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The sweet life: The effect of mindful chocolate consumption on mood

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ABSTRACT

Chocolate consumption is anecdotally associated with an increase in happiness, but little experimental work has examined this effect. We combined a food type manipulation (chocolate vs. crackers) with a mindfulness manipulation (mindful consumption vs. non-mindful consumption) and examined the impact on positive mood. Participants ($N = 258$) were randomly assigned to eat a small portion (75 calories) of chocolate or a control food (crackers) in a mindful or non-mindful way. Participants who were instructed to mindfully eat chocolate had a greater increase in positive mood compared to participants who were instructed to eat chocolate non-mindfully or crackers either mindfully or non-mindfully. Additional analyses revealed that self-reported liking of the food partially mediated this effect. Chocolate appears to increase positive mood, but particularly when it is eaten mindfully.

People in the U.S. are estimated to consume candy once every 2–3 days on average (Hornick, Duyff, Murphy, & Shumow, 2014). Consumption is higher in other areas of the world (Forbes, 2015). Chocolate and other candies are treats and indulgent foods that typically have added sugars, which people are told to avoid in large quantities (O'Neil, Fulgoni, & Kicklas, 2011). Yet, candy consumption in moderation does not appear to be related to adverse physical health issues (Duyff et al., 2010; O'Neil et al., 2011).

People's consumption of candy like chocolate is likely due to many reasons. Chocolate is reported to be one of the most craved foods (Pelchat, 1997; Weingarten & Elston, 1991) likely because of its good taste, the pleasant physiological effects of the ingredients, the association with childhood experiences, and its consumption in pleasurable situations (Molinari & Callus, 2012; Parker, Parker, & Brotchie, 2006). An interesting related reason may be because of its effect on mood. Although there seems to be an anecdotal belief that chocolate or candy consumption increases happiness, only a small amount of experimental research appears to exist. We do note that there is work on mood and the consumption of the individual ingredients in chocolate (Scholey & Owen, 2013), but little work has examined chocolate consumption and mood using chocolate in a form that people consume as a treat (e.g., a candy bar). One of the earliest studies was conducted by Weisenberg, Gerby, and Mikulincer (1993) who found that, compared to participants in a control condition who did not eat anything, participants who ate chocolate after working on an unsolvable task reported less anxiety on a one-item measure that used a visual analog response (0–100). Macht and Dettmer (2006) conducted a more direct study. These researchers found that participants reported a more positive mood using a one-item bi-polar scale (0 = extremely bad mood to 10 = extremely good mood) 5, 30, 60, and 90 min after eating a chocolate bar (50 grams) versus an apple or nothing. To our knowledge, the study by Macht and Dettmer (2006) is the only experimental study that has examined chocolate and positive mood. Other work has shown that eating chocolate seems to reduce a negative mood after it is induced via a manipulation. For example, eating chocolate versus drinking water decreased participants' self-reported negative mood assessed using a one-item 25-point scale (1 = very bad mood to 25 = very good mood) after it was induced via a sad movie (Macht & Mueller, 2007; see Scholey & Owen, 2013, for a review of related work).

Eating in general is associated with emotions and moods. For example, people in a more positive mood tend to choose more nutritious foods while people in a more negative mood tend to choose more indulgent or less healthy foods (Canetti, Bachar, & Berry, 2002; Gardner, Wansink, Kim, & Park, 2014; Macht, 2008). Eating can be used to regulate or reduce negative emotions like anxiety and may partially explain some instances of disordered eating (Canetti et al., 2002; Christensen, 1993).

The limited literature discussed above suggests that moderate candy consumption might be beneficial for short-term mood states

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and therefore the exploration of ways to enhance its impact is useful. Yet, experimental research on candy consumption and mood is scarce. One potential reason for this lack of published research could be because some studies have not found significant effects and therefore have not been published (e.g., a file drawer problem). Candy may have an effect on mood, but only in certain situations that have not yet been identified. We believe there could be unidentified moderators or variables that make candy consumption more versus less likely to affect mood. Mindfulness might be one variable that could moderate the connection between candy consumption and positive mood. Mindfulness is characterized by a receptive and non-evaluative awareness of present experiences (Brown & Ryan, 2003; Brown, Ryan, & Creswell, 2007; Goodman, Quaglia, & Brown, 2015). Mindfulness is rooted in Buddhist philosophy and it has become a widely examined topic in multiple disciplines (Brown et al., 2007; Hölzel et al., 2011). People high in mindfulness tend to focus more on the present environment and they experience situations less defensively and allow positive and negative thoughts and feelings to occur with less judgement.

