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“The thought is gonna come and the thought is gonna go”: A qualitative study on how non-meditators learn and apply brief mindfulness-based instructions for food cravings

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Declarations of interest: None
Abstract

While brief mindfulness-based interventions have emerged as tools to modulate automatic responding in various domains of health and wellbeing, findings are primarily based on quantitative experimental research. However, these group-level findings do not capture the rich subjective experiences of individuals learning mindfulness. In the following qualitative study, we explored how non-meditators learn and apply brief mindfulness instructions in the domain of food cravings. Ten non-meditators listened to ‘normal viewing’ instructions, which asked them to view foods in the way that they normally would. They then viewed a video of attractive foods, and were interviewed about their experiences of learning and applying the instructions. Next, participants listened to a five-minute recording of mindfulness instructions, viewed another food video while applying the mindfulness instructions, and were interviewed again. The data were analysed using thematic analysis. When participants applied brief mindfulness, their relationship to the food stimuli changed such that they started perceiving their experiences as transient. Certain factors (e.g., use of visual metaphors) and processes (e.g., listening to the ‘normal viewing’ instructions first) facilitated this change. The ease of applying the instructions fluctuated with food preferences and perceived strength of cravings. Participants reported that they would apply the instructions in daily life if they felt a need for this, including in domains other than food. However, they anticipated challenges such as remembering and finding time to apply. Our findings highlight the specific aspects that influence how brief mindfulness instructions are learned and applied. These insights may change how brief mindfulness is studied empirically, and may inform the development of simple and empowering techniques that can promote wellbeing in daily life.

Keywords: mindfulness, decentering, food cravings, qualitative research, thematic analysis
1. Introduction

Mindfulness-based instructions have gained both scientific and popular interest in the last few years, including brief interventions and those in the domain of food cravings (Howarth et al., 2019; Van Dam et al., 2018). This interest may relate to a need for simple and effective techniques that improve health and wellbeing. Further, compared to longer term mindfulness-based interventions that entail an extended daily practice (e.g., the 8-week Mindfulness-Based Stress Reduction (MBSR) course; Kabat-Zinn, 1982), brief mindfulness may be more compatible with fast-paced daily lives, especially for non-meditators who are starting to practice mindfulness for the first time. Although ‘brief mindfulness’ does not have a standard definition in the literature, its brevity has been loosely conceptualised as “a duration of 30 minutes or less on any one occasion” (Howarth et al., 2019). Recent research suggests that even 3-12 minute decentering mindfulness instructions can positively affect cognition and behaviour in domains such as food cravings, cigarette smoking, stressful events, and emotional responding (e.g., Bowen & Marlatt, 2009; Erisman & Roemer, 2010; Keesman et al., 2017, 2019; Lebois et al., 2015). In a systematic review of brief mindfulness-based interventions, 93% of studies reported positive effects of these interventions on health-related outcomes such as stress, negative affect, emotion regulation and memory (Howarth et al., 2019). These outcomes were observed in a wide range of mindfulness-based techniques such as breathing exercises and acceptance practices, with instructions as short as five minutes.

However, so far, brief mindfulness has primarily been studied through quantitative experimental research (for an overview, see Howarth et al., 2019; Jiménez et al., 2020). Although these findings are highly informative and necessary, they lack rich accounts of how participants experience these techniques. As a result, it is not known whether mindfulness instructions are effective for every participant when a study demonstrates their group level
effectiveness. Equally, when the instructions are not effective at the group level, the underlying processes that take place at the individual level are unknown. Here, in a qualitative study, we explored how non-meditators learn and apply brief decentering mindfulness instructions in the domain of food cravings.

In the Western secular context, mindfulness has been defined as the awareness that develops from paying intentional and non-judgmental attention to experiences, moment-by-moment (Kabat-Zinn, 1994). Beyond this definition, however, mindfulness as a construct may carry different but related meanings within the modern literature, such as a dispositional quality (trait), a state of being, a practice, strategy, or intervention (Chiesa & Malinowski, 2011; Vago & Silbersweig, 2012). In the present study, we refer to mindfulness primarily as a strategy that can be used in the context of an intervention. Accumulating evidence demonstrates the effectiveness of mindfulness-based interventions across various domains of health and wellbeing such as reactivity to food cues, alcohol cravings, nicotine dependence, anxiety, and mood problems (e.g., Baquedano et al., 2017; Ostafin et al., 2012; for meta-analyses, see Goyal et al., 2014; Howarth et al., 2019).

