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## **Full Length Research Paper**

# **The Impact of Emotions on Creative Thinking: Can induced mood change peoples' level of creativity?**

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## Summary

The purpose of this study was to investigate the impact of mood on creative output. Positive moods have been shown to be beneficial for big picture, creative, innovative thinking and negative moods have been found to create more accuracy, bottoms up processing and problem finding. This experiment aimed to induce either a positive or negative mood before participants undertook a creative task. The video clips used to induce mood did show an impact on subjective mood experienced in the moment and analysis of the creative output found that positive mood led to a greater creative result than the negatively induced mood. The results were statistically significant. This study concludes that positive moods seem to be beneficial for creative output, both quantity and quality.

## Introduction and Objectives

Human beings are emotional and social creatures. Emotions are a consistent, if ever changing, presence. Ekman (1999) says: *"... the fundamental function of emotion is to mobilize the organism to deal quickly with important interpersonal encounters."*

All relationships are suffused with emotion, whether this is positive or negative, so understanding more about specific feelings can help improve relationships in the workplace. Specifically, it is helpful to understand how emotions and moods affect others and contribute to, or detract from those relationships. Employee moods and emotions influence several critical elements in organisations – such as job performance, turnover, creativity, decision making.

Organisations require employees to solve problems every day – from small ones that only require old information, such as problems that have been encountered before; to much more complex problems. Both types of problems require brain activity, however more complex problems that do not have an obvious answer may benefit from activity in the anterior cingulate cortex that is evident in moments of insight (Kounios & Beeman, 2009). More and more organisations are looking for new and innovative ideas to give them the

edge over their competition (Amabile, Khaire, Goffee, Jones, Florida and Goodnight, 2008; Pratt and Jeffcutt, 2009). Recent neuroscience research may provide organisations with insights into how the brain works to encourage more creativity in the workplace.

The human brain from a neuroscience perspective relies on reward and threat (Gordon, 2000; Gordon, Barnett, Cooper, Tran and Williams, 2008). The brain is designed to minimize threat and maximize rewards. The reward, or approach, state is also linked to increased dopamine levels, positive emotion, interest, learning (Rock, 2008).

Positive emotions have been found to promote problem solving, innovation, creativity and insight. Positive emotions tend to create an upward spiral in emotions and resilience (Fredrickson, 2001) and research shows that people experiencing positive emotions tend to perceive more options. Jung-Beeman's (2007) work also finds that positive emotions have a positive impact on people's ability to solve non-linear problems using insight. Higher levels of positive emotion appear to be better for solution focused thinking and possibilities (Caruso and Salovey, 1990).

The reward state, when people are experiencing positive emotions, leads to:

- Increased cognitive resources (Arnsten, 1998)
- A wider perceptual view (Schmitz, De Rosa and Anderson, 2009)
- More ideas and options for possible actions and solutions (Fredrickson, 2001)
- More creativity (Friedman and Forster, 2001)
- More problems solved with insight, which is required for complex problem solving (Jung-Beeman et.al, 2009)

The threat state acts as a survival mechanism and is linked to negative emotions. The threat state is more likely to lead to people staying with the status quo and avoiding change. Problems can appear more challenging and less likely to be resolved by insight (Jung-Beeman et al, 2009). It can also reduce the likelihood of collaboration thereby reducing the opportunity to share ideas and possible solutions (Rock, 2009).

Slightly negative to neutral emotions appear to be better for problem finding, critiques and accuracy (Forgas and Wyland, 2006). People in a negative mood may be better at detail, bottoms up processing and more accurate eye witnesses (Forgas, Vargas and Laham, 2005; Forgas and Wyland, 2006). Please note – negative does not mean bad, all emotions are data, there is no such thing as a good / bad emotion (Ekman, 1999).

When solving problems however, negative moods can lead to tunnel vision (Schmitz, De Rosa and Anderson, 2009). In a positive mood the visual cortex can take in more information and is more likely to lead to insight. Friedman and Foster (2001) used a maze of a mouse getting from one side to the other with either a piece of cheese or an owl on the opposite side. They found the group who had completed the maze with the cheese solved more creative problems afterwards than the group with the owl. The reward / threat response appears to be quite sensitive and has considerable impact on creative output.

