoric he nonetheless made use of a fundamentalist Islamic context to further his personal ambitions. Ultimately, he claimed, it was a question of personal choice and inclination. His inclination was for making money and leading a glamorous life.

> *Right from the beginning I was not interested in it…let me tell you 90 % of men working for me were Hindus. If they got to know that I was a proponent of Jihad, they would not have worked with me. Anyone who gets embroiled in Jihad is finished. Because of my association with ARK, I earned the reputation of a Jihadi.*

The crimes MJ 13 committed had nothing to do with Jihad. But, it all changed when ARK was killed in exchange of fire with the Police. ARK's brother and associates, who belonged to Kolkata wanted to avenge the killing of ARK by the police. ARK committed crime to earn money, which was used to fund Jihad. He also provided logistic support for different Pakistan-based Jihadi organisations for committing terror crimes in India. But, after ARK's death ARK's younger brother and associates had decided to do their own Jihad.

MJ 13 ordered a major terrorist strike and claimed responsibility by making telephone calls. MJ 13 claimed that he agreed with the decision to carry out the attack since he thought a major attack of that magnitude would make him 'big'. This would have then given more credibility for him to extort money from rich businessmen with telephone calls from his hide-out in the Middle East, using his gang in India. He claims that he was just a criminal and not a Jihadi, though he committed the mistake of associating himself with Jihadis and is therefore, paying for the association.

Repertory grid and principal components analysis

His Grid in Figure 7 show that seven of his elements include three gang lords and a criminal associate, ARK, who linked him to the Jihadi world. The PCA Plot for the repertory grid of MJ 13 in Figure 8 indicates an X-axis that accounts for 80.5% of the variance. Although this is still high it is notably lower than the others considered above indicating that he did not have such a strongly one-dimensional perspective on the people who were significant to him.

Trains you in the wrong things	1	5	2	5	5	1	1	5	5	5	Doesn't train you in wrong things
Guide you in the wrong way	1	5	2	5	5	1	1	5	5	5	Advise you in the right path
Motivate people to become terrorists	1	5	1	5	5	1	1	5	5	5	Don't motivate people to become terrorists
Works for monetary interest of self	5	5	1	5	5	1	1	5	5	5	Considers your interest
Jihadis	4	4	1	1	5	1	1	5	5	5	Not Jihadis
Helpful	5	1	5	3	1	5	5	1	1	1	Not helpful
Mujaheed	4	5	3	3	5	1	1	5	5	5	Not a Mujaheed
After power	4	5	1	4	5	1	1	5	5	5	Not after power
Objective to create ruination	3	5	2	5	5	1	1	5	5	5	Wants peace
Unaware of the world of Mujaheed	3	1	4	4	1	5	5	1	1	1	familiarity with terror world

person, who helped him to surrender 'F'
Parents
me as I would like to be
Salauddin (Chief of HM)
Guide, who took him to Pakistan 'Z'
Uncle 'Y'
As I was when I was a Mujaheed
Amir of the organisation (Trainer)
As I was before I became a Mujaheed
Motivator 'X'

