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Acceptance- and imagery-based strategies can reduce chocolate cravings: A test of the elaborated-intrusion theory of desire

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ABSTRACT

The elaborated-intrusion theory of desire proposes that craving is a two-stage process whereby initial intrusions about a desired target are subsequently elaborated with mental imagery. The present study tested whether the craving reduction strategies of cognitive defusion and guided imagery could differentially target the intrusion and elaboration stages, respectively, and thus differentially impact the craving process. Participants were randomly assigned to a cognitive defusion, a guided imagery or a mind-wandering control condition. Pre- and post-intervention chocolate-related thoughts, intrusiveness of thoughts, vividness of imagery, craving intensity, and chocolate consumption were compared. Experiment 1 recruited a general sample of young women ($n = 94$), whereas Experiment 2 recruited a sample of chocolate cravers who wanted to reduce their chocolate consumption ($n = 97$). Across both experiments, cognitive defusion lowered intrusiveness of thoughts, vividness of imagery and craving intensity. Guided imagery reduced chocolate-related thoughts, intrusiveness, vividness and craving intensity for chocolate cravers (Experiment 2), but not for the general sample (Experiment 1). There were no group differences in chocolate consumption in either experiment. Results add to existing evidence supporting the elaborated-intrusion theory of desire in the food domain, and suggest that acceptance- and imagery-based techniques have potential for use in combatting problematic cravings.

1. Introduction

Food cravings are thought to play a key role in the overconsumption of high caloric foods (May, Andrade, Kavanagh, & Hetherington, 2012). Cravings refer to an intense urge to ingest a particular food and are difficult to resist (Weingarten & Elston, 1990). Cravings are distinct from hunger, in that hunger can be satisfied by ingesting food in general, whereas craving is usually only satisfied by ingesting the specific craved food (Pelchat, 2002). The most commonly craved foods are those high in fat, salt and sugar, with chocolate being the most highly craved food in Western society (Hill & Heaton-Brown, 1994; Weingarten & Elston, 1990, 1991). Cravings are thought to be cognitive in nature, and have been described as a subjective motivational state (Shiffman, 2000; White, Whisenhunt, Williamson, Greenway, & Netemeyer, 2002). Although food cravings are not necessarily pathological, they can be maladaptive for some people. In particular, food cravings have been linked to negative mood and depression (Davis et al., 2011), disordered eating, especially binge eating episodes (Gendall, Joyce, Sullivan, & Bulik, 1998; Mitchell, Hatsukami, Eckert, & Pyle, 1985; Waters, Hill, & Waller, 2001), as well as health problems associated with weight gain and obesity (von Deneen & Liu, 2011; Wurtman & Wurtman, 1986). In light of these negative consequences, there is a clear need to develop interventions to combat food cravings.

A number of theories have been proposed to explain the inception and maintenance of cravings. The elaborated-intrusion theory of desire proposes that a craving is a cognitive motivational process that consists of two distinct stages (May et al., 2012; Kavanagh, Andrade, & May, 2005). First, thoughts or intrusions are generated in response to craving-related cues (e.g., pictures of food) in the environment. These cues can be cognitive, emotional or physiological in nature, and can be tied to positive memories and associations, which contribute to an initially pleasant experience. Second, craving-related thoughts subsequently motivate the individual to mentally elaborate the intrusion with vivid imagery using several senses, which creates a realistic representation of the craved target. Of the five sensory modalities, visual, olfactory and

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gustatory components feature prominently in food craving-related imagery elaboration (May, Andrade, Pannabokke, & Kavanagh, 2004; Tiggemann & Kemps, 2005). Mental elaboration, while initially pleasurable, can grow to become unpleasant if the desire cannot be satisfied. Desire thinking theory (Caselli & Spada, 2010; 2015) likewise emphasises multi-sensory imaginal elaboration of a desired target. Desire thinking theory also adds another process, verbal perseveration, which involves continual self-talk about reasons for engaging with the desired target (Caselli, Soliani, & Spada, 2013). Accordingly, Caselli and Spada (2010) suggest that metacognitions play a role in desire thinking and contribute to the cyclic continuation of desire thoughts and stronger cravings (Spada, Caselli, Nikčević, & Wells, 2015). Normally cravings can be alleviated by either ingesting the target, or through diversion with an alternative task. However, as food and craving cues in the environment are abundant, the process may be triggered repeatedly, and consumption of the target may still occur after a delay.

As the elaborated-intrusion theory suggests that cravings can be reduced through a reduction of intrusions and elaboration, techniques could logically target either of these mechanisms. To date, food craving research has primarily focused on targeting the later elaboration stage, rather than the initial intrusions. Most strategies have used alternative imagery to replace craving-related imagery in limited capacity visuospatial working memory. Laboratory studies have demonstrated that forming alternative images of objects (e.g., imagining the appearance of a rainbow), smells (e.g., imagining the smell of freshly mown grass; Hamilton, Fawson, May, Andrade, & Kavanagh, 2013; Harvey, Kemps, & Tiggemann, 2005; Kemps & Tiggemann, 2007) or enjoyed activities (e.g., walking on the beach; Knäuper, Pillay, Lacaille, McCollam, & Kelso, 2011) can interrupt craving-related imagery in the laboratory. Other techniques include forming mental representations of shapes while modelling clay into pyramid and cube shapes with hands hidden from direct view (Andrade, Pears, May, & Kavanagh, 2012), watching dynamic visual noise (a flickering, random pattern of black and white dots; Kemps, Tiggemann, & Hart, 2005; Kemps, Tiggemann, & Christianson, 2008; Kemps, Tiggemann, Woods, & Soekov, 2004; McClelland, Kemps, & Tiggemann, 2006), and even playing the computer game 'Tetris' (Skorka-Brown, Andrade, & May 2014). Kemps and Tiggemann (2013) and Hsu et al. (2014) further showed that imagery-based techniques can reduce craving-related consumption in the field.

