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RESEARCH PAPER

A Comparative Study of Disease vs. Evolutionary Model of Vindictive Behavior among Psychiatric Patients and Normative Group

Dr. Shazia Khalid [1] Dr. Shazia Ashraf [2] Dr. Sumaya Batool* [3]

1. HOD, Department of Psychology, Preston University, Islamabad, Pakistan
2. Assistant Professor, Department of Psychology, Preston University, Islamabad, Pakistan
3. Lecturer Department of Psychology, University of Sargodha, Sargodha, Punjab, Pakistan

PAPER INFO	ABSTRACT
 *Corresponding Author sumaya.batool@ uos.edu.pk	The prime objective of the present study was to evaluate the two popular theoretical explanations of vindictive behavior. It was also intended to gauge the validity of the evolutionary model of vindictive behavior. The present study was undertaken to compare both perspectives in psychiatric patients and normative group. The sample comprised of Clinical Group 1 consisting of psychiatric patients with no history of treatment ($n = 37$), Clinical Group 2 comprising of psychiatric patients who were undergoing treatment ($n = 45$), and normative group from general population with no history of psychiatric illness ($n = 50$). The ages of the participants ranged from 18 to 63 with 60% comprising of women. Results of One-way ANOVA followed by post hoc test and zero-order correlation provided empirical evidence for the disease model. However, non-hierarchical cluster analysis suggests that the relationship of vindictive behavior with mental illness may not be as straightforward.

Introduction

Vindictive behavior refers to a behavioral response in reciprocation to a perceived transgression with a passionate desire to see others suffer (Bajwa & Khalid, 2015; Beaumont, 2009; Ruggi, Gilli, Stuckless, & Oasi, 2012; Stuckless & Goranson, 1992). Numerous studies have highlighted the grim outcomes of vindictiveness such as aggression (Barber, Maltby, & Macaskil, 2005; Eisenberger, Lynch, Aselage, & Rohdieck, 2004), violence and homicide (Kubrin & Weitzer, 2003), however, several others have emphasized upon potential benefits of the same including restoration of self-esteem (McCullough, Bellah, Kilpatrick, & Mooney, 2001), catharsis of hurt feelings (Bushman, 2002), or an attempt to strike societal equity (Gollwitzer & Denzler, 2009). This paradoxical nature of 'vindictiveness' has been supported by two competing theories namely, the disease model and

evolutionary model which have attempted to explain the origin of vindictive behavior (McCullough et al., 2001). Whereas, the former model ties vindictive behavior with mental health problems, the later view it as a survival skill. The present study was planned to compare both models of vindictive behavior.

Literature Review

The disease model, chiefly propagated by the psychodynamic theorists, attribute vindictive behavior as one of the risk factors for the development of mental health problems (Oasi & Massaro, 2004). According to the model, early childhood experiences marked by excessive emotional abuse, apathy, or authoritarianism (Horney, 1948; McCullough et al., 2001; Ruggi et al., 2012) are 'colonized' inside the avenger with a pervasive anger and a need for justice (Horney, 1948); so much so that all intellectual and coping capacities are subject to 'one goal of vindictive triumph' (McCullough et al., 2001). The model states that external world injustices and social injuries make the person retreat into their infantile world where they are trapped and focused on 'self' (Steiner, 1993). Thus, the pattern of behavioral and emotional response becomes characteristically vindictive and abnormal (Horney, 1948). Hereafter, we see divergence within the tradition of psychodynamics. The orthodox theorists proposed that too much reliance on vindictive and avenging inclinations in social relationships would lead to psychopathology and mental aberrations. This proposal has received support from several studies. For instance, Carlsmith, Wilson, and Gilbert (2008) experimentally showed that individuals who punish others' themselves tend to ruminate excessively about the incident, which in turn enhances negative affect and mood, making them vulnerable to psychological distress and reduced feelings of psychological wellbeing. On the other hand, neo psychodynamic theorists such as Karen Horney (1948) went on to argue that the strong desire for vengeance is like a poison making one sick and even if individuals with such aberrant tendencies, are not allowed to express their vindictive impulses, they may develop psychosomatic and other mental health problems. This hypothesis has been termed as hydraulic model or cathartic aggression, which has not received much empirical support. For instance, Bushman (2002) showed that venting aggression not only failed to decrease aggressive tendencies but, in fact, had a spiraling effect supporting the adage "violence begets violence." Similarly, Bloom (2001) agreeing with the orthodox psychodynamic approach, view vindictive behavior as a 'displaced anger.' She proposed that early adverse experiences hinder in the development of normal inhibitory neural pathways for retaliation, thereby, predisposing one towards vindictiveness as an effective and only method to solve problems. She further added that such individuals develop a distorted lens to view and react to the world and have a life-long urge to avenge early maltreatment, which lingers through adulthood.

