COGNITIVE FLEXIBILITY STRATEGIES ENHANCE WORK ENGAGEMENT AND INDIVIDUAL INNOVATION AMONG CORPORATE EMPLOYEES

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ABSTRACT

The aim was to study how enhanced cognitive flexibility impacts work engagement and individual innovativeness. Cognitive flexibility (CF) is an aspect of Behavioural Science which is the person's capacity to adapt their strategies to new environments. Work Engagement (WE) and Individual Innovativeness (II) are aspects of Organisational Development (OD). Work engagement is the capacity of a person to bring themselves fully at work and individual innovativeness is the capacity of implementation of new ideas. The population will consist of 50 corporate sector employees, both men and women. Mixed Research design as well as a Pretest-Posttest design will be used in which strategies to enhance CF were taught to the participants with the aim of enhancing WE and II components. The statistical analysis included mean as descriptive statistics and paired sample t test as an inferential statistical tool. Qualitative analysis was done to identify common themes and ideas that participants gave across all the tasks of the intervention. The statistical results were significant for both the hypotheses at p,0.05 level of significance. Both the alternate hypotheses were accepted. Discussion focuses on explaining how the process of enhancing CF, WE, II were actually acquired through the interventions. Limitations and future directions were discussed.

Keywords: Cognitive Flexibility, Work Engagement, Individual Innovativeness, Behavioural Science, Organizational Development.

INTRODUCTION

Behavioural science focuses on all forms of human actions and comprises multiple fields of study such as cognitive neuroscience, psychology, economics, anthropology as well as biology, law, psychiatry and political science. It comprises cognitive psychology and cognitive flexibility is an important part of it. Behavioural science also helps in understanding the way cognitive flexibility functions; it enables the person to view a situation from multiple perspectives (CF theory by Spiro and Jheng,1990). This is because behavioural science as a school of thought comprises multiple fields and thereby facilitates viewing a situation from all those perspectives which avoids formation of a tunnel vision or narrowing. Secondly, it also facilitates a shift of perspective that is an important element of cognitive flexibility and helps approach the goal from a different viewpoint and can lead to generation of various ideas. Finally, knowledge representation and learning, can also be facilitated with the help of behavioural science, wherein one learns various principles and concepts and the application of those concepts can be materialised and expanded by various fields in behavioural sciences, which can then increase one's cognitive flexibility by expanding knowledge representation.

COGNITIVE FLEXIBILITY:

Cognitive flexibility is broadly defined as, "the ability to shift perspective or approach in order to adapt to changes in the environment." (Johnco, Wuthrich & Rapee, 2014a) (Johnson, Benjamin Todd, 2016). It involves several executive functions as it requires generating ideas and alternative perspectives, inhibiting habitual responses to better adapt to changed demands. This shift in attention, mental sets and approaches allows a non-rigid way of responding to the environmental demands. Employing multiple perspectives involve making knowledge more transferable. Oversimplification and narrowing down of any contexts or concepts are avoided.

It involves dealing with concepts at different times, in different ways, in different situations, events or contexts and when in different roles. It mainly focuses on knowledge acquisition and learning, ability to shift between multiple concepts, attend multiple stimuli at the same time and consider multiple aspects of the same situation and also consider which aspects are relevant to the problem that has to be tackled (Smelser, N. J., & Baltes, P. B., 2001). Cognitive flexibility is the capacity of a person to adapt their cognitive processing strategies to deal with new and unexpected conditions and changes in the surroundings (Canas et.al, 2003; Canas, Fajardo & Salmeron,2006). It is a function which involves breaking out of the traditional stimulus-response pattern and over-ride the well learnt, habitual actions to produce adaptive behaviour (Bream & Egner, 2018). Cognitive Flexibility refers to the ability to refocus attention to relevant stimuli and also simultaneously consider conflicting representations of information in order to execute goal directed behavior. According to Martin and Anderson (1998), it consists of awareness, willingness and self-efficacy. It is determined by the person's capacity to seek novel solutions to the problems and display adaptability as per the need of time and the type of work and also the understanding of the various choices the circumstances provide and the ability to choose from those choices. It also consists of being open to making these adjustments and having the trust that they are capable of making these choices (Singh & Das,2016). The phenomena is also denoted with the help of other similar terminologies such as mental flexibility, mental set shifting, cognitive shifting, task shifting or attentional shifting.

Cognitive flexibility is associated with two perspectives. First is the attentional process. High levels of attention is required to understand that the situation has undergone a shift and now requires a different response. The person needs to assess the situation and plan an action accordingly along with keeping in mind environmental factors and avoidance of forming a mental set. Second is knowledge representation. It is the way in which knowledge is stored and organised and the ways in which the learnt information is used to do a particular task. It also focuses on the connection of different ideas. A person needs to know the way in which the task is represented and the possible ways to deal with the situation. the knowledge of these ways should be modified to suit the changing environments (Canas, Fajardo & Salmeron,2006).

COGNITIVE FLEXIBILITY AND WORK ENGAGEMENT:

Employees who then feel confident about performing the tasks and are in alignment with the organizational goals are more likely to have an attachment towards the organization (McDonald & Siegall, 1992; Singh & Das, 2016). An employee who is high on cognitive flexibility, will therefore have low negative emotions towards the organization and is more likely to accept challenges and stay in the organization (Singh & Das, 2016). This attachment towards the organization is termed as work engagement, a terminology that was first conceptualised by Kahn in 1990 as the capacity of people to bring themselves completely at work. In engagement, people get the opportunity to express themselves physically, cognitively and emotionally in their work roles (Schaufeli, 2012).

There are two major determinants of Work Engagement namely; job resources and personal resources (Christian, Garza & Slaughter, 2011; Halbesleben, 2010; Mauno, Kinnunen, Mäkikangas, & Feldt, 2010;Schaufeli, 2012). Job resources are the physical, social and organizational aspects of the job that reduces job demands, is functional in achieving work goals and stimulates personal growth, learning and development (Bakker & Demerouti, 2008). Personal resources on the other hand are positive evaluations of the self that are related to resilience and are related to the person's capacity to understand their ability to successfully control and impact their environment (Hobfoll, Johnson, Ennis, & Jackson, 2003; Schaufeli, 2012). In addition, Work Engagement involves vigor, dedication and absorption. Vigor refers to a high level of energy and resilience at work and also includes the willingness to take efforts without being easily fatigued. It involves the characteristic of persistence. This factor may also be of importance to cognitive flexibility, where there is a need to constantly adapt to changing situations. Dedication is the sense of significance from one's work and feeling enthusiastic and proud. It involves feeling challenged by a task, while absorption is being completely immersed in a task.