Previous research has shown that people solve insight or creative problems better when in a positive mood (Subramaniam, Kounios, Parrish and Jung-Beeman, 2009). fMRI research has found that the ACC is active with both positive mood and insight and it appears the ACC has a preparatory effect as it fires just before the moment of insight for the individual (Subramaniam et al, 2009). As Subramaniam et al (2009) discuss, the “result suggests that positive mood enhances insight, at least in part, by modulating attention and cognitive control mechanisms via ACC.” There is also evidence of the ventral striatal dopamine systems (reward systems) being active during positive affective state.

The purpose of this study is to explore if mood can be induced by a simple method and how the mood impacts creative output. The aim was to induce either a positive or negative mood before inviting participants to undertake a creative output task.

The null hypothesis ( $H_0$ ) is that mood will have no impact on the creative output of the task. Literature and research to date suggest that positive moods are beneficial (Salovey and Mayer, 1990; Caruso and Salovey, 2004) for creative output, therefore the hypothesis ( $H_1$ ) is that positive moods lead to higher creative output than negative moods.

## Methodology

Participants were invited to participate in the study through a database invitation. Ethics were considered and an ethics statement was included both in the initial email invitation and on the webpage participants visited to complete the research activity. The initial response also asked for demographic information and personality preferences using Myers Briggs Type Indicator (Myers, 1990) wording around iNtuitive and Sensing preference for how people take in information.

After two weeks participants received a second email that asked them to go online to complete a series of activities, which were the focus of the research. The activities were:

1. Watch a short video clip
2. Complete a current mood questionnaire
3. Complete a creative task

The second email with the task details again clarified the ethics and anonymity of the research as well as confirming their willingness to participate. Participants were advised the task would require three steps and would take approximately 20 minutes of their time.

All the activity was conducted online with full disclosure and participants were able to participate through their own free will.

## Project Activity

### *Materials*

Myers Briggs Type Indicator (MBTI) is a valid and reliable (Myers, 1990) personality preference tool. The area of interest for this study was the second dimension of how

people prefer to gather information. The dimension is N for iNtuiting or S for Sensing. The words used are listed below:

<b>INTUITING – N</b>	<b>SENSING - S</b>
<ul style="list-style-type: none"> <li>▪ Inspiration and inference</li> <li>▪ Oriented to the future</li> <li>▪ Sees patterns and connections</li> <li>▪ Trusts theory more than experience</li> <li>▪ Analogies</li> <li>▪ Idealism</li> <li>▪ Innovation and imagination</li> <li>▪ Likes to learn new skills</li> <li>▪ Possibilities</li> <li>▪ Visionary</li> <li>▪ Sixth sense or hunch</li> </ul>	<ul style="list-style-type: none"> <li>▪ Practical</li> <li>▪ Common sense</li> <li>▪ Specific and literal</li> <li>▪ Oriented to the present</li> <li>▪ Trusts experience</li> <li>▪ Certain, concrete</li> <li>▪ Gathers information through senses</li> <li>▪ Realism</li> <li>▪ Likes to use and hone established skills</li> <li>▪ Facts and data</li> </ul>

Participants were asked to simply choose which words most resembled them. This data is for future study to explore how expressed personality preferences in this area may impact creative output.

The video clips were between two and three minutes in length. They were chosen by a small group for their ability to induce positive and negative mood.

The Positive mood clip showed tiger and lion cubs playing with humans with music in the background - <http://www.langleygroup.com.au/asset/2140.html>. The negative mood clip was the Sussex Roads Embrace Life advert indicating a member of the family having a car crash, emotive music in the background <http://www.langleygroup.com.au/asset/2137.html>

The mood questionnaire chosen was the State-Trait-Cheerfulness-Inventory (30). This is a validated tool, which in this case was focused on in the moment state assessment of mood as opposed to trait assessment (Ruch, Kohler, van Thriel, 1996). The short form was chosen to reduce the likelihood of the induced mood dissipating. The STCI has three subscales – state cheerfulness, state seriousness and state bad mood. The assessment of mood was

based primarily on the Cheerfulness and Bad Mood scales to ensure the videos had successfully induced the correct mood.