These assertions have found sufficient empirical support in various studies. For instance, desire for revenge has been linked with depression and reduced life satisfaction (Ysseldyk, Matheson, & Anisman, 2007), PTSD and psychiatric morbidity (Cardozo, Kaiser, Gotway, & Agani, 2003) and neuroticism (Bajwa & Khalid, 2015).

Haley and Strickland (1986) observed that depressed women were more likely to retaliate compared to non-depressed. In another investigation, Bono, McCullugh, and Root (2008) conducted a longitudinal study to explore the impact of revenge urges on psychological and health outcomes on different days. They found that 'reduced revenge motivations on a given day' were associated with better affect, satisfaction with life, and less physical complaints 'the following day.'

In complete contrast, evolutionary perspective claims vindictiveness as a universal and instinctual behavior of humans, which evolved over time by the process of natural selection, implying that vindictive behavior is not associated with madness but is a part of being human (McCullough et al., 2001). The major proponents of this approach believe that vindictive behavior is an adaptive response to effectively deal with unjustified transgression perceived as an intention to harm the victims and their family members. They support their view by noting that the behavior is prevalent in all human societies, even in animals. McCullough et al. (2016) reported that certain species of fish have been observed to use revenge as a problem-solving strategy. Another evidence comes from neuroscientists who have observed that during vengeful experience, same parts of the brain are stimulated as when one is trying to achieve something very important. That is, vindictive behavior is not an outcome of abnormality and does not reflect madness, but in fact, is a natural tendency in human beings. Price (2009) highlighted the potential benefits of revenge, referring to the phenomena as 'the revenge paradox,' to explain the apparently usual practice of vindictive behavior. He proposed that people generally report that vindictiveness helps to achieve the goal of catharsis after experiencing unjustified injury. According to the Theory of Equity, revenge helps reduce the distress resulting from being a victim to transgression (Price, 2009). While, another benefit observed with vindictiveness is restoration of self-esteem. Frijda (1994) reported that the victims of transgression perceive that the transgressor does not consider the victim worthy of respect, therefore, retaliation helps to strike power balance between them and restore the self-esteem of victim. McCullough et al., (2001) observed that mainly there are three motivations that a person tries to achieve by being vengeful: to restore moral balance; to return the transgressor what he or she deserves; and to reestablish one's self-esteem. Another explanation has emerged from Fehr and Gachter who have utilized evolutionary theory to propose their hypothesis (Carlsmith et al., 2008). According to their theorization, "punishing others in this context---what is referred to as 'altruistic punishment'---is a way to keep societies working smoothly—you are willing to sacrifice your well-being in order to punish someone who misbehaved."

