



Bolder, happier, smarter: The role of extraversion in positive mood and cognition

Lorenzo D. Stafford ^{*}, Wendy Ng, Roger A. Moore, Kim A. Bard

Department of Psychology, University of Portsmouth, Portsmouth PO1 2DY, United Kingdom

ARTICLE INFO

Article history:

Received 17 October 2009
Received in revised form 29 January 2010
Accepted 8 February 2010
Available online 5 March 2010

Keywords:

Mood
Emotion
Personality
Extraversion
BAS
RST

ABSTRACT

Positive mood induction has contrasting effects on performance which vary according to cognitive task. Less clear is the role of personality and its interactive effects with positive mood on cognition. In the study here, participants ($N = 86$) completed the EPQ-BV were then randomly assigned to positive (MI-P) or neutral (MI-N) mood induction, and completed three cognitive tasks: creativity, executive function and free recall. As predicted, greater increases in positive mood were found for high compared with low extraverts. In the creativity task, performance improved in the MI-P compared to MI-N condition for high extraverts but not low extraverts. Positive mood impaired free recall performance whilst no differences were found in executive function tasks. These findings are the first to show how stable personality characteristics interacting with positive mood induction contribute to enhance creativity.

© 2010 Elsevier Ltd. All rights reserved.

1. Introduction

An important benefit of positive mood is that it can enhance cognition, e.g. (Ashby, Isen, & Turken, 1999; Isen, Daubman, & Nowicki, 1987). However, recent research suggests that the ability of positive mood to improve performance may be task specific (Phillips, Bull, Adams, & Fraser, 2002). Here, we explore the divergent effect of positive mood on different cognitive tasks by proposing that personality plays a vital role. Specifically, we theorise that extraversion modulates the influence of positive mood on cognition. To date, there are two contrasting views regarding the extent to which positive mood can influence cognition. One theory predicts that positive emotion enhances tasks including creativity, memory and executive function (Ashby et al., 1999). The second view claims that positive mood produces selective enhancements (e.g. in creativity and verbal fluency) (Phillips et al., 2002) but impairs tasks which place greater demands on executive function (e.g. switching cognitive set) and working memory. One further possibility explored here is that extraversion may exert an additive effect on positive mood and thereby enhance/impair performance on a variety of tasks.

Previous explanations have suggested that positive mood acts to increase dopaminergic activity in a number of key areas involved in cognition and emotion, including the amygdala, the hippocampus, the prefrontal cortex and the anterior cingulate. It is

proposed that an emotion related dopaminergic increase, brought about by positive mood induction, facilitates improved cognitive performance (Ashby et al., 1999; Mitchell & Phillips, 2007). Allied to this, it has also been suggested that an optimal balance of dopaminergic activity is required to achieve benefits in cognition and that this balance possibly follows an inverted-U shape (Ashby et al., 1999). Research also suggests that dopaminergic activity in certain subcortical structures influences manifest extraversion levels (Depue & Collins, 1999). The subcortical regions to which this refers, overlap with those in which positive mood is thought to increase dopaminergic levels. Since extraversion level and positive mood depend on and influence subcortical dopaminergic activity respectively, we theorise they may interact to effect cognition in a task dependant manner. For instance in tasks of creativity, where positive mood acts to increase cognitive flexibility (Isen et al., 1987), it could be the case that the effects of increased positive mood are superimposed onto existing extraversion levels to raise dopaminergic activity resulting in improved cognitive processing relating to these types of task. In contrast, in executive and working memory tasks, where positive mood can possibly disrupt task switching (Phillips et al., 2002), it could be the case that these same increases in dopamine activity act to push highly extraverted individuals beyond optimal dopaminergic levels and thereby impair performance.

The present study is the first to examine this specific question, though earlier work has demonstrated using affectively laden cognitive tasks that the combination of mood and personality can influence cognitive performance (Rusting, 1999). This effect was explained with reference to Gray's (1987) behavioural inhibition system (BIS)/behavioural activation system (BAS) personality

^{*} Corresponding author. Address: Department of Psychology, University of Portsmouth, King Henry Building, King Henry I Street, Portsmouth PO1 2DY, United Kingdom. Tel.: +44 2392 846322; fax: +44 2392 846300.

E-mail address: Lorenzo.Stafford@port.ac.uk (L.D. Stafford).

theory. Gray proposed that the motivational systems (BIS and BAS) control sensitivity to punishment and reward, respectively. Of specific interest, Gray's theory predicts that individuals who demonstrate strong BAS response will also demonstrate heightened sensitivity to signals of reward. Parallels are often drawn between Gray's notion of BAS and extraversion. Matthews and Gilliland (1999) reported that the BAS feature of Gray's BIS/BAS framework occupies a position in three dimensional, 30°-rotated, factor space with respect to Eysenck's conception of extraversion. This indicates substantial overlap between the two proposed bases of personality. Additionally, in his discussion of the relationship between the RST dimension BAS and Eysenck's extraversion, Corr (2008) makes a strong case that most elements of BAS functioning (with the exception of impulsivity) are closely linked to extraversion.