The creative task was a simple random outline of shapes with no clear meaning, except what the participants created in their minds. Participants were asked to look at the image and list all the things the image could represent or could be used for. See Appendix 2 for the image provided.

### *Participants*

In total, 141 participants replied to the invitation to participate via email through the organisation Emotional Intelligence Worldwide Pty Ltd and their database. Following the second email a total of 42 people chose to complete the full creative task.

The sample consisted of 43 adults (62.8% female) most of whom were either working full-time (53.5%) or self-employed (34.9%). Nearly all participants indicated that they were working in management level positions (CEO: 11.6%, senior executive: 11.6%; management: 32.6%; team leader: 9.3%; no response: 4.7%). The most frequent industries of employment were training and development (37.2%), IT (14.0%), financial services (7.0%) and retail (7.0%). As a group, the participants were relatively well educated (doctoral degree: 4.7%; masters degree: 32.6%; post-graduate degree: 20.9%; bachelors degree: 16.3%; high-school certificate: 25.6%). It will be noted that complete data were not available for all participants. However, the number of missing data points was very small (<1%), consequently, a mean imputation method was used to replace the missing values.

Participants were randomly assigned to a 'positive mood' or 'negative mood' group and all data was collated and analysed. The final experimental group consisted of:

- 'Negative' group – 25 participants, 18 female and 7 male
- 'Positive' group – 18 participants, 9 female and 9 male

Full details of the participant group and demographics are shown in the results and Appendix 3

### *Measurement*

The creative output was measured on volume, i.e. the number of ideas each participant provided in answer to the final question. There was also a subjective assessment of the level of creativity involved in the answers. This subjective assessment was a panel of experts providing a scoring of the level of creativity in the answers, for instance output such as – “circles connected by three lines, two eyes, two wheels” was not considered as creative as output such as – “two Mexicans in sombreros sitting by the bank of a river fishing and sipping Corona or an old radio transistor that I used to play music on as a kid.”

### *Ethical Issues*

The issue of ethics was considered as the research involved human subjects. Ethics approval is designed to protect the rights of the subjects, the rights of the researcher and the reputation of the relevant university. The Ethics Committee at Sydney University, the Middlesex University policy and advice from the NeuroLeadership Institute academics was sought to ensure all measures had been put in place.

All participants were advised during the first invitation that the study involved emotion and cognition. Full details of expectations or hypotheses were not provided during the initial invitation in order to protect the integrity of the research. Participation was on a volunteer basis. Informed consent was obtained during the initial invitation and again during the actual experimentation stage. All criteria for informed consent were met. All participants were advised their results would be kept anonymous and they could withdraw from participation at any stage – nobody took up this offer. Participants were offered a copy of the final research report (this paper) once complete.

## Project Findings

Prior to conducting the principal analyses, an examination of the dependent variable distributions was performed. Based on skew and kurtosis estimates, it was found that the distributions tended to be appreciably non-normal. For example, the quantity creativity variable was associated with a skew value of 2.18 and kurtosis of 6.13. Therefore, the data were not analysed using parametric statistical analyses, which assume normal distributions. Instead, the data were analysed using non-parametric statistical techniques. However, the means and standard deviations are nonetheless reported in Table 1 for completeness.

The first series of analyses consisted of a manipulation check. Specifically, numerical differences between the positive-mood and negative-mood induced group means on the State-Trait-Cheerfulness-Inventory (STCI) were tested for statistical significance. As can be seen in Table 1, based on a series of Mann-Whitney U tests, there was evidence for the efficacy of the mood induction procedure, as the positive group was associated with a statistically significant ( $p = .015$ ) higher mean rank ( $M = 26.92$ ), in comparison to the other negative mood group ( $M = 18.46$ ) on the CH subscale. Furthermore, there was also a statistically significant mean rank difference on the BM subscale ( $p = .030$ ), such that the negative mood group scored higher than the positive mood group ( $M = 25.00$  vs.  $M = 17.83$ ). However, the two groups did not differ statistically on the SE subscale ( $p = .298$ ).