Studies have consistently shown that individual innovativeness is an important agent that leads to organizational success (Gokçearslan, Karademir, & Korucu, 2017; Hong, Hwang, Ting, Tai, & Lee, 2013; Jin, 2013; Park & Kim, 2010; Si & Wei, 2012). Interaction between psychological factors and organizational factors play an important role in innovativeness. Some researchers believe that they are different as creativity is about idea generation, while innovation is about idea implementation, while others believe that creativity is the beginning of the innovation, which involves idea generation, while innovation comes later with application of proposed ideas. (Miron et al., 2004; Rank, Pace, & Frese, 2004 ;West & Farr, 1990;Rank et al., 2004;West & Farr, 1990).

COGNITIVE FLEXIBILITY AND INDIVIDUAL INNOVATIVENESS:

Scientists also now support the idea that organizational success depends on the individual employee's ability to innovate (Van de Ven, 1986; Smith, 2002; Jong 2007). Campbell, Gasser and Oswald (1996) have also been able to establish a link between innovation specific behaviours of the employees and the organizational success (Jong,2007). Individual innovation can also be termed as creative thinking which not only helps in solving complex as well as everyday problems but also allows an individual to be flexible in nature. In this manner, cognitive flexibility can be seen to be related to individual innovation and creative thinking as cognitive flexibility gives a person a chance to deal with the changes that occur in the ever changing world. Because it plays such a crucial role in innovation and creativity, it has also become an important component for the organizations (Runco 2004; Ritter & Mostert 2016).

Ritter & Mostert (2016) also found that when trained to improve creativity, it was cognitive flexibility that led to generation of more creative ideas post training, as it helps in getting away with mental sets, mental blocks, functional fixedness and also perceptual fixedness. Additionally, according to the dual processing creativity model, the creative or innovative output is seen as an end result of creativity which is facilitated by cognitive flexibility along with cognitive persistence which is persistently probing and systematically assimilating all the information, and breaking the set pattern of working (Baas et al., 2008; De Dreu et al., 2008; Nijstad, De Dreu, Rietzschel, & Baas, 2010;Dreu,Nijstad & Baas,2011). In the creative process, cognitive flexibility manifests itself using the divergent thinking process through the use of broad cognitive categories and the switching between these categories. The model also further suggested that there can be trait or state factors that increase cognitive flexibility to facilitate innovation in a person. These trait and state manifestations come in the form of extraversion, which is positively related to creativity and innovation, as well as joy and happiness, all of which are related to both cognitive flexibility and creativity (Elliot & Thrash, 2002; Feist, 1998; Furnham & Bachtiar, 2008; Amodio, Master, Yee, & Taylor, 2008; Carver, 2006; Gray, 1990; (Ashby, Isen, & Turken, 1999; Baas et al., 2008; Dreu,Nijstad & Baas,2011).

OTHER FACTORS THAT CAN AFFECT THE RELATIONSHIP:

While understanding the factors that can link cognitive flexibility and the other two variables it can be seen that a person's mood can affect this relationship. According to Lin et.al (2013), positive mood facilitates cognitive flexibility and Ansari et al. (2008) & Derakshan et al. (2009) also pointed out that negative emotional moods such as anxiety can have a detrimental impact on the levels of cognitive flexibility (Vasques-Rosati, Montefusco-Siegmund, Lopez & Cosmelli, 2019). Suzanne Hazelton (2014) suggested that positive affect or emotions can have an impact on the levels of work engagement. She suggested that positive emotions such as joy and contentment increase levels of work engagement while negative emotions like stress, anxiety, panic and fear can decrease it. It was also further purported that as the work engagement increases as a result of positive emotions, it in turn has a positive impact on the mental and physical health, resilience and social relationships of the employees. Similarly, individual innovation and creativity can also be influenced by mood states (Kauffman, 2003). It gets enhanced by positive mood states as they facilitate motivation and focus. On the other hand, negative emotions such as anxiety, fear and even sometimes relaxation can decrease innovation (Khalil, Godde & Karim, 2019).

Further, personality traits may also affect cognitive flexibility (Murdock et al. 2013; Odaci & Cikrikci, 2018). It has been seen that extraversion, openness to experience and agreeableness, are also positively related to cognitive flexibility (Campbell et al. 2011; Jensen-Campbell et al. 2002; Murdock et al. 2013; Odaci & Cikrikci, 2018). Work engagement can also be affected by the personality traits. Neuroticism and extraversion have strong links with work engagement. It has been seen that the reverse of neuroticism, that is; emotional stability and conscientiousness have been closely related to increased work engagement along with social proactiveness and achievement orientation, which are the subtypes of extraversion. It has also been argued that even though environmental factors also have an impact on work engagement, the personality traits have the capacity for independent impact on the levels of engagement (Inceoglu & Warr, 2012). Taken together, cognitive flexibility and work engagement can be predicted to be related to each other through the presence of the above mentioned personality factors.

Personality traits also affect levels of individual innovation in a way that a person's characteristics and behaviours affect the way their innovativeness is manifested in the organization (Patterson et al., 2009; Yesil & Sozbilir, 2013). Past studies report that personality characteristics such as being imaginative and inquisitiveness which are properties of openness to experience along with high energy, high need for autonomy, social rule independence and high rule confidence can affect innovation (Patterson et al., 2009; Yesil & Sozbilir, 2013). Further, Ahmed (1998) also suggested that high value of aesthetic experiences, broad interests, attention to complexities, independence of judgement, intuition, self-confidence, ability of accommodation, persistence and curiosity, all of which are associated with openness to experience and agreeableness are fundamental to individual innovation at workplace (Yesil & Sozbilir, 2013) . Taken together, personality factors, and openness to experience in particular can help establish the relationship between cognitive flexibility and individual innovation. On the basis of the emotional factors and personality factors discussed above it can also be suggested that work engagement and individual innovativeness may also be related to each other through the prevalence of positive emotions and personality traits of extraversion and openness to experience. The study aims at enhancing multiple cognitive processes like perception, attention, thinking, problem solving, learning and application (cognitive flexibility) to in turn improve the levels of work engagement and individual innovativeness. These cognitive factors improve the levels of creativity, satisfaction, happiness, innovation amongst the individuals.