Material and Methods

Procedure and Participants

Matched-comparison research designs allow to recruit participants with almost similar secondary demographic characteristics so as to compare the behavior under investigation across the groups. Accordingly, the present study created three

groups of participants: Clinical Group 1 comprised of psychiatric patients who had never visited a mental hospital before or received any kind of treatment previously and it was their first visit to psychiatry department; Clinical Group 2 consisted of psychiatric patients who were already undergoing treatment, while the Normative Group was defined as including participants from general population who had never sought psychiatric or psychological help. Since the major purpose of the present study was to explore vindictive behavior among individuals with mental health problems, the demographics of Clinical Group 1 including age, gender, income, education, and occupation status provided the baseline for creating the other two groups ex-post facto. Another inclusion criterion for research participation was qualification of at high school degree. This was to ensure that the participants could read and respond easily to the questionnaires. The clinical data were acquired from a psychiatry department of a local public hospital after taking permission from their administration and consent from the patients. According to the data shared by the administration, these patients were diagnosed for a given psychological disorder using Mental Health Examination and psychiatric self-report measures. For Clinical Group 1, 50 participants were approached, out of which 39 individuals agreed to participate in the study and 2 participants did not complete the forms, which were discarded. Similarly, Clinical Group 2 was formulated through purposive sampling technique comprising a sample of 45 patients. The non-clinical data were acquired from general population who met the demographic profile of Clinical Group 1. All the participants were approached individually and were assured of confidentiality of data before data collection.

Research Tools

The construct of vindictive behavior was measured through the 20-item Vengeance Scale (VS) originally developed by Stuckless and Goranson (1992). It is a 7-point Likert type scale, in which half items are negatively worded. In the present study, the scale was translated in to Urdu language using forward translation method. For this purpose, the scale items, response options, and instructions were given to two bilingual committee members who had previous experience in translation procedure. The members were also required to assess the cultural relevancy of the items. Later, an independent translator reconciled the translations with the help of the researchers of the present study. The comprehensibility of the translated items was determined by applying the translated scale on 3 psychiatric patients and 2 non-clinical prospective participants. On the basis of the feedback, the scale was considered appropriate for research on psychiatric and general population. Psychological well-being and psychological distress were determined through Urdu-translated version of Mental Health Inventory-18 (MHI-18; Hanif & Ashraf, 2015). The items of Mental Health Inventory-18 are placed on a 6-point rating scale, among which 9 items measure psychological well-being and 9 items measure psychological distress. In order to compute, a composite score for mental health, the items of psychological distress were reverse scored and then summed together. Before administration of scales, permission was obtained from the authors of both scales. The Cronbach's alpha values for the scales used to measure the study variables in

the present study indicated the adequate reliability indices (.77, .82, .83, .82 for VS, MHI-18, Psychological Well-being, & Psychological Distress, respectively) (Table 2).

Results and Discussion

This section presents frequency and percentages calculated for the characteristics of the participants of the three groups and the descriptive statistics and reliability index computed for Vengeance Scale. Table 1 shows that the age of the participants ranged from 18 to 63 (*M* = 29. 67, *SD* = 12), among which 60% of the participants were women. The average monthly income of the participants was found to be approximately PKR 38818/- (*SD* = 23,322). 53% of the participants were unemployed and their education level ranged from high school to Masters.

Table 1
Demographic Characteristics of Groups (N=132)

Demographics	Categories	Clinical Group 1 *f* (%)	Clinical Group 2 *f* (%)	Normative Group *f* (%)
No. of Visits to a Psychiatry Department	None First Visit More than One	37 (First Visit)	45 (Undergoing Treatment)	50 (No History of Psychiatric Help)
Type of Diagnosis	Mood Disorder Anxiety Disorder Schizophrenia	28 (76.77) 6 (16.22) 3 (8.11)	35 (77.77) 7 (16.26) 3 (6.67)	-
Age	18-35 36-55 56-63	18 (48.65) 13 (35.14) 5 (13.51)	23 (51.11) 16 (35.56) 6 (13.33)	25 (50) 19 (38) 5 (10)
Gender	Men Women	15 (40) 22 (60)	18 (40) 28 (60)	20 (40) 30 (60)
Qualification	High School Intermediate Bachelors Masters	24 (64.86) 9 (24.32) 3 (8.11) 2 (5.41)	27 (60) 10 (22.22) 6 (13.33) 2 (4.44)	28 (56) 10 (20) 7 (14) 5 (10)
Occupation Status	Student Unemployed Employed	20 (54) 7 (19) 10 (27.03)	26 (57.78) 9 (20) 10 (22.22)	25 (50) 6 (12) 19 (38)
Income	Range	PKR5000-60000 (*M* = 38833.33, *SD* = 21912.76)	PKR 8000-67000 (*M* = 35376.92, *SD* = 13312.77)	PKR 12000-150000 (*M* = 42246.91, *SD* = 34744.97)
Family System	Nuclear Joint	30 (81) 7 (19)	23 (51.11) 22 (49)	32 (64) 18 (36)
Marital Status	Single Married	29 (78) 8 (21.6)	35 (77.77) 10 (22.22)	45 (90) 5 (10)