To test the principal hypothesis of this investigation, two Mann-Whitney U tests were performed on both the 'quantity' and 'quality' dependent variables. As can be seen in Table 1 (bottom), the hypothesis was supported in the case of the quantity dependent variable. That is, the positive mood group was associated with a mean rank score of 25.72 whereas the negative mood group was associated with a mean rank score of 19.32 ( $p = .049$ ). However, the two mood groups did not differ statistically significantly on the quality variable ( $p = .319$ ). To appreciate the effect observed on the quantity variable, an additional analysis was performed. Specifically, a Spearman rank correlation was performed on the group variable (negative = 0, positive = 1) and the quantity variable, which yielded a correlation of  $r_s = .26$ ,  $p = .049$ .

Finally, a series of Spearman correlations were performed between the MBTI intuitive and sensing personality dimensions and the two creativity output variables. The intuitive dimension was found to correlate positively and statistically significantly with quality ( $r_s = .28, p = .037$ ) yet not significantly with quantity ( $r_s = .25, p = .054$ ). Thus, higher levels of intuition are associated with higher levels of creativity quality. By contrast, the sensing dimension was found to correlate positively and statistically significantly with quantity ( $r_s = .39, p < .01$ ) and not significantly with quality ( $r_s = -.04, p = .81$ ). Thus, higher levels of sensing are associated with lower absolute levels of creative output.

Table 1

*Mean differences between the positive and negative mood groups*

	Mean (SD)		Mean Rank		Z	p
	Negative (N = 25)	Positive (N = 18)	Negative (N = 25)	Positive (N = 18)		
<b>STCI</b>						
CH	26.10 (6.18)	29.28 (3.68)	18.46	26.92	-2.18	.015
BM	15.74 (6.82)	11.91 (2.48)	25.00	17.83	-1.88	.030
SE	27.78 (4.54)	28.00 (5.08)	21.14	23.19	-.53	.298
<b>Creativity</b>						
Quantity	8.54 (7.86)	10.33 (6.99)	19.32	25.72	-1.66	.049
Quality	5.48 (2.31)	5.64 (1.64)	21.24	23.06	-.47	.319

Note.  $N = 43$ ; Positive = positive mood group; Negative = negative mood group; STCI = State-Trait-Cheerfulness Inventory; CH = Cheerful; BM = Bad Mood; SE = Serious; all  $p$  values are one-tailed.

The significance indicates the videos did work in creating the positive and negative mood desired. The hypothesis was supported in that positive mood did lead to increased creative output. Personality also played a part in the creative output of the subjects.

## Conclusion and Recommendations

Positive moods increase both the volume of creative output and the levels of perceived creativity compared to those experiencing negative moods based on the mean and standard deviation.

The videos did significantly induce the desired moods and the levels of increase in creativity that were observed in the results suggest that perhaps if the increase in positive mood generation in the Positive Group had been greater than  $p=0.01$  then maybe the subsequent levels of output and perceived creativity in this group may have been even more significant. There are also indications of more convergence in the results of the Positive Group based on the standard deviation that may have indicated perhaps some people did not find the negative video particularly negative or that it was not as good at inducing a consistent mood. Further work into inducing the required mood may be required.

The video chosen for the Positive Group also had some challenges. A more appropriate video could induce the required level of positive mood generation to significantly impact the creativity results. Some participants reported the music was distracting and it was a little too long.

There were also 12 participants who experienced technical difficulties with the link to the Positive Group video that may have created a level of frustration that reduced the impact of the mood generation.

The Negative Group video had interesting results with a few outliers still indicating they were high on the cheerfulness scale – up to 37 out of a possible 40. This indicates the video may not have worked as well for some people, although the video itself is quite emotive and the researchers cannot watch without tears.