LITERATURE REVIEW

Work engagement plays an important role in the employee's well-being and work performance and therefore is an important topic in occupational mental health. Many interventional programs have been developed in order to increase work engagement which include resilience training, increasing social support, leadership training and stress management. A similar study conducted by Sasaki et.al. (2020) aimed at understanding the effects of the newly developed smartphone based stress management program to improve the work engagement of hospital nurses in Vietnam. It was seen that out of the two intervention programs developed, program B, which was a fixed order CBT program showed significant improvement in the work engagement after a three month follow-up. A meta-analysis conducted by Knight, Patterson & Dawson (2017) identified four types of interventions that have been used so far to increase work engagement that is personal resource building work engagement, job resource building work engagement, leadership training interventions and health promoting interventions. The meta-analysis revealed a small but significant effect of these interventions on work engagement as well as the subparts of work engagement that is; vigour, dedication and absorption. It also suggested that designing group interventions can help increase work engagement. Further, organizations have to maintain innovation and productivity of their employees irrespective of the changes that take place. Kuper, Rivkin & Schmidt (2016), designed interventions to improve innovations and productivity in the organizations at the individual level as well as the managerial level. Results indicated that the interventions at the individual level, which were aimed at improving cognitive abilities and stress management abilities were successful at fostering innovation. Managerial interventions were also successful at reducing age stereotypes and conflicts. Bunce & West (1996) conducted a comparative study between the traditional stress management program, an intervention promoting innovation at work as a way of managing stress and a control group. It was seen that innovation interventions as a way of stress management were associated with improvement in work related stress and individual innovation. It was also seen that an increase in the levels of innovation could be observed one year after the intervention, indicating a need for innovation based interventions for managing stress at the workplace. Individual innovation is also labelled as creativity at the workplace. Within this context, a study by Ritter & Mostert (2016), focused on enhancing the creative thinking skills using cognitive based creative training. Using the cognitive based creative training which included convergent thinking, divergent thinking and creative problem solving, it was seen that there was an improvement in the creativity performance especially in the educational and organizational set-ups.

RESEARCH METHOD

HYPOTHESES:

Null Hypothesis:

1. There is no significant difference in the level of work engagement in the pretest intervention phase and the post-test intervention phase

2. There is no significant difference in the level of individual innovativeness in the pretest intervention phase and the post-test intervention phase

Alternate Hypothesis:

1). There is a significant difference in the level of work engagement in the pretest intervention phase and the post-test intervention phase

2. There is a significant difference in the level of individual innovativeness in the pretest intervention phase and the post-test intervention phase

SAMPLING:

Purposive sampling methods were incorporated i.e. those employees who fit the criteria and aim of the study were selected as samples.

Inclusion Criteria: The participants should be full-time employees of corporate sectors. They should have minimum two years of work experience until the date of data collection. They should fall in the age group of 26 to 60 years. The participants included both: males as well as females.

Exclusion Criteria: Those who have opted for Voluntary Retirement Service (VRS) or have retired were not included in the study. Those from small scale set industries were not included as a part of the study. Government employees were not included as samples.

DESIGN:

The study followed a mixed research and an experimental design. Descriptive statistics included mean and paired sample t-tests were calculated for quantitative analysis. Qualitative analysis was aimed at finding common themes and ideas of participants across all the intervention tasks.

VARIABLES:

Independent Variable:

Cognitive Flexibility

Dependent Variable:

Work Engagement

3). Individual Innovation

TOOLS:

1. Cognitive Flexibility Inventory:

   It is a self-report measure of the type of cognitive flexibility necessary for individuals to successfully challenge and replace maladaptive thoughts with more balanced and adaptive thinking. It was designed to measure three aspects of cognitive flexibility: (a) the tendency to perceive difficult situations as controllable; (b) the ability to perceive multiple alternative explanations for life occurrences and human behavior; and (c) the ability to generate multiple alternative solutions to difficult situations. (John P. Dennis, Jillon S. Vander Wa, 2009). The scale was developed by John P. Dennis, Jillon S., Vander Wal in 2009. The scale consists of 20 items each evaluated on a 7 points Likert scale described as, "strongly disagree (1)", "disagree (2)", "somewhat disagree (3)", neutral (4)", "somewhat agree (5)", "agree (6)", "strongly agree (7)". The scale consists of two subscales: Alternative and Control. The items 2, 4, 7, 9, 11, & 17 were reversed scored. The scale yields subscale scores as well as a total score. In the current study, the subscale scores were considered.

2. Utrecht Work Engagement Scale:

The scale was developed by Wilmer Schaufeli and colleagues. It consists of 17 items and responses are given on a 7 point likert scale. The scale has good psychometric properties. The scale consists of three subscales namely: vigour, dedication and absorption. Subscale scores as well as total scores can be obtained. The current study focuses on total scores.

3. Individual Innovativeness Scale:

The scale was developed by. It consists of 20 items and responses are given on a 5 point likert scale. The instrument is highly reliable with good predictive validity.

INTERVENTION PLAN

The current study was conducted into three phases: pre-test phase, intervention phase and post-test phase. The pre-test phase is the one in which no intervention tasks were introduced. In the intervention phase, the tasks to enhance CF were conducted. The pos-test phase is the one after the intervention phase.

Following is the plan of intervention to enhance cognitive flexibility.

1) 9-dot problem: This task was specifically designed to increase Cognitive Flexibility and thus enhance Work Engagement and Individual Innovativeness. The task was conducted in three levels namely: level 1: 5lines, level 2: 4lines and level 3: 3lines. Every next level has increased difficulty.