Figure 7: *Repertory Grid of MJ 13*

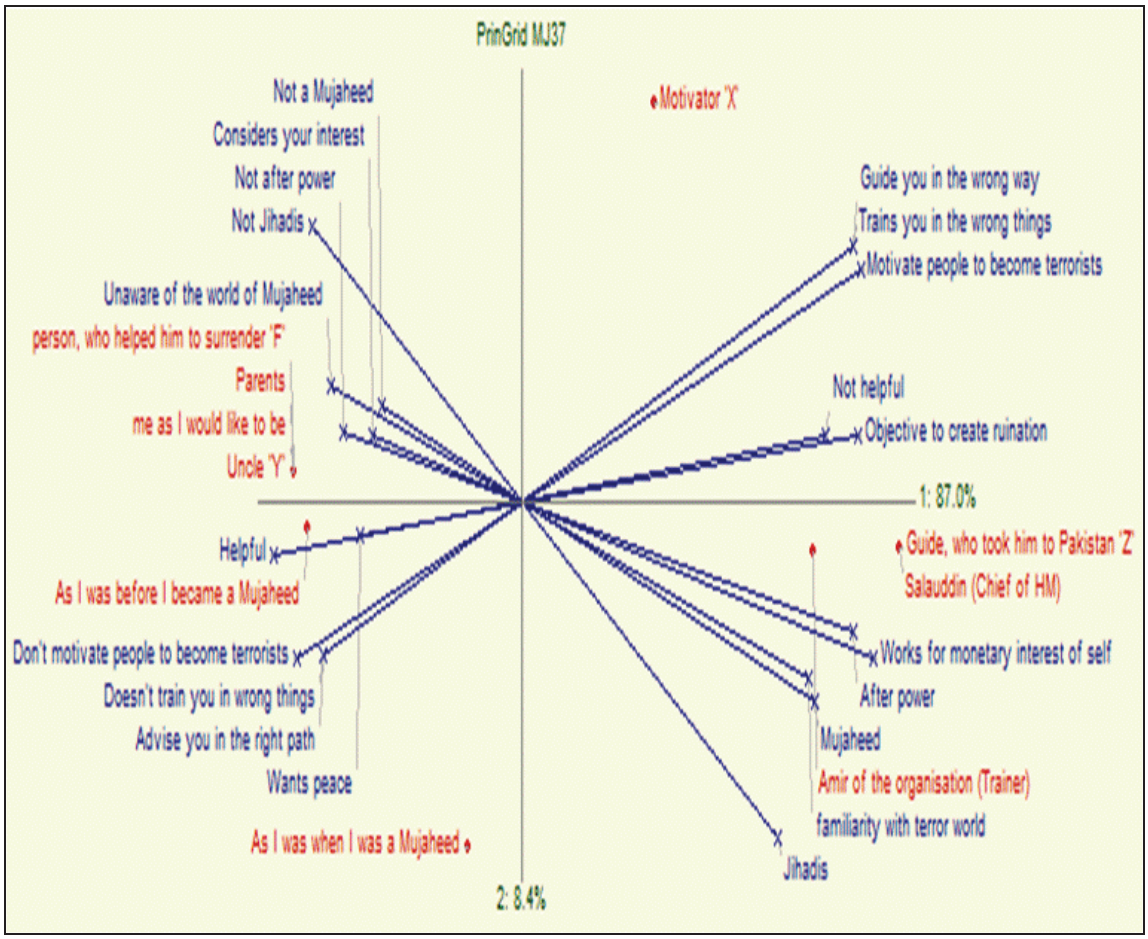

Figure 8: *Principal Component Analysis Plot of Repertory Grid of MJ 13*

The search for a glamorous life is a strong aspect of his dominant axis. This is seen as relating to misleading people and being wayward. Interestingly it is quite distinct from considerations of whether a person is involved in Jihad or not which creates the Y axis. There are no political or ideological constructs here at all, showing that the search for glamour can be an aspect of seeking personal significance without any strong religious or geo-political beliefs.

This individual's self concepts jump across the dominant axis in a most revealing way. He saw himself on the balance between wayward and acceptable behaviour before he became involved in Jihadi activity. This indicates that he recognises that he always had some potential of drifting into crime. It was the contacts that opened that pathway for him. He then saw himself moving strongly in a criminal direction until his arrest. His current desire is to move as far away from that type of person as he can.

MJ 13 demonstrates that involvement of criminals or criminal networks with terror organisations is an opportunist decision. Through association with terror networks the individuals find greater opportunity to pursue their criminal objectives of making money and wallowing in the notoriety that comes with terrorism.

DISCUSSION

The current paper shows the ways in which an open, life story interview can be combined with the Repertory Grid to provide an understanding of the personal constructs that are at the heart of an individual's radicalisation. The indications are that radicalised thinking takes different psychological forms, relying on different constructs and conceptualisations. These were understood in terms of underlying Islamic Jihad, Political Jihad, Social and Criminal themes. The examples selected elucidate the existing ideological, political and social explanations of terrorism. They suggest a further less developed explanation in terms of a simple criminal involvement. Although only four single cases are presented, they do illustrate the range of themes found in the original data set. The present study, consequently, does show how the Personal Construct approach allows insights into the details of the cognitive structures, the pertinent constructs and conceptualisations, that can be produced by these processes.