Decentering is a component of mindfulness (also referred to as de-reification, mindful attention, cognitive defusion, and urge surfing; e.g., Bowen & Marlatt, 2009; Lutz et al., 2015; Papies et al., 2012). The term ‘decentering’ has been coined by Safran and Segal (1990). It refers to the metacognitive insight that one’s thoughts, feelings and experiences are transient mental events, rather than accurate reflections of an objective reality (Bishop et al., 2004). If one adopts a decentred perspective, one experiences thoughts and feelings as less subjectively real, and as mental events that come up and go away on their own. Critically, this decentred stance is not the same as dissociation. Whereas dissociation is an unconscious avoidance mechanism, decentering can be better described as a conscious coping strategy (Corrigan, 2002; Zerubavel & Messman-Moore, 2015), which involves deliberately accepting
thoughts and feelings for what they are – transient mental events – without elaborating or ruminating on them (Fresco et al., 2007; Williams, 2010). For example, when one imagines their favourite attractive, yet unhealthy food, one may have the thought: “I need to eat it right now”. Adopting a decentred perspective may transform one’s perception of this thought from an objective truth that needs to be acted upon into a transient mental event (i.e. “I am having the thought that I need to eat it right now, and this thought will pass”).

Many quantitative studies suggest that decentering may be effective in regulating problematic cognitive patterns and behaviours (for an overview, see Bernstein et al., 2015). For instance, in the context of negative affect, decentering has been shown to reduce symptoms of anxiety and depression (e.g., Fresco et al., 2007; Lau et al., 2006; Teasdale et al., 2002). In the context of the reward-related process of food cravings, decentering has been shown to reduce cravings, reactivity to food cues, preferences for unhealthy foods, and the actual consumption of attractive, high-calorie foods (e.g., Arch et al., 2016; Jenkins & Tapper, 2014; Lacaille et al., 2014; Papies et al., 2015). In five-minute audio recordings, for example, Lacaille et al. (2014) instructed participants to adopt a decentred or a control perspective toward their food-related thoughts. When participants were then given one minute to look at and interact with their preferred piece of chocolate, the decentering participants reported reduced cravings. Again with brief cognitive defusion instructions, Jenkins and Tapper (2014) demonstrated that chocolate consumption was reduced over a five-day period. Similarly, Papies et al. (2015) instructed non-meditators to adopt a decentred perspective toward attractive but unhealthy, and healthy food images. Compared to a control group, participants in the decentering condition showed lower preferences for unhealthy foods in both laboratory and cafeteria settings (Papies et al., 2015).

One possible mechanism is that decentering reduces reactivity to appetitive stimuli by targeting consumption and reward simulations that lead to desire (Keesman et al., 2017;
Papies et al., 2015). According to the Grounded Cognition Theory of Desire and Motivated Behaviour (Papies et al., 2020; Papies & Barsalou, 2015), appetitive stimuli trigger spontaneous, often non-conscious re-experiences of eating and enjoying foods. These re-experiences, or “consumption and reward simulations,” can be so compelling that they lead to the conscious experience of desire and cravings (Papies et al., 2020). Here, desire refers to an “affectively charged cognitive event” (Kavanagh et al., 2005) that is focused around a stimulus or experience associated with reward (Papies & Barsalou, 2015). In simpler terms, a desire is an urge or a wish to gain pleasure or relieve discomfort. Although desires do not always conflict with a person’s goals and values (Hofmann et al., 2012), in the context of the present work, we are particularly interested in desires that favour short-term hedonic goals over longer-term health and wellbeing goals. This is because some of these desires, such as those toward attractive yet unhealthy or unsustainable foods, may have negative health or environmental consequences (e.g., weight gain, climate change; Boswell & Kober, 2016; Bryant, 2019).

The Grounded Cognition approach that we have briefly described here is our main theoretical framework of interest, as it seems particularly useful for understanding how decentering can change individuals’ responses to appetitive stimuli. Within this framework, assuming that consumption and reward simulations lead to desire (Papies et al., 2020), decentering directly targets these simulations by helping participants to view them and their associated urges as mental events. As such, these experiences are viewed as transient, rather than an objective reality that requires obtaining and consuming the food. Indeed, Keesman et al. (2017) have shown that even when participants experience simulations, decentering instructions reduce subjective cravings, and physiological responses to food such as salivation. Studies in other domains of health and wellbeing also demonstrate that decentering decouples the relationship between motivation and behaviour (e.g., cigarette
smoking; Bowen & Marlatt, 2009). In other words, according to quantitative research findings, decentering can change the way in which one relates to one’s mental experiences.