This study has shown support for the position that positive moods do produce higher levels of creative output and increased creativity based on subjective assessment.

It is known that certain personality traits can influence creative thinking. This study included a brief look at personality preferences along the dimension of 'how we prefer to gather information' – the statistical analysis did find the iNtuitive preference people had higher levels of creative quality than Sensing preference people and vice versa. It would be good to obtain more research in this area and explore whether mood then enhances these natural tendencies further.

Research in neuroscience has found that the dorsal anterior cingulate cortex fires just prior to the moment of insight (Subramaniam, et al., 2009). During this study there is no way of knowing if that area of the brain was functioning more in those exhibiting higher levels of creativity. There is no way of knowing, except through self-report, how the participants were feeling.

The data on positive emotion and how it impacts performance is significant (Amabile, Barsade, Mueller, & Staw, 2005), especially in a workplace setting. Organisations seek highly creative people to design new and innovative ideas that will carry them forward to the future and beat their competition. Research into creativity and insight and the emotional states and brain functions that underpin these activities could be valuable to hiring decisions and professional development. As Amabile et al (2005) point out "The results indicate that positive affect relates positively to creativity in organizations and that the relationship is a simple linear one".

There is a great deal of research into positive emotions in the workplace and the impact they can have on performance (Barsade and Gibson, 2007). As business plays a significant part on the economy of the world, more research will undoubtedly uncover further insights into how we can use the wonderful phenomenon that is the human brain.

Future research is required to tie together the emotion and neuroscience elements in a more effective way. This researcher already has the next steps for a follow up research project.

During a podcall I asked each person to perform a creative task. The first time fellow students were asked to spend 60 seconds coming up with ideas on what an object could be used for. The second time they were asked to focus all their attention on their anterior cingulate cortex, including showing an image of the area in the brain, then repeat the exercise. As just a spontaneous exercise many of the fellow students reported more ideas and more 'way out' ideas.

The next step for this research is to do a proper study linking concentrated focus on the anterior cingulate cortex before completing a creative output task. Previous research has found that mindfulness (Hassed, 2006) has an impact on performance. Finding a way to focus attention on the ACC could provide some interesting results. I understand this is incredibly difficult and I have sought advice from a statistician and full-time researcher on how we may be able to do this.

fMRI studies would be ideal, however this is expensive and time consuming and there are not enough researchers with access to the equipment. By focusing attention on the correct brain area it may be enough to send dopamine there and therefore actively trigger more creative output and insight. This may be a remote possibility, however, quantum physics research has found the observer effect, ie. an observer can impact the outcome of a particle, or the Schrodinger's Cat situation (Ford, 2005), therefore maybe we can have an impact on our own cells.

Further research is also recommended investigating the creative problem solving in a workplace context to ensure this neuroscience information is actually being used. I would like to see how we could adapt these situations to solving business problems that require a certain amount of creative ability. Using the basis of this research we could explore different ways of enhancing mood, such as different video clips, music, etc. Trainers already use music to enhance training programmes, perhaps focusing on music to induce emotion could lead to increased cognitive capacity.

More work needs to be done in this area to help organisations find ways to harness the creative output of their team, as well as helping those people who 'don't believe they are

creative' to develop their creative output. This could be tied to personality preferences, which many organisations are familiar with, and research could aim to find ways for both preferences to enhance their level of creative output.

I am looking forward to the next step of this research project.

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## Appendices

### **Appendix 1 – Questionnaire information:**

The State-Trait-Cheerfulness-Inventory (STCI) is a self-report instrument measuring the three concepts of cheerfulness, seriousness, and bad mood as both states (STCI-S) and traits (STCI-T). They are 20 and 10 items per scale in the STCI-T and STCI-S, respectively, and both parts utilize a 4-point answer format (strongly disagree to strongly agree).