Interestingly, a form of Personal Construct system dominated by personal issues, trauma or experiences was not readily identifiable. Although Kelly emphasised the role of experience in shaping an individual Personal Construct system, this does not imply that an individual's construct system will be a simple or direct representation of personal experience. The suggestion is then that the personal motivation processes that dominate some explanations of terrorism operate as precipitating factors rather than being the focus of radicalised thinking. The sensitivity to injustice Case 2 reports for example, that is likely to have its roots in a personal experience of injustice, does not structure his construct system. The assertion here then is that personal factors and experiences may manifest in different forms of radicalised thinking, rather than organising it. From an intervention perspective this does mean that Personal Construct systems cannot necessarily tell us about the background personal motivations that lie behind the individual's cognitive structure.

The individuals presented here all have limited, dominant themes to their construct systems. These themes account for a great deal of their conceptual systems revealing how narrow their world views are. This is an important finding, consistent with the work of Savage and Liht (e.g 2008) that has drawn attention to what they call 'the low integrative complexity' at the heart of extremist religious thinking. One possibility this low complexity opens up is that the different themes identified may all be reflections of a more generic perspective that there are moral, or religiously defined guiding principles for action which can be in conflict with the laws of the land. That is clearly the view of MJ27 who contrasts 'God's Laws with Man's laws'. MJ37 expressed something similar when he claims "being a Mujaheed was following the ways of Allah". In a more subtle way MJ1 conceptualises political action as being against the workings of the state. The challenge to legitimate society is also at the heart of MJ13's construct system. Future research would therefore benefit from a more detailed exploration of how the fundamental construct of self-defined principles versus those determined by legislation are manifested in a limited set of different themes relating to the particular contexts of individuals.

These limited themes demonstrate then that major explanations of terrorism in the existing literature have validity at the individual level, but that one theme, whether it be for example political or ideological, tends to be relevant for any given individual. In this way, the different theories about the psychological causes of terrorism are not in competition with each other, but are complementary, some applicable to some individuals, others applicable to others. The findings provide some initial empirical support then for the idea of distinct routes to terrorism as posited recently in the models of both McCauley and Moskalenko (2008) and Hutson, Long and Page (2009).

McCauley and Moskalenko's important work delineates twelve mechanisms of radicalisation that operate at individual, group and mass-public levels. This includes, for example processes of 'extremity shift in like-minded groups', 'extreme cohesion under isolation and threat' and 'within-group competition-fissioning'. An intriguing future research direction will be the integration of

these proposals on the mechanisms of radicalisation with the current findings. This will allow exploration of the particular combinations of mechanisms which relate to the different substantive radicalisation pathways of individuals that have now been identified.

Relatedly, it seems likely that the four psychological pathways observed here will be differentially relevant to different types of terrorist involvement. Future research will establish which of the Islamist Jihad, Political Jihad, Social or Criminal pathways apply to Nesser's (2006) Leader, Protege, Misfit and Drifter terrorist roles.

By combining the Grid results with the life story narratives it has also become apparent that the themes each individual reveals is rooted in his background. None of these individuals was coerced or 'brainwashed' into his violent actions. They grew out of his ways of thinking about the world and the personal aspirations he already had before the terrorist pathways opened to him. This implies de-radicalisation strategies that address these broader issues rather than simply neutralising the radical rhetoric these individuals will have been exposed to. Another curious consistency is the frequency with which these individuals cite their families as significant people in their lives. This is despite the extent to which they all hid their terrorist aspirations and activities from those families. There are certainly implications here for approaches to deradicalisation and the utilisation of family contacts to that end. But it also shows that families are unlikely to be a strong source for preventing early engagement if the clandestine opportunities are available.

The personal constructs and related life stories of these four individuals help to enrich our understanding of the dominant explanations of radicalisation and terrorist involvement. The individual who articulated a very strong religious theme to his construct system and the other who revealed a dominant political conceptualisation each illustrate the explanations for terrorism that have their base in notions such as a 'clash of cultures' or geo-political accounts of deprivation and abuse that are so commonly offered to help understand why apparently sensible people will kill others with whom they have no obvious and immediate quarrel.

The other two examples that show the significance of social contacts and the permeable boundary between terrorism and organised crime offer some degree of challenge to claims that terrorism can be explained solely in political terms or on the basis of altruistic acts. A distorted notion of altruism is certainly present in some terrorists' construct systems but there are clearly also individuals for whom objectives beyond their personal desires play no part in their conceptualisations.