However, from a deeper personal experience perspective, what happens during this decoupling process is unclear.

Further, quantitative studies of brief mindfulness-based instructions have limitations. Many of these limitations are common to mindfulness-based interventions more generally, such as the lack of a shared conceptual understanding and operational definition of mindfulness (Bergomi et al., 2013; Hanley et al., 2016), and the varying rigour of research designs (Goyal et al., 2014; Howarth et al., 2019; see also, Davidson & Kaszniak, 2015; Goldberg et al., 2017; Jiménez et al., 2020; Rosenkranz et al., 2019; Van Dam et al., 2018).

Most importantly for the present work, these studies are based on the underlying assumption that participants apply the specific instructions assessed in the study in the way that the researchers have intended them to. Although some studies call for participants to verbally summarise instructions before applying them (e.g., Lebois et al., 2015), this brief summary runs the risk of being a verbatim recall. This would not gauge the actual semantic or deeper, personal understanding of the instructions. Therefore, without asking participants for a detailed account of their understanding, it is unclear what exactly works in studies to cause the effects of brief mindfulness. While the active component could indeed be mindfulness, it could equally be something else. In the same vein, it is unclear what exactly does not work in studies that do not support the effectiveness of brief mindfulness. While the mindfulness strategy could indeed be ineffective, the results could equally be due to participants’ lack or incomplete understanding of the instructions.

Another major limitation of quantitative experiments on brief mindfulness is the control conditions used (Van Dam et al., 2018). If the control condition resembles the mindfulness condition too closely and participants perceive the control instructions as mindfulness,
demand effects may occur. This perceived or real resemblance of the control and mindfulness conditions may account for the lack of effectiveness suggested by these studies. Conversely, in studies that do show an effect of brief mindfulness, the control condition might not control for factors such as working memory load and relaxation effects. The control instructions may even contribute to the process that deems the mindfulness instructions effective. Therefore, it is important to get a sense of participant experiences and perceptions beyond what quantitative methodologies and measures can offer.

The qualitative studies conducted so far indeed highlight the importance of gaining a deeper understanding of mindfulness-based instructions based on personal experience (e.g., Howarth et al., 2016; Strauss et al., 2014). Previous qualitative research has been conducted mainly on manualised interventions. For instance, Strauss et al. (2014) interviewed participants who were experiencing major depression and receiving Person-Based Cognitive Therapy (PBCT). They identified themes such as participants’ altered relationship to their depressive symptoms after the intervention, characterised by an increased awareness of negative thoughts and rumination. Although rare, qualitative research has also examined brief mindfulness interventions. Howarth et al. (2016), for example, conducted interviews and focus groups with chronic illness patients who received brief body scan instructions. Patients reported positive effects such as relaxation. They also reported feeling positively about the contents of the instructions, but felt that the instructions were too short and rushed. These important perceptions and concerns would not be typically identified through quantitative research. Importantly, no previous research has studied brief decentering using qualitative methodologies.

The current study was designed to assess how non-meditators learn and apply brief decentering instructions in the domain of food cravings. To this end, we first instructed participants to view highly attractive food images in the way that they normally would, as a
control condition, and then again while applying brief mindfulness-based instructions. We conducted interviews after each viewing experience to explore how non-meditators learn and apply brief mindfulness. For this study, we adopted a critical realist epistemological stance. This perspective assumes that the world is “theory-laden” rather than “theory-determined” (Fletcher, 2017). In other words, knowledge may be gained through theories, one of which is the Grounded Cognition Theory of Desire and Motivated Behaviour (Papies et al., 2020). Critically, some of this knowledge is closer to reality than other knowledge.

2. Method

The reporting of this study was informed by the Consolidated Criteria for Reporting Qualitative Research (COREQ) 32-item checklist (Tong et al., 2007). The study was approved by the University of Glasgow Ethics Committee, and pre-registered on the Open Science Framework (OSF; https://osf.io/9cb28/). Also see the OSF for supplementary materials (https://osf.io/5yt2d/). Although the debate on the usefulness and appropriateness of pre-registration in qualitative research is new and ongoing (Haven & Van Grootel, 2019; Kern & Gleditsch, 2017; Pratt et al., 2019), we pre-registered this study to document our research process in a transparent way. We used Kern et al.’s (2017) pre-registration template and clearly indicated when we deviated from this (e.g., added sections).