Procedure:

- Show the 9 dot problem to the participant and ask him/her as to what it is and how they are perceiving it.
- Ask the following questions before the task starts (what are your thoughts and feelings about the task?)
- After the task, ask the following questions (what did you think and feel during the task? How did you tackle this problem? What are you feeling after completing the task? Did you think in specific ways to tackle this problem or any specific approach you undertook?)

Instructions:

- Level 1: You have to join all these 9 dots by 5 straight lines which can either be vertical, horizontal or diagonal. Remember that you are not supposed to lift your pencil while doing the task, you are not supposed to retrace your lines. You can take any number of attempts while doing this task and there is no time limit.
- Same instructions for 9 dots with 4 lines (level 2) and 3 lines (level 3).
- For all 3 levels: Note that there is no limit nor attempt limits to complete the task. You can stop anytime but we will constantly encourage you to complete the task successfully. For any hints or help we are available throughout the intervention phase.

2) Stroop Task: The Stroop task is also focused on improving work Engagement and Individual Innovativeness. The Stroop task comprises 2 levels, the first level is neutral condition wherein a sheet of boxes of different colours is presented to participants and the participant is asked to read out the colours aloud. In the second level, a sheet is presented to the participant consisting of colour-word conditions i.e. a word is written in different colour. The participants have to read the colour and not the word. There were 3 types of words in the colour-word condition which were neutral, positively loaded and negatively loaded words.

Procedure\Instructions

- Tell the participant of the cautions to be maintained (nodding the head is not allowed, tapping foot or hand or pointing your finger should be avoided while reading the colours and that they cannot read it in a sing song manner).
- Please note that there is no time limit. It is okay if you make errors. If at all you happen to take a pause kindly keep it a silent pause as far as possible and not use filler words like 'a', 'ummm', etc. If you happen to make an error, you can continue from the point you made an error and need not start from the beginning.
- Give neutral condition first, then the colour word condition.
- Note the reaction time and note errors if required.
- Every level was demonstrated by the experimenter before the participant was asked to do it.
- Before: Ask, what do you think and feel about the task?
- Keep a general observation of whether the speed increases after a point
- Later ask: how was your experience? What were the difficulties that you faced? How did you go about the task?

- Later a memory test was conducted wherein the participants were asked to recall as many words as possible that they saw in colour-word condition.

3) Concept application:

Procedure\Instructions:

- You might have heard about a concept called 'reward.' In simple terms you can get a prize or an acknowledgement for something good someone does. You will have to write how this concept of reward can be applied in multiple settings.
- For eg. In parenting we use rewards. If the child does a task as guided you pat on his or her back and say good, this is called verbal reward. When a child stands 1st in the class you buy him a promised gift for eg a cycle. This is a materialistic reward.
- Now use this concept and this example as a guideline and tell me how the idea of reward is used in an organisation set up. Try to think of as many ideas as you can. These ideas can be one that your or someone else's organisation is using or it can be something innovative that can be used. Also, try to think how different departments like Marketing, HR, sales, Finance, etc use rewards. You can think of rewards that are already used by your organisation or someone else’s that you know and you are also allowed to generate new reward systems that do not exist in the organisations. Try to be as innovative as possible.

GENERAL PROCEDURE OF INTERVENTIONS:

The current study was conducted in three phases. Participants were approached and briefed about the study. Only after acquiring their consent, the study began. In the first phase i.e. the pre-test phase, the participants filled a questionnaire consisting of demographic details and the scales that assessed Cognitive Flexibility, Work engagement and individual Innovativeness. This was the pre-test phase. In the second phase i.e., intervention phase, the above mentioned plan was administered. The first activity conducted was a 9-dot experiment, followed by a Stroop task and the last one was concept application. The participants were debriefed after the experiments and all the queries were solved. The third phase was the post-test phase. The participants filled the same set of demographic detail questionnaires and the scales to assess Cognitive Flexibility, Work engagement and individual Innovativeness.

ETHICAL CONSIDERATIONS:

Participant's permission and consent was obtained before collecting any data and conducting any of the intervention tasks. No harm was done to any participant physically, mentally, emotionally, financially or in any other ways, throughout the phases of the study. Unnecessary data and information were not collected. All the data and information is kept strictly confidential and is used only for research purposes. Data pertaining to any organisation, organisational strategies, code of conduct, legal and ethical considerations of the organisation or any other factors of the organisation was gathered.

RESULTS

The following research was aimed at studying how Cognitive Flexibility strategies enhance Work Engagement and Individual Innovation among corporate employees during the pandemic. Paired sample t-test was calculated to analyze the effectiveness of Cognitive Flexibility strategies on work engagement among. Similarly, paired t-test was calculated to analyze the effectiveness of Cognitive Flexibility strategies on Individual Innovativeness. The results were as follows:

Table 1.1. *Descriptive Statistics for Work Engagement.*

Work Engagement	Pre-test	Post-test
Mean	3.9	4.3

Table 1.1 depicts the Mean and Standard deviation (SD) scores of Work Engagement in pre-test and post-test conditions. The pre-test mean of Work Engagement was 3.9. The post-test mean of Work Engagement was 4.3. It denotes that the pre-test mean of Work Engagement is lower than the post-test mean. Figure 1 depicts means of Work Engagement in pre-test and post-test conditions. It is also evident from the Bar graph that the mean of pre-test condition is lower than the mean of post-test condition.

Table 1.2. *Descriptive Statistics for Individual Innovativeness.*

Individual Innovativeness	Pre-test	Post-test
Mean	69.5	73.7

Table 1.2 depicts the Mean and Standard deviation (SD) scores of Individual Innovativeness in pre-test and post-test conditions. The pre-test mean of Individual Innovativeness was 63.5. The post-test mean of Individual Innovativeness was 73.7. It denotes that the pre-test mean of Individual Innovativeness is lower than the post-test mean. Figure 2 depicts means of Individual Innovativeness in pre-test and post-test conditions. It is also evident from the Bar graph that the mean of pre-test condition is lower than the mean of post-test condition.

Table 1.3 *Paired sample t-test for Work Engagement*

Work Engagement	t	df	Sig (2-tailed)
	5.5703	42	0.00

In order to determine if there exists a significant difference between the pre-test and post-test results, paired sample t-test was calculated. According to Table 1.2, the mean difference between Work Engagement scores in the pre-test phase and the post-test phase was found to be 5.5703 which was significant at 0.05 level [t (42) = 5.5703, p<0.05]. Hence, there exists a significant difference in the levels of Work Engagement between pre-test and post-test phase. Therefore, the Null hypothesis is rejected and Alternate Hypothesis is accepted.