Zero-order correlations between the study variables suggest that vindictive behavior is negatively and significantly related with mental health and psychological

well-being while positive and significant correlation was observed between vindictive behavior and psychological distress (Table 2). These results implied that vindictive behavior is linked with mental health problems, thus, providing support for the disease model.

Table 2
Descriptive Statistics, Reliability Estimates, and Zero-order Correlations for Study Variables (N = 132)

		M	*SD*	*a*	**II**	**III**	**IV**
I	**Vindictive Behavior**	42.5	9.55	.77	-.42***	-.42***	-.24**
II	**Mental Health**	70.53	11.88	.82		.83***	-.87***
III	**Psychological Well-being**	31.48	5.91	.83		-	-.53***
IV	**Psychological Distress**	33.47	9.08	.82			-

*Note: ***p <.001; **p.01*

The above findings were further ascertained through conducting One-way ANOVA to compare vindictive behavior across the three groups of participants. Box plots, Shapiro-Wilk test of normality (W = .99; p> .05) and Levene's test of homogeneity of variances [F 92,1310 = 1.20; p> .05] indicated that the data were appropriate for running One-way ANOVA.

Results of One-Way ANOVA (Table 3) revealed a significant difference between the three groups [F (2, 128) = 27.08; p<.001], i.e., psychiatric and normative groups differed significantly on vindictive behavior. The eta squared estimate indicated that the model explained 30% variance in vindictive behavior.

Table 3
One Way ANOVA for Vindictive Behavior by Groups (N = 132)

Source	SS	df	MS	F	*p*	η²
Between	3272.73	2	1636.36	27.08	.000	.30
Within	7734.92	129	60.43			
Total	245041.000	132				

R^2 = .297 (Adjusted R^2 = .286)

In order to understand which group differed on vindictive behavior, post hoc analysis was conducted through Tukey HSD test (Table 4). The results yielded a significant difference between Clinical Group 1 (*M* = 52.25, *SD* = 8.13) and Normative Group (*M* = 38.15, *SD* = 8.04) and between Clinical Group 2 (*M* = 48.54, *SD* = 7.06) and Normative Group (*M* = 38.15, *SD* = 8.04). While non-significant difference was observed between Clinical Group 1 (*M* = 52.25, *SD* = 8.13) and 2 (*M* = 48.54, *SD* = 7.06). The data indicated that participants with psychiatric diagnosis and with and without treatment reported higher tendency for vindictive behavior as compared to normative group. On other hand, there was no difference between psychiatric patients with or without treatment on vindictive behavior.

Table 4
Post Hoc Analysis for Vindictive Behavior by Groups (N = 132)

(I)	(J)	Mean Difference (I-J)	SE	*p*	95% CI LL	95% CI UL
Clinical Group 1	Clinical Group 2	2.15	2.66	.698	-4.16	8.46
	Normative Group	11.94*	2.50	.000	6.02	17.86
Clinical Group 2	Clinical Group 1	-2.15	2.66	.698	-8.46	4.16
	Normative Group	9.78*	1.53	.000	6.17	13.40
Normative Group	Clinical Group 1	-11.94*	2.50	.000	-17.8558	-6.0178
	Clinical Group 2	-9.78*	1.53	.000	-13.4011	-6.1663