The distinctions between the different construct systems carry direct implications for approaches to disengagement and strategies that may be put in place to prevent radicalisation initially. The most obvious implication is that there are some people convicted of terrorism who are only too ready to disengage if a route out can be found for them. Those most open to this are those without dominant ideological or political conceptualisations. They will not drift into terrorism if the opportunities are not readily available.

On the other hand, the individuals who do have strong ideologies do not absorb these views as interesting ideas that can be changed by reasoned debate. Rather, they are embedded in central conceptions about themselves and what their life is about. It is only by harnessing their dominant commitments to non-violent outlets that any hope of reducing the involvement in terrorism may be possible for these individuals.

Finally, the limitations of results derived from only four individuals drawn from Jihadi terrorists convicted in India must be acknowledged. How general these findings are beyond the current sample can only be demonstrated by further study. To date, explanations of radicalisation have tended to be related to their specific contexts. Hutson, Long and Page (2009) are clear that the model they advance relates to Middle East radicalisation, Dalgaard-Nielsen's (2010) comprehensive review is a consideration of militant Islamic radicalisation in Europe and McCauley and Moskalenko's important work (2008) is focused on political radicalisation. The delineation of the current framework provides

the basis for future studies of the variations in radicalisation pathways across different contexts and types of radicalisation, exploring for example variations in Jihadi radicalisation around the world.

However notwithstanding this, the ways in which the findings accord with but enhance the wide ranging literature on the psychology of terrorism goes some way to supporting their general validity. The Personal Construct approach in its focus on psychological concepts may allow the development of a framework that is generalisable across different radicalisation contexts. Indeed, it is noteworthy that Jihad dominates only one of the construct systems described in the accounts provided by these four terrorists convicted in India.

REFERENCES

Atran, S. (2003). Genesis of suicide terrorism. *Science, 299*, 1534-1539.

Bandura, A. (1997). *Self Efficacy: The exercise of control.* New York, NY: Freeman.

Bloom, M. (2005). *Dying to Kill : The allure of suicide terror.* New York, NY: Columbia University Press.

Bloom, M. (2009). Chasing butterflies andrainbows : A critique of Kruglanski et al's "Fully committed: Suicide bombers' motivation and the quest for personal significance". *Political Psychology 30*, 387-395.

Dalgaard-Nielse, A. (2010). Violent radaclisation in Europe: What we know and what we do not know. *Studies in Conflict and Terrorism, 33,* 797-814.

Fransella, F., Bell, R. & Bannister, D. (2004). *A Manual for Repertory Grid Technique.* Chichester: John Wiley & Sons.

Gambetta, D. (2005). *Making Sense of Suicide Missions.* Oxford, UK: Oxford University Press.

Goodwin, J. (2006). A theory of categorical Terrorism. *Social Forces, 84*, 2027–2046.

Gupta, D., Horgon, J. & Schmid, A. (2009). A marriage made in hell? Terrorism and organized crime. In D. Canter (*ed.*), *The Faces of Terrorism: Cross-Disciplinary Investigations* (pp123-136). London, UK: Wiley-Blackwell.

Gurr, T. (1970). *Why Men Rebel?* Princeton: Princeton University Press.

Huston, R., Long, T. & Page, M. (2009). Pathways to violent radicalisation in the Middle East: A model for future studies of tranditional Jihad. *The RUSI Journal, 154*, 18-26.

Jankowicz, D. (2004). *The Easy Guide to Repertory Grids.* West Sussex: Johan Wiley & Sons Ltd.

Kelly, G. A. (1955/1991).*The Psychology of Personal Constructs.* London, UK: Routledge.

Kepel, G. (2004). *The War for Muslim Minds: Islam and the West.* Cambridge,MA: Belknap Press.

Khosrokhavar, F. (2005). *Suicide Bombers: Allah's new martyrs.* London: Pluto Press.

Kruglanski, A., Chen, X., Dechesne, M., Fishman, S. & Orehek, E. (2009). Fully committed: Sucide bombers' motivation and the quest for personal significance. *Political Psychology 30*, 331-357.

McAdams, D. (1993). *The Stories We Live By: Personal Myths and the Making of the Self.* New York, NY: The Guilford Press.

McCauley, C. & Moskalenko, S. (2008). Mechanisms of political radicalization: pathways towards terrorism. *Terrorism and Political Violence, 20*, 415-433.