The assumption that reward sensitivity is higher in strongly extraverted individuals and that positive mood induction constitutes a reward signal, helps to explain previous work where extraverts compared to introverts reacted more strongly to a positive mood induction (Larsen & Ketelaar, 1991). Moreover, it raises the question that individuals who are classified as highly extraverted may be most responsive to the cognition enhancing qualities afforded by positive mood induction.

In the current study, we aim to explore the divergent effect of positive mood on cognitive tasks and, additionally, to investigate the role played by extraversion. Initially, extraversion levels will be assessed in each participant and then they will be exposed to either a positive or neutral mood induction. This will be followed by completion of a range of cognitive tasks. We predict that high compared to low extraverts will yield higher positive mood scores following a positive mood induction and that positive mood induction will enhance creativity but impair free recall and executive function performance.

2. Method

2.1. Participants

Eighty-six (17 male, 69 female) undergraduates from the University of Portsmouth participated for course credit. Age ranged from 18 to 53 years ($M = 20.74$ years, $SD = 6.76$). There were 43 participants in each mood condition (participant characteristics Table 1), who all spoke English as their first language. The study was described as investigating the relationship between individual differences and cognitive performance and was approved by the University's Ethics Committee.

2.2. Design

Participants were randomly assigned to either a positive mood (MI-P) or neutral mood (MI-N) condition. They also completed the Eysenck Personality Questionnaire Brief Version (EPQ-BV; (Sato, 2005) and, based on their scores were categorized into either a 'low' or 'high' extraversion group. All participants then completed (in counterbalanced order) the executive function task, free recall task and creativity task. The study, therefore, had a mixed design where mood condition and personality comprised the between-subjects factors and type of task was the within-subjects factor.

Table 1
Participant characteristics (Mean and standard deviations).

Mood induction	Age	Gender male/female	Extraversion EPQ-BV
MI-P ($n = 43$)	20.5 (7.45)	8/35	42.09 (5.9)
MI-N ($n = 43$)	20.9 (6.14)	9/34	41.09 (6.2)

3. Materials

3.1. Mood induction

Mood was manipulated using a musical mood induction (MI) procedure. The positive piece of music was Delibes' *Coppelia* and the neutral piece of music was Holst's *Neptune – the Mystic*. These pieces have been validated in several previous mood induction studies (for a review, see (Gerrardshesse, Spies, & Hesse, 1994). Participants listened to the music through headphones and were left undisturbed for its duration (approx 6 min).

3.2. Personality measures

The EPQ-BV from Sato (2005) was used as the main personality measure. The EPQ-BV consisted of two measures, one for extraversion and one for neuroticism. This 24-item (12 extraversion and 12 neuroticism) questionnaire consisted of five point Likert scale with response ranging from not at all (1), slightly (2), moderately (3), very much (4), to extremely (5).

3.3. Executive function tasks

Executive function was tested using four Stroop tasks which were the same as those from the earlier study (Phillips et al., 2002) (1) colour x naming (xxxx), (2) reading colour words (colwd), (3) naming display colour (Stroop) and (4) alternating between naming display colour and reading colour word (alt). Each trial began with a centrally presented fixation symbol '+' remaining on screen for 1000 msec. This was then replaced by the relevant stimulus (word or xxxx) displayed until a response was detected. Participants had to select the colour of the stimuli for each trial using one of four labelled keys (blue, black, red, or green), which retained the same mapping throughout the Stroop tasks. There were 24 trials for each task, preceded by eight practice trials. Analyses were conducted only on the 24 main trials for each Stroop task. As in the earlier study (Phillips et al., 2002), Stroop 'cost' was calculated by subtracting correct reaction times on the xxxx task from those in the Stroop task. Alternation 'cost' was calculated by subtracting the mean of the two constituent tasks (colwd task and Stroop task) from the alternating task reaction time. The same method was used to examine the number of errors.

3.4. Free recall task

In this task 15 words were individually presented on the computer screen for 1000 msec with a further 1000 msec inter-trial interval. The words were presented in a random order. The 15 words covered a range of word lengths (5–11 letters) and syllables (2–4) and hence placed a high demand on memory. Additionally, there was no obvious connection between each word thus reducing categorical priming effects. The words were: ginger, eyelash, religion, marble, shoelace, bereavement, mosquito, whistle, appreciate, paper, cocaine, apology, portrayal, bracelet, capacity. After a 1 min delay, participants were asked to recall all of the words in any order.

3.5. Creativity task

Creative problem solving performance was assessed using the Remote Associates Test (RAT) (Mednick, Mednick, & Mednick, 1964). Following (Isen et al., 1987), 21 RAT items of varying difficulty levels were prepared on a sheet of paper (7 easy, 7 moderately difficult, and 7 very difficult items). Each item consisted of three words followed by a blank space. Participants were in-

Download English Version:

<https://daneshyari.com/en/article/892243>

Download Persian Version:

<https://daneshyari.com/article/892243>

[Daneshyari.com](https://daneshyari.com)