Food Quality and Preference 39 (2015) 56–61

Contents lists available at ScienceDirect

Food Quality and Preference

journal homepage: www.elsevier.com/locate/foodqual

Short Communication

Investigating the effects of tea, water and a positive affect induction on mood and creativity

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ARTICLE INFO

Article history:
Received 4 July 2013
Received in revised form 18 June 2014
Accepted 29 June 2014
Available online 5 July 2014

Keywords:
Tea
Creativity
Insight
Mood
Positive affect

ABSTRACT

Positive affect has been shown to be predictive of improved creativity. This study investigated the immediate effect of the tea experience on positive affect and creativity, compared to both a neutral and positive control condition. Regular tea drinkers ($N = 150$) were allocated to three conditions: (1) tea preparation and consumption, (2) water consumption, or (3) a positive affect induction. Participants completed the Affect Grid pre and post intervention, and measures of creativity and motivation post intervention. Tea consumption increased the valence dimension of mood, similar to the positive affect induction. Although it was expected that positive affect induction and tea consumption would improve creativity, we observed a trend in that direction on one measure of creativity (showing faster insights for difficult problems), but the effect did not reach statistical significance. Our study shows that a simple everyday activity such as tea consumption can effectively boost mood immediately after consumption.

Introduction

Tea consumption is commonly associated with feelings of satisfaction (Desmet & Schifferstein, 2008). Moreover, there are indications that tea consumption affects mood. According to the frequently used framework by Russell and colleagues (Russell & Carroll, 1999; Russell, Weiss, & Mendelsohn, 1989), mood states can be reduced to the dimensions of valence and arousal. While valence refers to the degree to which an affective state is pleasurable (i.e., negative vs. positive), arousal denotes the degree of activation or energy (i.e., low vs. high). Generally, research has focused on tea's arousing effects, due to the stimulant caffeine (Ruxton, 2008). Findings suggest effects can be separated into three phases (Aspen & Quinlan, 1998; Quinlan, Lane, & Aspinall, 1997; Quinlan et al., 2000). The first phase, immediately after consumption, involves small and transient increases in heart rate and blood pressure, resulting in feelings of arousal, as well as more pronounced increases in skin conductance mainly due to sensory effects. The second phase, 10–20 min post-consumption, involves peak responses in skin temperature and skin conductance, likely due to temperature. In the last phase, 30–60 min post-consumption, tea ingredients caffeine and theanine have reached relevant plasma and brain concentrations (Magkos & Kavouras, 2005; Van der Pijl, Chen, & Mulder, 2010), again resulting in increased arousal (Hindmarch, Quinlan, Moore, & Parkin, 1998) and improved attention and alertness (De Bruin, Rowson, Van Buren, Rycroft, & Owen, 2011).

Regarding valence or pleasure, findings are limited. Two studies found improved hedonic tone 30–60 min after drinking a hot (caffeinated) beverage (Quinlan et al., 1997, 2000). Notably, theanine seems to improve relaxation and stress relief (Kimura, Ozeki, Juneja, & Ohira, 2007; Yoto, Motoki, Murao, & Yokogoshi, 2012). Studies to date however largely neglected another interesting possibility: that positive affect may increase during and/or immediately after consumption, due to the consumption experience itself. This tea consumption experience includes the combination of the preparation, sensory properties (i.e. smell, taste, mouth feel, appearance) before, during and after consumption, and potentially even by simply providing a break from other activities. Thus, the primary aim of this study was to assess the immediate mood benefits of tea consumption.

Positive affective states have been shown to promote positive, favorable characteristics and build enduring personal and cognitive resources (i.e. Fredrickson, 2001; Lyubomirsky, King, & Diener, 2005). Hence, it is of interest whether simple everyday activities, such as tea consumption, can generate small improvements in mood, as these may accumulate to greater benefits over time. Moreover, positive affect also has immediate beneficial

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http://dx.doi.org/10.1016/j.foodqual.2014.06.016
0950-3293/

effects on a range of motivational and cognitive processes (i.e. Fredrickson, 2001). Isen, Labroo, and Durlach (2004) investigated the relationship between iced tea consumption, positive affect, and creativity. Albeit with a limited sample ($n = 62$; $n = 52$), two experiments showed that tasting a familiar, branded iced tea (or receiving a bag of candies, a validated positive control) led to more creativity and greater positive affect than tasting an unfamiliar, unbranded iced tea and a control group that received nothing or water. Specifically, after consuming the iced tea (or receiving the candies), participants performed better on a creative problem solving task (adapted Remote Associate Test; RAT; Mednick, 1962) and generated more unusual and pleasant first associates to a randomly selected letter of the alphabet. It should be noted that these studies are somewhat restricted because of limited number of trials (i.e. 7 items of moderate difficulty). However, it does seem that consumption of a pleasant drink can increase creative problem solving to a similar extent as a well-known positive affect induction. Moreover, the study also showed the importance of the product being familiar and branded. The authors proposed that the mechanism by which iced tea consumption improved creativity, was through improved positive affect. Hence the secondary aim of this study was to assess the effect of tea consumption on creativity.