Figure 1 shows the mean values of the three groups on vindictive behavior. According to the graphical presentation of data, the Normative Group obtained lowest score on vindictive while Clinical Group1 highest followed by the Clinical Group 2.
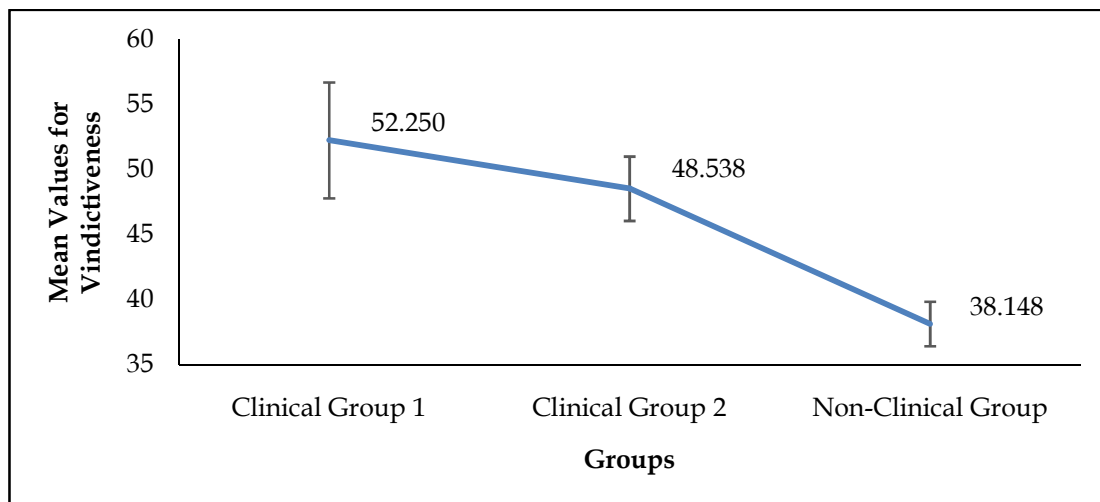

Figure 1: Mean Values for Vindictiveness by Groups (N = 132)

Cluster Analysis is an exploratory data mining method which is used in physical and psychosocial sciences to classify the data into groups or formulate profiles of individuals based on homogeneity of characteristics of the participants (Bolin, Edwards, Finch, & Caasady, 2014). In the present investigation, cluster analysis was utilized to construct a profile of the participants of the present study with different shades of vindictive behavior. Henry, Tolan, and Gorman-Smith (2005) have provided four step guidelines for performing cluster analysis in psychological research. This includes preparing data for application, selecting clustering method, validation of cluster segments, and interpretation of solution. As per recommendations, the content validity of the variables entered into the model plays a critical role in cluster analysis, i.e., only those variables which are theory and

research driven should be included. Since, previous research suggests that vindictive behavior varies conditional to age and gender differences (Ghaemmaghami, Allemand, & Martin, 2011), vindictive behavior, psychological distress, psychological well-being, age, and gender were entered in to the model. In addition, raw as well as standardized data (*z* scores) (Bolin et al., 2014), non-hierarchical clustering method (or K-means) and criterion-related validation method (Henry et al., 2005) were considered appropriate for performing the analysis on the data of present investigation. In the output, terms 'higher' and 'lower' represent participants away from the mean while 'moderate' reflects participants around the mean value.