More recently, May et al. (2012) have suggested that acceptance-based interventions may be beneficial for targeting the initial intrusion stage, a suggestion consistent with targeting metacognitions in desire thinking (Spada et al., 2015). Specifically, changing individuals' reactions to their intrusions before elaboration can take place may be an effective way to halt the craving process in this early stage. More generally, acceptance-based interventions have been applied to the eating domain (Alberts, Mulkens, Smeets, & Thewissen, 2010; Alberts, Thewissen, & Raes, 2012; Baer, Fischer, & Huss, 2005; Kristeller & Hallett, 1999; Papies, Barsalou, & Custers, 2012) and one particular skill, cognitive defusion, has shown promise for use with chocolate cravings (Forman et al., 2007; Jenkins & Tapper, 2014; Hooper, Sandoz, Ashton, Clarke, & McHugh, 2012; Lacaille et al., 2014; Moffitt, Brinkworth, Noakes, & Mohr, 2012). A number of studies have compared cognitive defusion to other mindfulness techniques (e.g., acceptance, awareness), alternative cognitive techniques (e.g., cognitive restructuring) or control (e.g., distraction or no instructions) and found that cognitive defusion increased the likelihood of abstaining from chocolate (Forman et al., 2007; Jenkins & Tapper, 2014; Hooper et al., 2012; Moffitt et al., 2012). However, there has been mixed evidence as to whether cognitive defusion can reduce cravings (Forman et al., 2007; Lacaille et al., 2014; Moffitt et al., 2012). In addition, previous studies did not examine the mechanisms postulated by the elaborated-intrusion theory.

To date, only a handful of studies have compared acceptance-based and imagery-based craving reduction techniques within the context of the elaborated-intrusion theory. The first study by May, Andrade, Batey, Berry, and Kavanagh (2010) compared acceptance-based strategies (i.e., breath focus and body scan, techniques promoting acceptance of physiological sensations in the body) with imagery-based strategies (i.e., guided imagery). They found that body scan reduced thoughts but not craving intensity; breath focus and guided imagery had no effect on either. In the second study, Hamilton et al. (2013) found that body scan and guided imagery reduced craving intensity relative to a mind wandering control; however, there was no effect of either technique on intrusiveness of thoughts and vividness of imagery.

In the present study, we were particularly interested in targeting the individual components of craving, namely, intrusions (targeted by a cognitive defusion technique) and elaboration (targeted by a guided imagery technique), to determine effects on craving intensity and consumption. Cognitive defusion was chosen to target the initial intrusion process instead of body scan (as used by May et al., 2010; Hamilton et al., 2013) because it is less likely to draw attention to physiological cues linked with hunger. Cognitive defusion focuses specifically on acceptance of thoughts rather than physical states. We used chocolate as the desired target because it is the most commonly craved food in Western environments (Hill & Heaton-Brown, 1994; Weingarten & Elston, 1990, 1991) and is more likely to induce cravings than breakfast food items (as used by Hamilton et al., 2013). Experiment 1 examined the impact of cognitive defusion and guided imagery in a general sample of young undergraduate women. Experiment 2 replicated and extended this investigation to a sample of self-identified chocolate cravers.

Based on the elaborated-intrusion theory framework, and consistent with the predictions of desire thinking theory, we expected that craving intensity and consumption would be reduced through a decrease in the individual craving mechanisms of intrusiveness of thoughts and vividness of imagery. We predicted that cognitive defusion would halt the craving process by reducing the intrusiveness of thoughts, and subsequently the vividness of imagery, craving intensity and consumption. We further predicted that guided imagery would reduce the vividness of imagery, and subsequently reduce craving intensity and consumption.

2. Experiment 1

2.1. Method

2.1.1. Participants

Participants were 94 women aged 17–26 years ($M = 20.68$, $SD = 2.45$), who were recruited from the Flinders University student population, and from the wider Adelaide community. Young women were specifically recruited because cravings are more common in women than in men (Weingarten & Elston, 1991), and cravings are reported less often as people age (Pelchat, 2002). A further inclusion criterion was that participants should like chocolate. This criterion was confirmed at testing where all participants responded affirmatively to the question 'Do you like chocolate?'. Participants were asked to refrain from eating or drinking for 2 h prior to attending the session, to ensure they were equated on hunger and satiety. Participants were also asked to abstain from eating chocolate for 24 h prior to attending the testing session.

2.1.2. Design

The study used a mixed 3 (condition: cognitive defusion, guided