Table 1.4 *Paired sample t-test for Individual Innovativeness*

Individual Innovativeness	t	df	Sig (2-tailed)
	5.6247	42	0.00

In order to determine if there exists a significant difference between the pre-test and post-test results, a paired sample t-test was calculated. According to Table 1.4, the mean difference between Individual Innovativeness scores in the pre-test phase and the post-test phase was found to be 5.6247 which was significant at 0.05 level [t (42) = 5.6247, p<0.05]. Hence, there exists a significant difference in the levels of Work Engagement between pre-test and post-test phase. Therefore, the Null hypothesis is rejected and Alternate Hypothesis is accepted.

DISCUSSION

Results of the present study suggest that Cognitive Flexibility strategies have significantly enhanced Work Engagement and Individual Innovativeness. Results also suggest that both the paired sample t-tests were significant at $p<0.05$ level and both the alternate hypotheses were accepted.

Cognitive flexibility is the capacity of an individual to adapt to the environment. It involves generating a new response (adaptive response) by overcoming the obstructions caused by the response patterns. Cognitive flexibility involves two features called attentional processes and knowledge representation. Cognitive Inflexibility\Rigidity occurs due to four blockages namely, perseveration also called as cognitive blockade, cognitive hysteresis, functional fixation and functional reduction.

Work engagement is the ability of the people to bring themselves completely at work. It involves vigor, dedication and absorption.

Individual innovation refers to the employee's capacity to habitual generate and implement new ideas.

Alternate Hypothesis one: 'There is a significant difference in the level of work engagement in the pretest intervention phase and the post-test intervention phase.'

Cognitive flexibility strategies have significantly increased Work engagement. Cognitive flexibility consists of a characteristic called attentional process. It refers to the steps used to focus on a particular stimulus or set of stimuli while side track irrelevant information. The intervention of Stroop task is a classic example of an attention process. Attention process is successful when the individual has understood that they have undergone a shift in the situation and now to deal with it, they need to react differently. In terms of Stroop, the situation now requires focusing attention on reading the colours and not the words. Cognitive flexibility is giving up on habitual responses by generating new responses to adapt to the situation. In Stroop task, the habitual response of reading words is given up and the new response is generated (reading colours) to adapt to the new requirements (completing the task with minimum possible errors). WE can reduce when employees do not understand which parts of the tasks to focus and give priority to. Therefore, employees may not work to a particular level of performance and in turn be dissatisfied. Stroop task as a strategy to enhance Cognitive flexibility focuses on inculcating in the participant (here, employees) which parts of the work to focus upon for successful completion. In the Post Task Questions (PTQs) participants reported that they felt more engaged and enjoyed the intervention phase, which is nothing but enhanced levels of Work engagement in general. The Stroop task was specifically designed by using words from organisational set-up, both positively and negatively loaded. Qualitative analysis of the discussion with the participant suggests the following: While the participants did the second level of Stroop task that is the colour-word condition, those who focused more on the positively loaded organisational terms like success, progress, profit, talent, reward, appraisal, engaged, wellness, satisfied, productive, happiness, balance, etc were seen to depict higher levels of Work engagement than those who focused on negatively loaded organisational words like turnover, bullying, boredom etc. The type of words focused were known by taking a memory test of the words after the task was completed. The idea behind this is that memory leads to emotional engagement. When one focuses on the positively loaded words, the happy memories, in this case, regarding the organisation, are triggered. Similar is the working process for negatively loaded emotional words. As per qualitative analysis of the responses and individual data on Work engagement scores in both pre and post-test phases Participants who memorised positive words showed higher levels of Work engagement than those who memorised negative words. The levels of Work engagement did not differ for those who memorised all to most neutral words like career, presentation, meetings, contract, etc.

The 9-dot problem was also used as an intervention task to improve work engagement. WE is related to the factor of Flow. Flow is being in the present moment and getting carried away by the happiness that the current moment gives. It is nothing but the Absorption (as discussed above). 9 dot problem was a challenging situation that the employees faced in the intervention phase. The concept of Flow basically has 3 sub-parts to it: burnout, flow and anxiety which are measured on the level of skills of the individual and the level of challenge that is posed by the task. If the individual is highly skilled but does a less challenging job, he\she will face burnout. If the level of skills and challenge match, it is the state of flow (as per WE, it is the state of absorption). If the skill levels are lower and challenge levels are higher than the individual will face anxiety. In either burnout or anxiety, the levels of WE will be lower. 9 dot focuses on the same. Qualitative analysis of the discussion with the participants before, during and after the 9-dot task suggests the following: Those who thought that the task was difficult prior to actually doing the task, also noted facing anxiety while doing the task and noted to be less satisfied after the task was over. These observations were common to all three levels of 9 dot problem. Those who thought that the task of interesting and were enthusiastic about it before actually doing the task, could think creatively, most of them could also tackle it successfully which in turn made them feel rewarded and noted after the task that they actually enjoyed the intervention. This can be connected to the idea of absorption or flow. Therefore, it is safe to say that the concept of 9-dot problem and the idea of absorption, if used appropriately can be enhance CF and in turn WE.

Alternate Hypothesis two: ‘There is a significant difference in the level of individual innovation in the pre-test intervention phase and the post-test intervention phase.’