Cluster Analysis Template (Fripp, 2021), Excel program uses *K*-means clustering method by default for producing 1 to 5 segments. As per rule, a fairly distributed percentage of respondents within each cluster, the cluster with low Sum of Squared Error (SSE) Total, and comprehensible centroid values provide direction for the number of clusters to be retained. Following this guideline, 5 clusters were deemed necessary to provide most meaningful segmentation of data (Table 5). Results suggested that approx. 19% of the sample had high tendency for vindictive behavior; this group reported high psychological distress, low psychological well-being and was mainly composed of mainly men with mean age of 34 (Cluster 2). Cluster 5 included participants with lowest z score value for vindictive behavior and psychological distress but high tilt towards psychological well-being. This group comprising of 12% of total sample, included men only, whose age centered around 21 years. Two clusters appeared with moderate vindictive inclinations. Interestingly, Cluster 4 formulating the biggest chunk in the sample (36%), reported moderate vindictiveness but high psychological well-being and low psychological distress. This group contained women only who had mean age of 28. Cluster 1 also had distinctive characteristics: almost 19% participants fell in this category mainly comprising of men with low vindictive behavior and moderate psychological well-being but high psychological distress. Lastly, Cluster 3 depicted that men mainly reported somewhat low vindictiveness, very low psychological distress and quite high psychological well-being. Overall, the findings of Cluster 2 and 5 provide clear support for the disease model while Cluster 4 indicated that people who moderately express vindictiveness might have better psychological well-being, and which might inhibit psychological distress.

Table 5
Centroids for Five Clusters on Study Variables (N =132)

Mean/ Centroid	Vindictive Behavior (Z scores)	Psychological Distress (Z scores)	Psychological Well-being (Z scores)	Age (Z scores)	Gender (Z scores)	CM[1] (%)
Cluster 1	39.79 (-.043)	37.08 (.57)	32.00 (-.05)	27.42 (-.27)	Women + Men Mainly (.48)	18.5
Cluster 2	48.17 (.83)	37.75 (.67)	26.54 (-1.08)	33.54 (.35)	Women + Men Mainly (.30)	18.5
Cluster 3	38.25 (-.18)	25.50 (-.91)	37.63 (.78)	34.75 (.51)	Women + Men Mainly	15.2

				(1.00)		
Cluster 4	40.31 (-.04)	29.77 (-.40)	34.72 (.43)	28.28 (-.12)	Women Only (-1.00)	35.8
Cluster 5	24.00 -1.88	22.33 (-1.32)	35.00 (.48)	21.33 (-.74)	Men Only (.33)	12
Average	40.70 (0)	32.94 (0)	32.30 (0)	29.67 (0)	1.46 (0)	100

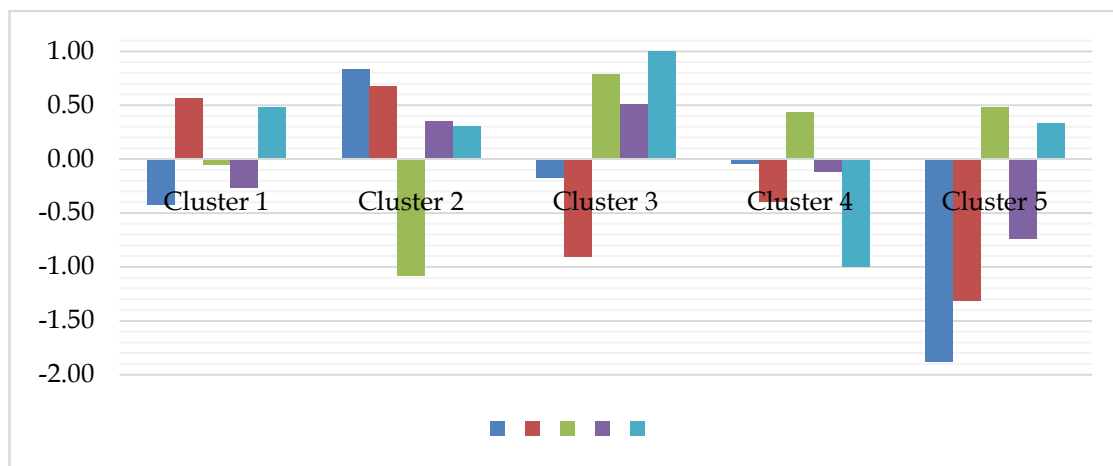*Note: SSE Total 282.1; CM = Cluster Membership*

Figure 2: Clusters for Study Variables (N = 132)

Discussion

The present study has several strengths. This investigation is one of its kind: no study has as yet compared disease model with evolutionary model to understand if vindictive behavior is connected with psychopathology or has positive outcomes. The findings of the present study suggested that vindictiveness was related with mental health problems, thus providing support for the disease model (Oasi & Massaro, 2004). However, results of cluster analysis revealed that moderate vindictive behavior may actually be associated with psychological well-being and low psychological distress specifically among women. This may offer evidence for evolutionary perspective on vindictive tendencies though further research is needed to corroborate the findings.