The concepts are considered to assess the temperamental basis of humor and the scales have been validated in a variety of studies. The trait part is reliable and state part is sensitive to change. The traits are disposition for the activation of the homologous states and it has been demonstrated that trait cheerfulness is not only predictor for getting in a cheerful mood more easily (threshold in), experience that state more strongly, and remain in that state longer, even under adverse circumstances (i.e., of the phenomenon of "keeping" or "losing one's humor"). The state and state versions of the inventory take approximately 10 and 5 minutes to complete, respectively. More at:

#### STCI - S <30> (t)

Name (Code): \_\_\_\_\_ Age: |\_\_|\_\_| Gender: male  female

#### Instructions:

The following statements refer to your **current** mood and mental state. Please try as much as possible to describe your **current** feelings and state of mind by marking an X through one of the four alternatives. Please use the following scale:

- (1) strongly disagree
- (2) moderately disagree
- (3) moderately agree
- (4) strongly agree

For example:

I have an even temper..... (1) (2) (3) (4)

If you strongly agree with this statement, that is, if you have an even temper **at this moment**, mark an X through (4). If you strongly disagree, that is, if you **at present** do *not* have an even temper *at all*, mark an X through (1).

If you have difficulty answering a question, pick the solution that *most* applies.

Please answer *every* question, do not omit any.

---

1.	I am in a bad mood.	(1) (2) (3) (4)
2.	I am set for serious things.	(1) (2) (3) (4)
3.	I feel chipper.	(1) (2) (3) (4)
4.	I am sad.	(1) (2) (3) (4)
5.	I have important things on my mind.	(1) (2) (3) (4)
6.	I am cheerful.	(1) (2) (3) (4)
7.	I am in a thoughtful mood.	(1) (2) (3) (4)
8.	I could laugh at the drop of a hat.	(1) (2) (3) (4)
9.	I feel grouchy.	(1) (2) (3) (4)
10.	I have a serious mental attitude.	(1) (2) (3) (4)
11.	I feel merry.	(1) (2) (3) (4)
12.	I feel downhearted.	(1) (2) (3) (4)
13.	I am in a pensive frame of mind.	(1) (2) (3) (4)
14.	I am ill-humored.	(1) (2) (3) (4)
15.	My thoughts are profound.	(1) (2) (3) (4)
16.	I feel great.	(1) (2) (3) (4)
17.	My mood is spoiled.	(1) (2) (3) (4)
18.	I am in a serious frame of mind.	(1) (2) (3) (4)
19.	I am amused.	(1) (2) (3) (4)
20.	I am peeved.	(1) (2) (3) (4)
21.	I see the funny side of things.	(1) (2) (3) (4)
22.	I regard my situation objectively and soberly.	(1) (2) (3) (4)
23.	I'm walking on air.	(1) (2) (3) (4)
24.	I feel gloomy.	(1) (2) (3) (4)
25.	I am in a crabby mood.	(1) (2) (3) (4)
26.	I am delighted.	(1) (2) (3) (4)
27.	I feel dejected.	(1) (2) (3) (4)

28. I'm prepared to do a task in earnest. (1) (2) (3) (4)
29. I am ready to have some fun. (1) (2) (3) (4)
30. I am in a sober frame of mind. (1) (2) (3) (4)

Please check to see that you have answered every statement.

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### Scoring key for the STCI-S<30>

The short version of the STCI-S (with 30 items) measures three dimensions: state-cheerfulness (CH), state-seriousness (SE), and state-bad mood (BM).

The four answer alternatives are coded as follows: "strongly disagree" = 1, "moderately disagree" = 2, "moderately agree" = 3, and "strongly agree" = 4.