CF strategies have significantly increased II. Cf consists of characteristic called attentional process. According, to this process, shifting the focus between the stimuli in order to adapt to the changing environment is the key. In other words, it means, breaking of the mental set. Mental set is basically the tendency to view only those solutions that have worked in the past. This can happen because of the blockage in CF called functional reduction. In functional reduction we view only one or a few factors as the cause of a situation or problem. In work, constantly encountering and dealing with same challenges leads to formation of functional reduction and in turn the mental set. It also causes perseveration, i.e. solving the situation using same logic every time. Sometimes, these logics do not work but we still follow that logic base to solve the issue at hand. Hence, the 9-dot intervention task was used to break this mental set. The same problems are viewed from multiple perspectives when the levels of difficulty of the task increase from 5 lines to 4 lines and from 4 lines to 3 lines. CF also involves shifting between perspectives and viewing same situations from multiple perspectives. Another blockage that was changed is called perseveration. 9-dot helps participants understood that they need to change their thinking patterns for 4-line level and for 3-line level. Once they learnt a particular way of thinking, they use the same logic to tackle 4- and 3-line levels. That however, does not work. Once they understood or were hinted to extend lines in the 4-line task and extend only diagonal lines in 3-line task, they are able to tackle the challenge. 9-dot is a CF strategy that generates innovative solutions to common problems. Qualitative analysis of the PTQs suggest the following. By showing the image of 9-dots the participants were asked what it was to know their perceptions. Those who said that they were mere 9-dots or it formed a visual square if they were imaginably joined, had already found a mental set or a blockage. On the basis of individual scores, it was found that the time they required to tackle the problem was higher and the success rates were lower for such participants. However, those who stated that they were 9-dots and along with they perceive it to be stars, patterns of Rangoli (Indian cultural design), random sets of dots which can be joined to form any shape, etc, required less time and success rates for them were higher. This indicates that mental set was not formed strongly or rigidly and hence it was also easier to break. It can be predicted that mental set is formed at the very perception of the stimulus and hence CF focuses on developing multiple ways of perceiving something. Thus, 9-dots through developing perceptions and breaking of blockages enhance CF and in turn innovation.

Stroop task leads to innovation. One of the key aspects to innovation is inhibiting habitual or generic responses and consciously generating new responses or solutions to common problems. Stroop task consisted of a colour-word condition. The habitual or automatic response was to read the word. But it has to inhibited and a new response of reading colour has to be generated to creatively tackle the task. Therefore, Stroop task enhances innovation by shifting attentional processes.

Concept application was also an intervention task that was conducted. The concept of 'reward' was applied by the participants in as many ways as possible. CF also focused on knowledge representation and applying the learnt knowledge in different situations. Knowledge representation is the way the information is analysed and the way it is used when we do a particular task. It involves connection between the concepts and ideas. When the participants were asked to do so, they could shift their focus from one area of application to another and view the same concept from multiple perspectives. They could also represent the same knowledge (apply the same concept) in many ways. This was seen to enhance CF and therefore, enhance II. The rewards mentioned by participants were as follows: Criteria based reward systems such as amount of sales brought by the department, the percentage of client requirements fulfilled by the HR department, etc. Monetary benefits like gift vouchers, annual bonus, general cash incentives, etc. reward systems based on appreciation in various forms such as giving holidays or outing breaks, etc. Need Based reward systems like providing a reward on the basis of the need of a specific department or an employee with the aim of increasing productivity and dedication to work. Many participants came up with new reward systems like hobby allowance, self-care breaks, sanitation kits, employee growth and development approach, etc. Thus, the participants were first asked to note common reward patterns and by slowly shifting their perspectives and ways of knowledge representation they could generate innovative reward systems.

In addition, neuroplasticity also plays a role in innovation. When a person does a particular task in a certain way for an extended period of time, the brain develops neural connections for the same, which develops in the form of a mental set. When a person tries innovative ways of solving problems, this mental set and neural connections undergo a change after repeated attempts and eventually the brain may form neural connections that promote innovativeness and eventually, it may become a part of an individual's personality to have an innovative approach to problems.

<u>Ancillary Observations:</u> As per qualitative analysis, it can be predicted that Individual innovativeness can act as a mediator between Cognitive flexibility and Work engagement. This is not supported statistically in the current research nor is the aim of the study. However, qualitatively and conceptually Cognitive flexibility was seen to affect Work engagement through Individual innovativeness. In case of the 9-dot intervention task, participants who innovated the solutions for the challenge felt more rewarded after completing the task. They also stated to be more engaged in further levels of the same task as well motivated and engaged in upcoming Stroop and concept application tasks. Therefore, here, we can predict that Cognitive flexibility led to Individual innovativeness and Individual innovativeness led to Work engagement. Similarly, participants suggested that doing same job tasks for many years

led to monotonous work life thereby leady to burnout, dissatisfaction and in turn lower levels of Work engagement. By applying the concept of reward in multiple ways, it gave them an understanding that same tasks can be done in different ways. This increased motivation and feelings of satisfaction when they completed the tasks innovatively. This satisfaction can be called a mental reward. Once an individual feels rewarded the levels of dedication and engagement in that particularly activity generally increases.

LIMITATIONS

The present study is only related to the corporate sector of management and other sectors are not explored. The study does not take into account the gender, age and level of experiences wise differences in the level of CF, WE and II. The current study uses interventions that were generic in nature. The tasks were not customized for any specific type of organisation, gender based tasks or any other specifications were not considered.

FUTURE DIRECTIONS

Studying gender differences, age differences, differences due to years of experiences, level academic qualification and subject of specialization on CF WE and II, developing company specific or department specific or job tasks specific intervention plans to enhance CF, WE and II. Considering other variables that mediate or moderate WE and II other than CF. In the current study only those from corporates were considered. Future studies can focus on education, healthcare, hospitality, banking sectors etc.