Mindfulness is apparent at state and trait levels (Brown & Ryan, 2003; Brown et al., 2007). In state terms, people can be encouraged to be more or less mindful in the moment. That is, in momentary terms, people can be more or less likely to be receptive and non-evaluative of their present experiences. Several studies reveal that state mindfulness can be briefly manipulated in a laboratory setting in a variety of ways (e.g., Heppner et al., 2008; Hopthrow, Hooper, Mahmood, Meier, & Weger, in press; Jordan, Wang, Donatoni, & Meier, 2014; Ostafin & Kassman, 2012; Weger, Hooper, Meier, & Hopthrow, 2012). A common technique, which influenced the current study, involves the mindful consumption of raisins (Heppner et al., 2008; Kabat-Zinn, 1990). This manipulation encourages people to eat a raisin either mindfully or normally. In the mindful condition, participants are asked to slow down and pay attention to the color, texture, and smell of a raisin. When eating it, they are asked to chew slowly and notice the sensations produced by the raisin and so on. State mindfulness scales (e.g., "I was curious about each of the thoughts and feelings I was having") can be used to assess the effect of manipulations like this one (Lau et al., 2006). Recent work has even shown that state mindfulness can be induced over the internet using computer-mediated manipulations (Mahmood, Hopthrow, & Randsley de Moura, 2016).

Trait mindfulness is a personality variable and it generally refers to the tendency to have more versus less experiences of state mindfulness. People high versus low in trait mindfulness tend to engage in more mindful thought, attention, and behavior on a daily basis (Goodman et al., 2015). Trait mindfulness has been measured with a variety of personality scales that tap different aspects of attention, thought, and behavior (e.g., "I find myself listening to someone with one ear, doing something else at the same time"; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Brown & Ryan, 2003).

Mindfulness has been specifically examined in relation to food consumption in multiple ways. Research indicates that mindfulness as a state or trait is related to healthier food choices (Jordan et al., 2014), reduced caloric intake (Beshara, Hutchinson, & Wilson, 2013; Timmerman & Brown, 2012), and a reduced susceptibility to hunger cues. For example, Marchiori and Papies (2014) found that a mindfulness manipulation did not reduce the portion size effect (i.e., consuming more calories when given a larger versus smaller portion of food), but self-reported hunger was not related to calories consumed in a mindfulness condition but it was in a non-mindfulness condition (hungry people consumed more calories; also see Papies, Pronk, Keesman, & Barsalou, 2015). When applied to eating behavior, mindfulness practices are centered on focusing attention to the present eating situation and enhancing the sensations experienced by eating. Participants are encouraged to attend to different aspects of food such as its color, texture, smell, etc. Such experiences are meant to enhance the pleasure of eating as well as to decrease hunger sensations even when people consume small portions (Kristeller, 2015; Kristeller & Wolever, 2010; Timmerman & Brown, 2012). Mindful eating strategies also focus on food choices, but the goal is not to eliminate less healthy foods from one's diet, but to encourage moderate consumption. Such techniques may enhance the positive mood people receive from eating candy like chocolate and we therefore examined this idea in the current study.

1. The current study

The study by Macht and Dettmer (2006) appears to be the only published study that experimentally examined chocolate consumption and positive mood. In the current study, the effect of mindful chocolate consumption on mood was examined. Participants were randomly assigned to eat a small portion of chocolate or a control food (crackers) in a mindful or non-mindful way. Positive and negative mood were measured before and after consumption and a measure of food liking was also collected. It was hypothesized that participants assigned to a mindful chocolate consumption condition versus a non-mindful chocolate consumption or mindful and non-mindful cracker consumption conditions would experience enhanced positive mood. We believed one potential reason or mediator could be related to the liking of the chocolate. Negative mood or negative affect is typically at the lower end of a given measurement scale (e.g., 1.50 on a 5-point scale) unless it is induced via a manipulation. We therefore did not expect the manipulation to affect it given its low resting value (Watson, Clark, & Tellegen, 1988).

2. Method

2.1. Participants

Data was collected from 273 Gettysburg College participants, but analyses were performed on 258 participants (167 females; 90 males; 1 reported neither male nor female) with a mean age of 19.12 ($SD = 2.31$) years. The majority of the sample was Caucasian (212 or 82%). Fifteen participants were removed from the sample for various reasons. Five participants had suspicions about the true purpose of the study in that they mentioned the study was about attention to eating and mood. Many participants thought the study was assessing an aspect of mood, which is reasonable considering the numerous mood items, but these five participants specifically mentioned a mindful-like component. Four participants were removed because they did not spend any time eating their food after the audio instructions were finished. Data from three participants were lost due to a computer crashing and the remaining three participants were removed because they did not eat all of their food or they ate prior to the study within the two-hour timeframe. The number of participants in each condition was as follows: Mindful/Chocolate $N = 59$, Mindful/Cracker $N = 64$, Non-Mindful/Chocolate $N = 68$, and Non-Mindful/Cracker $N = 67$.

2.2. Procedure and materials

The study was approved by the Gettysburg College IRB. Participants were randomly assigned to one of four conditions in a 2 (Mindfulness condition: Mindful vs. Non-mindful) by 2 (Food condition: Chocolate vs. Crackers) design. Participants ate either 5 pieces of Blommers Appalachian Gold Milk Chocolate Discs (approximately 14 grams) or 5 Carr's Plain Table Water crackers