Merrari, A. (2007). Psychological aspects of suicide terrorism. In B. Bongar, L. M. Brown, L. E. Beutler, J. N. Breckenridge & P.G. Zimbardo, (eds.), *Psychology of Terrorism* (pp101-115). Oxford, UK: Oxford University Press.

Moghaddam, F. (2005). The staircase to terrorism. *American Psychologist , 60*, 161-169.

Nesser, P. (2006). *Jihad in Europe: A Survey of the Motivations of Sunni Islamist Terrorism in the Post-Millennium Europe.* Norway: Norwegian Defense Research Establishment.

Pape, R. (2005). *Dying to Win: The strategic logic of suicide terrorism.* New York, NY: Palgrave Macmillan.

Ranstorp, M, (2006). Introduction: Mapping terrorism research. In M. Ranstorp (eds.). *Mapping Terrorism Research. State of the art, gaps and future direction* (pp1-28). New York, NY: Routledge.

Rotter, J. (1954). *Social Learning and Clinical Psychology.* New York, NY: Prentice-Hall.

Roy, O. (2004). *Den globaliserede islam.* København: Vandkunsten.

Sarangi, S. & Canter, D. (2009). The rhetorical foundation of Militant Jihad. In D. Canter (eds.). *Faces of Terrorism: Multidisciplinary Perspectives* (pp 35-61). Oxford, U.K.: Wiley-Blackwell.

Savage, S. & Liht, J. (2008). Mapping fundamentalisms: The psychology of religion as a subdiscipline in the prevention of religiously motivated violence. *Archive for the Psychology of Religion, 30*, 75-91.

Seligman, M. (1975). *Helplessness: On Depression, Development, and Death*. San Fransico: W. H. Freeman.

Silke, A. (2008). Holy warriors: Explaining the psychological processes of Jihadi radicalization. *European Journal of Criminology 5*, 99–123.

Speckhard, A. & Akhmedova, K. (2005). Talking to terrorists. *Journal of Psychohistory 33*, 125-156.

Taylor, M. & Horgan, J. A. (2007). Conceptual framework for addressing psychological process in the development of the Terrorist. *Terrorism and Political Violence 18*, 585-601.

Vidino, L. (2011). The Buccinasco Pentiti: A unique case study of radicalization. *Terrorism and Political Violence 23*, 398-418.

Youngs, D., & Canter, D. (2012). Narrative roles in criminal action: An integrative framework for differentiating offenders. *Legal and Criminological Psychology*, *17*, 233–249.

ABOUT THE AUTHORS

Sudhanshu Sarangi: The original draft of the paper was prepared by Sudhanshu Sarangi, who is a senior officer of the Indian Police Service in the rank of Inspector General of Police, as part of his PhD work in the University of Liverpool during 2006-2008 and submitted to his PhD supervisor Prof. David Canter, who has revised the paper with the assistance of Dr Donna Youngs, submitting it for publication before Sarangi left the UK after being awarded a PhD Degree by the University of Liverpool.

David Canter: Professor David Canter Directs the International Research Centre for Investigative Psychology at The University of Huddersfield, being also Emeritus Professor of Psychology at The University of Liverpool. He has been involved in Personal Construct Psychology since his early contacts with Don Bannister and Neil Warren in the 1960's.

Donna Youngs: Dr Donna Youngs is a Reader in Investigative Psychology at the International Research Centre for Investigative Psychology, University of Huddersfield where she Directs the IRCIP Doctoral Program. Her research focuses on the modelling of offending action patterns and the psychological correlates of these across all forms of crime from robbery and stalking to serial murder and terrorism. With David Canter, she is developing a Narrative psychology approach to understanding the processes that shape offending and offenders which integrates closely with many ideas from the current work on terrorists' Personal Constructs.

Address for correspondence:

Professor David Canter,
International Research Centre for Investigative Psychology
The University of Huddersfield
Queensgate
Huddersfield, HD1 32H
Uk

Email: dvcanter@btinternet.com

REFERENCE

Sarangi, S., Canter, D., Youngs, D. (2013). Themes of radicalisation revealed through the personal constructs of Jihadi terrorists.
Personal Construct Theory & Practice, 10, 40-60, 2013

(Retrieved from http://www.pcp-net.org/journal/pctp13/sarangi13.pdf)

Received: 21 May 2013 - Accepted: 23 August 2013 – Published: 5 September 2013.