APPENDICES

APPENDIX A

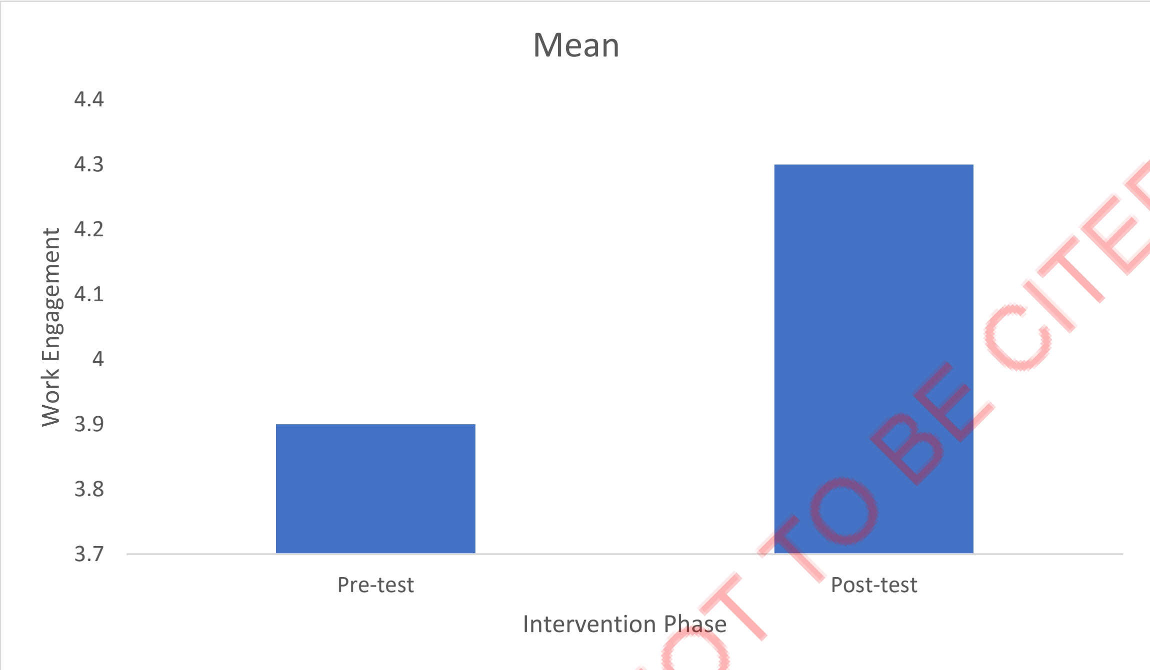

Fig 1. Means of Work Engagement in pre-test and post-test phases.

APPENDIX B

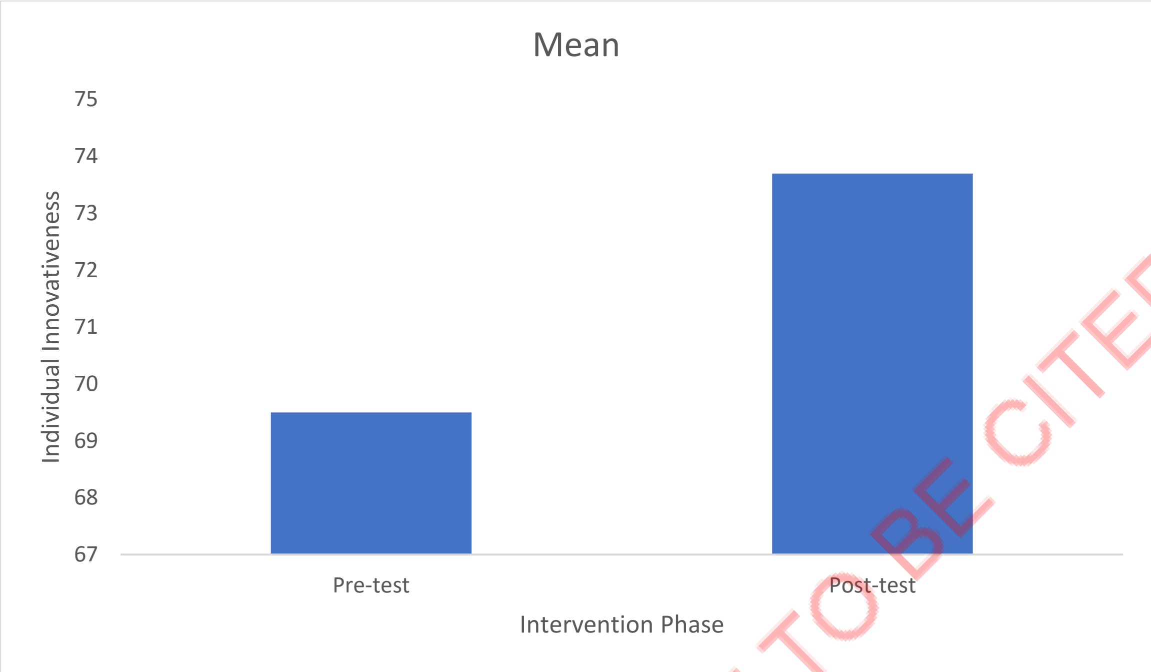

Fig 2. Means of Individual Innovativeness in pre-test and post-test phases

REFERENCES

Because of Increased Cognitive Flexibility. Social Psychological and Personality Science. 2 (1). 72-80. DOI: 0.1177/1948550610381789.Retrievedfrom:https://www.researchgate.net/publication/240287796_Behavioral_Activation_Links_to_Creativity_Because_of_Increased_Cognitive_Flexibility#:~:text=For%20example%2C%20behavioral%20activation%20induces,%2C%20%26%20Baas%2C%202011)%20.

Braem, S., Egner, T. (2018). Getting a Grip on Cognitive Flexibility. Current Directions in Psychological Science. 27 (6). 470-476. DOI: 10.1177/0963721418787475Retrieved From:https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6291219/pdf/nihms-976245.pdf

Bunce, D. & West, M.A. (1996). Stress Management and Innovation Interventions at Work. Human Relations. 49 (2). 209-232.Retrieved from:https://search.proquest.com/openview/3886b4b6022b7c8681ec9ad0cb291495/1?pq-origsite=gscholar&cbl=41702

Canas, J.J, Farjado. I., Salmeron, L (2006). Cognitive Flexibility. International Encyclopedia of Ergonomics and Human Factors. 297-300. DOI: 10.13140/2.1.4439.6326Retrieved From: https://www.researchgate.net/publication/272022148_Cognitive_Flexibility

Das, P., Byadwal, V. & Singh, T. (2017). Employee Engagement, Cognitive Flexibility and Pay Satisfaction as Potential Determinants of Employees' Turnover Intentions: An Overview Indian Journal of Human Relations. 51 (1). 147-157. ISSN-0974-1089.Retrieved Fromhttps://www.researchgate.net/publication/321579858_Employee_Engagement_Pay_Satisfaction_Cognitive_Flexibility_Compensation_Fairness_Affective_Commitm ent_and_Turnover_Intention_A_Comparative_Study_of_Private_and_Public_Sector_Banks_in_India