Meta-analyses of mood–creativity research revealed that positive mood states lead to more creativity than neutral states (Baas, De Dreu, & Nijstad, 2008; Davis, 2009). Specifically, induction of positive mood, for example by a small gift, a short comedy film, or recalling a past happy event, exerts significant positive effects on creative problem solving (e.g. Estrada, Young, & Isen, 1994; Isen, Daubman, & Nowicki, 1987). Additionally, participants higher in positive affect solved more insight problems (Estrada et al., 1994; Isen et al., 1987), i.e. problems for which the correct solution appears as a flash of insight, typically after non-conscious restructuring of the problem rather than deliberate and analytic processing (Sio & Ormerond, 2009).

De Dreu, Baas, and Nijstad (2008) proposed a dual pathway model for the relation between mood and creativity. Creativity can be a function of either cognitive flexibility (i.e. broad attention, accessing multiple cognitive categories), or cognitive perseverance (i.e. focused attention, persevering few cognitive categories), and these pathways are moderated by mood. Mood states high in valence and arousal (i.e., happy) are associated with more creativity than neutral states via increasing cognitive flexibility, while moods high in valence but low in arousal (i.e. relaxed) are not (Baas et al., 2008; De Dreu et al., 2008). Negative activating moods (i.e., anger, fear) decrease flexibility, but can increase creativity as compared to neutral ones through stimulating perseverance (Nijstad, De Dreu, Rietzschel, & Baas, 2010), while negative deactivating moods (e.g., sadness) do not. Moreover, recent studies attribute a perhaps even more important role to motivation, as activating mood states with a promotion focus (happiness) have been related to cognitive flexibility, while activating mood states with a prevention focus (fear) is related to persistence (Baas, De Dreu, & Nijstad, 2011). Further evidence for the benefits of positive mood states for creativity comes from a fMRI study. Participants experiencing more positive affect showed different patterns of preparatory brain activity preceding each solved insight problem (Subramaniam, Kounios, Parrish, & Jung-Beeman, 2009). Particularly, positive affect altered activity in the Anterior Cingulate Cortex (ACC) during response preparation. This activity is thought to be involved in executive control and is hypothesized to facilitate problem processing, i.e., fast and relatively automatic rather than a slow analytical process. Indeed, positive affect has been shown to lead to faster insights than negative affect (De Dreu et al., 2008).

The present study investigated the immediate effect of the tea experience on positive affect and creativity, compared to both a neutral and positive control. We hypothesized that tea consumption will increase positive affect, which in turn improves creative problem solving, as compared to a neutral control and to a similar extent as a positive control. Tea was provided branded, following Isen et al. (2004), and involved preparation, while largely excluding the effects of ingredients (i.e. caffeine and theanine). The study used measures of affect, and divergent and convergent creativity. Divergent tasks are open-ended, designed to assess one's ability to generate original ideas or solutions. Convergent tasks are problem solving tasks, with a single correct answer that can be solved through methodical, analytic processing, or through sudden insight (Sio & Ormerond, 2009). Finally, as positive mood can affect motivation, two measures of motivation were included.

Materials and methods

Participants

One-hundred-fifty Dutch regular tea drinkers (>5 cups per week) were recruited. Participants were predominantly female (77%), with an average age of 34.48 years (±SD 7.72) who drank black tea at least 5–6 times per week (69% drank tea on a daily basis).

Design

Participants were assigned at random to three parallel conditions: (1) preparation and consumption of a cup of branded black tea (Lipton Yellow Label), (2) consumption of a glass of cold water (neutral control), (3) positive affect induction (positive control).

Procedure

Participants were tested individually in a lab setting. They were instructed how to use the mood test (i.e. Affect Grid), followed by short neutral film clip (3′26″) to ensure a similar neutral affective state. In this clip, originally a screen saver, sticks of different colors fall on top of each other. Next, the first Affect Grid was administered and participants were assigned to one of three conditions. In the tea condition, participants were provided with a cup of hot water, a branded tea bag, sugar, milk, and a teaspoon, and were instructed to prepare and drink the tea as preferred (e.g. strength, with or without milk and/or sugar). This ensured that although experienced in a lab context, tea consumption resembled closely how participants would generally prepare and drink their tea. This meant that participants were allowed to consumer their tea exactly as they liked it. We assumed that this would allow us to achieve the maximal effect of tea on mood state. We did not expect glucose to affect outcomes, given that performance facilitation by glucose pertains to verbal memory (e.g., De Bruin & Gilsenan, 2009), and mood effects have not been found at relevant doses (Sünram-Lea, Owen, Finnegan, & Hu, 2011). In the positive affect condition, participants were asked to describe a recent event that made them feel very happy and cheerful. This allowed comparing effect size for tea consumption to a well-known and effective induction (Baas et al., 2008). In the water condition participants consumed a glass of cold water. Water has been previously used as a neutral control (Isen et al., 2004) and is a realistic everyday alternative to tea. After consumption or the affect induction, the second grid was administered, followed by the creativity tasks, a motivation task and scales. The duration of the three conditions was kept constant at 10 min between the two grid administrations.