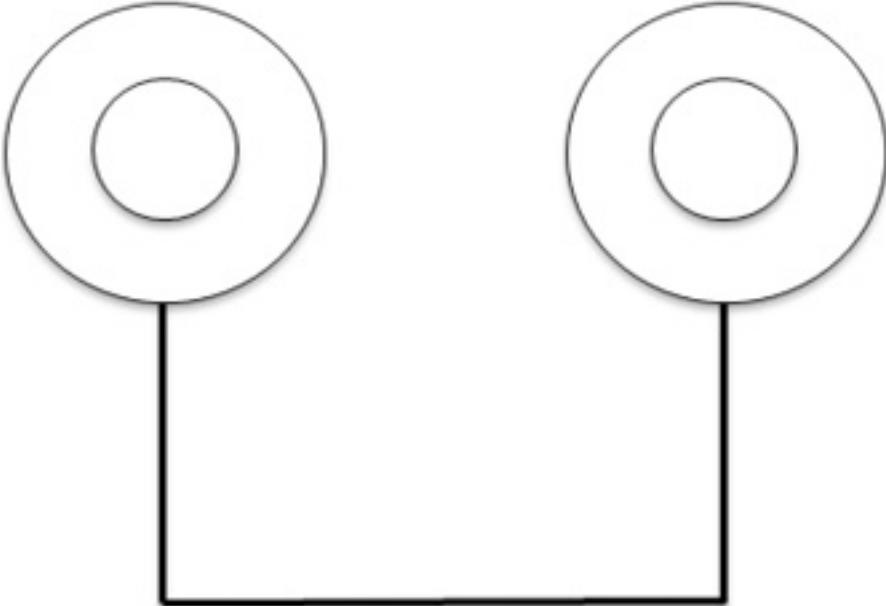
Below you find the formulas for computing the scores of the three dimensions.

CH: 3 + 6 + 8 + 11 + 16 + 19 + 21 + 23 + 26 + 29

SE: 2 + 5 + 7 + 10 + 13 + 15 + 18 + 22 + 28 + 30

BM: 1 + 4 + 9 + 12 + 14 + 17 + 20 + 24 + 25 + 27

**Appendix 2 – Image for creative output task:**



**Appendix 3 – Participant demographics:**

	Positive Group		Negative Group	
	Male	Female	Male	Female
Participants	9	9	7	18
Age:				
▪ 18 – 29	0	0	0	1
▪ 30 – 44	2	7	5	12
▪ 45 – 59	5	1	2	4
▪ 60+	2	1	0	1
▪ <b>Total</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>18</b>
Education:				
▪ HSC	4	3	0	4
▪ Bachelors	1	1	3	2
▪ Post Grad	0	1	2	6
▪ Masters	4	4	2	4
▪ Doctorate	0	0	0	2
▪ <b>Total</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>18</b>
Employment:				
▪ PTE	0	0	0	2
▪ FTE	3	5	6	9
▪ Self employed	6	3	1	5
▪ Retired	0	1	0	1
▪ <b>Total</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>18</b>
Occupation:				
▪ Frontline	1	3	3	6
▪ Team Leader	0	0	3	1
▪ Management	2	4	1	7
▪ Senior Exec	5	0	0	0

▪ CEO	1	1	0	3
▪ No Response	0	1	0	1
▪ <b>Total</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>18</b>
Industry:				
▪ Education	0	0	0	1
▪ Financial Serv	0	0	1	2
▪ Government	0	0	1	1
▪ HR	0	1	1	0
▪ IT&T	1	1	3	1
▪ Management	0	0	0	1
▪ Manufacturing	0	2	0	0
▪ Other	2	0	1	1
▪ Prof Services	1	1	0	0
▪ Retail	0	1	0	2
▪ Training and Dev	5	3	0	8
▪ Travel / Tourism	0	0	0	0
▪ No response	0	0	0	1
▪ <b>Total</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>18</b>

**Appendix 4 – STCI results:**

	Positive Group n = 18	Negative Group n = 25
STCI – CH scale*		
▪ Mean	29.11	26.00
▪ Median	29.00	26.00
▪ SD	3.71	6.40
STCI – BM scale*		
▪ Mean	11.83	15.52
▪ Median	11	13

▪ SD	2.55	6.61
STCI – SE scale*		
▪ Mean	28	28
▪ Median	28.5	27
▪ SD	5.076	4.97

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We would like to acknowledge all the volunteers who took part in the study for their time and patience. It was wonderful to see such commitment to what may have seemed like an arbitrary activity. We hope each person involved in this study may consider being part of the follow up study.

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