Dreu, C.K.W.D., Nijstad,B.A. & Baas, M. (2011).Behavioral Activation Links to Creativity Employees' Innovative Work Behavior.. University of Amsterdam. ISBN 978-90-371-0725-8.Retrieved from:https://www.researchgate.net/publication/5012717_Individual_Innovation_The_Connection_Between_Leadership_and_Employees'_Innovative_Work_Behavior#:~:text=Leaders%20can%20influence%20employees'%20innovative,ideas%20and%20practices.%20...&text=Umi%20Anugerah%20Izzati-,...,to%20assess%20innovative%20work%20behavior.&text=It%20was%20developed%20by%20

Engagement in Everyday Life, Business, and Academia. Romanian Journal of Applied Psychology. 14 (1). 3-10.RetrievedFrom:https://www.researchgate.net/publication/230580677_Work_Engagement_What_Do_We_Know_and_Where_Do_We_Go_Work_Engagement_in_Everyday_Life_Business_and_Academia

Hazelton, S. (2014). Positive Emotions Boost Employee Engagement. Human Resource Management International Digest. 22 (1). Pg 34-37. DOI:http://dx.doi.org/10.1108/HRMID-01-2014-0012t. Retrieved from:https://www.emerald.com/insight/content/doi/10.1108/HRMID-01-2014-0012/full/html

Inceoglu, I. & Warr, P. (2012). Personality and Job Engagement. Journal of Personnel Psychology. Retrieved from:https://www.researchgate.net/publication/241843477_Personality_and_Job_Engagement

Johnco, C., Wuthrich, V. M., & Rapee, R. M. (2014a). Reliability and validity of two self-report measures of cognitive flexibility. Psychological Assessment, 26, 13811387

Johnson, Todd. B., "The Relationship Between Cognitive Flexibility, Coping, and Symptomatology in Psychotherapy" (2016). Master's Theses (2009 -). Paper 354. http://epublications.marquette.edu/theses_open/354

Jong, J. P. J. (2007). Individual Innovation The Connection Between Leadership and

Khalil, R., Godde, B. & Karim, A.A. (2019). The Link Between Creativity, Cognition and Creative Drives and Underlying Neural Mechanisms. Frontiers in Neural Circuits. 13 (18). Pg 1-16. DOI: https://doi.org/10.3389/fncir.2019.00018 Retrieved from:https://www.frontiersin.org/articles/10.3389/fncir.2019.00018/full

Knight, C., Patterson, M. & Dawson, J. (2016). Building work engagement: A systematic review and meta-analysis investigating the effectiveness of work engagement interventions. Journal of Organizational Behaviour. DOI: 10.1002/job.2167.Retrieved from:https://www.semanticscholar.org/paper/Building-work-engagement%3A-A-systematic-review-and-Knight-Patterson/350d594385144ffff1dfb8898342358bcf64f98f

Knight, C., Patterson, M., Dawson, J. & Brown, J. (2017). European Journal of Work and Organizational Psychology. 26 (5). 634-649. DOI: 10.1080/1359432X.2017.1336999.Retrieved from:https://www.tandfonline.com/doi/full/10.1080/1359432X.2017.1336999

Knight, C., Patterson, M., Dawson, J. & Brown, J. (2017). European Journal of Work and Organizational Psychology. 26 (5). 634-649. DOI: 10.1080/1359432X.2017.1336999.

Odaci, H. & Cikrikci, O. (2018). Cognitive Flexibility Mediates the Relationship between Big Five Personality Traits and Life Satisfaction. The International Society for Quality-of-Life Studies (ISQOLS). DOI: https://doi.org/10.1007/s11482-018-9651-y Retrieved fromhttps://link.springer.com/article/10.1007/s11482-018-9651-y#:~:text=Cognitive%20flexibility%20was%20considered%20partial,fully%20mediated%20by%20cognitive%20flexibility.

Ritter, S.M., & Mostert, N. (2016). Enhancement of Creative Thinking Skills Using a Cognitive-Based Creativity Training. J Cogn Enhanc. DOI: 10.1007/s41465-016-0002-3. Retrieved from:https://www.researchgate.net/publication/308945660_Enhancement_of_Creative_Thinking_Skills_Using_a_Cognitive-Based_Creativity_Training

Rivkin, W & Schmidt, K.H. (2016). Training Interventions to Increase Innovation and Productivity in Age-Diverse Teams. Advances in Ergonomic Design of Systems, Products and Processes. 115-124.Retrieved from:https://link.springer.com/chapter/10.1007%2F978-3-662-53305-5_8

Sasaki, N., Imamura, K., Trann, T.T.T., Nguyen, H.T. et,al. (2020). Effects of smartphone-based stress management on improving work engagement among nurses in Vietnam: a secondary analysis of a three-arm randomized controlled trial. Journal of Medical Internet Research. Retrievedfrom:https://www.researchgate.net/publication/341507763_Effects_of_Smartphone-Based_Stress_Management_on_Improving_Work_Engagement_Among_Nurses_in_Vietnam_Secondary_Analysis_of_a_Three-Arm_Randomized_Controlled_Trial_Preprint

Schaufeli, W.B. (2012). Work Engagement. What Do We Know and Where Do We Go? Work

Smelser, N. J., & Baltes, P. B. (2001). *International encyclopedia of the social & behavioral sciences. Vol. 25: Name Index*. Amsterdam: Elsevier)

Vasquez-Rosati, A., Montefusco-Siegemund, R., Lopez, V. & Cosmelli, D. (2019). Emotional Influences on Cognitive Flexibility Depend on Individual Differences: A Combined Micro-Phenomenological and Psychophysiological Study. Frontiers in Psychology. 10 (1138). Pg 1-14. DOI: https://doi.org/10.3389/fpsyg.2019.01138

Yesil, S. & Sozbilir, F. (2013). An Empirical Investigation into the Impact of Personality on Individual Innovation Behaviour in the Workplace. 1st World Congress of Administrative & Political Sciences (ADPOL-2012). 540- 551. DOI: 10.1016/j.sbspro.2013.06.474 Retrievedfrom:https://www.researchgate.net/publication/273853530_An_Empirical_Investigation_into_the_Impact_of_Personality_on_Individual_Innovation_Behaviour_in_the_Workplace