It appears that high and low vindictiveness may be related with psychopathology whereas moderate vindictive inclinations might be associated with mental health especially in women. Several arguments can be presented to assist this finding. For instance, Schumann and Ross (2010) proposed that vindictive behavior may not be as much an impulsive behavior as we would like to believe, instead different options are weighed by the victims before they react to a wrongdoing, such as, relative advantages and disadvantages of retaliation, whether the perpetrators qualifies a response, the intensity of anger experienced by the victim, the status and

the position of the transgressor etc. in other words, vindictive response may be viewed as a conscious behavior modulated according to interpersonal and contextual cues. Similarly, others have pointed out several positive consequences for the avenger such as attaining 'moral balance' (Gollwitzer & Denzler, 2009), reclaiming self-esteem and personal control (McCullough et al., 2001), and deterrence for future occurrences (Pinker, 1997) suggesting that vengeance may increase positive affect and feelings of psychological well-being in the victim and inhibit development of distress. Moreover, studies using neuroimaging techniques such as PET scan have provided evidence for vindictive behavior as a rewarding and satisfactory experience for victims. However, these studies were limited in not considering modulated or moderate vindictive behavior in their analysis. Taken all together, it is recommended that future investigations may include moderate or modulated vindictiveness in their equations when investigating associated negative and positive outcomes.

The study is also distinctive in that it employed matched-comparison research design to create three groups consisting of Clinical Group 1, Clinical Group 2, and Normative Group. The first two groups contained participants with psychiatric patients while the normative group comprised of individuals with history of no psychiatric problems. The groups were formulated ex-post facto matched on age, gender, qualification, and income through purposive sampling technique. Another strength of the study was the use of Cluster Analysis template to dig into the data and produce segments of individuals with distinctive characteristics. In the present investigation, non-hierarchical clustering method was preferred over hierarchical method while criterion method was selected for validation of cluster solution. It has been argued that non-hierarchical method provides more reliable, stable, and discrete solution compared to hierarchical method (Bolin et al., 2014). In addition, the distinctive characteristics of the clusters (as discussed above) lent criterion-related validation for the 5-segment cluster solution.

Conclusion

The present study was intended to gain a deeper understanding of vindictive behavior and its relationship with mental health and behaviors, which may inhibit the tendency for vengeance. It is expected that the results of the study will be used to plan further investigations to develop psychological mechanisms to inhibit retaliatory responses and enhance conciliatory behaviors.

Recommendations

Future researches can also explore the origin of vindictive behavior from developmental perspective, which was not within the scope of this study. In support of Psychodynamic theorists, cognitive approach emphasized that painful experiences in early as well as later in life may result in 'life-long accumulation of such grievances' (Beaumont, 2005), leading to distorted and irrational cognitive

schemas. Such erroneous perceptual systems may make an individual vulnerable to use revenge as a habitual response to even slight offenses (Schumann & Ross, 2010) making one vulnerable towards mental health issues. Earlier Jacoby (1983) and Elster (1990) had noted that revenge is 'an irrational act that has no place in the civilized society.' In contrast to the traditional psychodynamic perspective Karen Horney (1948), a neo-psychodynamic theorist, observed that individuals who have pent up grievances because of hostile and unaccepting childhood experiences have a high probability of developing mental illnesses if they do not show vindictive behavior. The present study did not test the later approach. Thus, studies can be designed to explore impact of early childhood experiences and emotional dysregulation on the emergence of vindictive tendencies as well as Horney's (1948) model of vindictive behavior.

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