2.1. Study Design

We used an exploratory case study design. First, each participant viewed foods while applying the ‘normal viewing’ control instructions. These instructions asked them to view the foods as they normally would. Participants then viewed foods while applying the ‘decentering’ instructions. These instructions explained the metacognitive concept of decentering and asked participants to observe their responses to food as transient mental events. See Materials for further details of the instructions.
We conducted semi-structured interviews, which are recommended for collecting rich descriptive data (Hill & Lambert, 2004). The semi-structured interview provided structure to study our research question through our theoretical framework of interest (i.e. Grounded Cognition Theory of Desire and Motivated Behaviour; Papies et al., 2020), and flexibility to explore and identify new themes.

2.2. Participants

We recruited 10 participants from the general population (8 female; age range: 22-35). See Appendix A for further demographic information, and the Discussion section for a brief account of gender imbalances in our sample.

Participants self-selected to take part based on the inclusion criteria that they currently live in the UK, consume an omnivorous diet, are not on a weight loss or other restrictive diet (e.g., gluten-free), have normal or corrected-to-normal vision, do not have any psychological, psychiatric or neurological condition, or learning disabilities, and have no current eating disorder or a history of eating disorders (without providing any further descriptions of these criteria). Further, participants were screened based on the inclusion criteria that they do not have a past and/or current formal meditation practice, and do not regularly use meditation applications (i.e. at least once a week). If an individual indicated that they had or currently have a meditation practice, they further described the type and nature of this practice in an open textbox. The participants were screened on a case-by-case basis by all authors (e.g., those who practice yoga were eligible, whereas those who have attended an MBSR course were not eligible).

To ensure that participants were not fully satiated, they were asked to refrain from eating and drinking except water, black tea or coffee without sugar one hour prior to their
scheduled interview time. Participants were asked to verbally confirm that they had complied
with these instructions before beginning the interview.

Participants were recruited with convenience sampling, through the online social
networks of RP’s personal social network and the University of Glasgow Psychology Subject
Pool. None of the researchers knew the participants prior to the study. Interviews were
scheduled through email communication. Participants did not know about the researchers’
reasons or personal goals for doing this research at the time of participation. They received a
gift voucher worth £6 as compensation for their participation.

2.3. Interview Schedule

We developed the interview questions by reviewing the specific literature on brief
decentering instructions, as well as wider literature on brief mindfulness instructions, and
interventions that feature decentering as a component such as Acceptance and Commitment
Therapy (for example, Bacon et al., 2014; Chittaro & Vianello, 2016; Howarth et al., 2016;
Strauss et al., 2014). First, BT (female, PhD student and trainee counsellor) and RP (female,
third year undergraduate student) generated and discussed a list of questions that may be
relevant to assessing experiences of learning and applying decentering to food cravings. This
process was also guided by the Grounded-Cognition Theory of Desire and Motivated
Behaviour (Papies et al., 2020; Papies & Barsalou, 2015). EKP reviewed and provided initial
feedback on the questions. BT and RP then created an initial interview schedule, shared it
with other colleagues for feedback (one masters student, three PhD students, one postdoctoral
research assistant, one professor/principal investigator), and refined the interview schedule
based on feedback. We pilot-tested the interview on one participant.

The final interview schedule contained a list of pre-determined, open-ended question
that all participants were asked, and optional, more closed probing questions that were asked
if the interviewer judged them as relevant and potentially informative. The interviewer also asked follow-up questions that were not pre-determined probes, but based on the responses that participants gave to previous interview questions.

After both the normal viewing and decentering instructions, we asked participants to describe their experiences of (1) viewing the foods, (2) listening to and learning the instructions, and (3) applying the instruction to the foods. In addition, after the decentering instructions, we asked participants to verbally rate their experiences using the Food Thoughts Overlap Measure (see Materials), and to explain their choice. Then, we asked participants to give a name or title to the decentering instructions, and explored participants’ potential future daily use of these instructions. Finally, we asked participants about their previous knowledge and experience of mindfulness and/or meditation. See Supplementary Material 1 for the full interview schedule.

2.4. Materials

2.4.1. Food Images

Participants viewed two videos, one with normal viewing and one with decentering instructions. Each video contained five highly attractive food images (e.g., brownie, burger). The images were selected from a pilot study where participants had rated the attractiveness of various food images (video 1 attractiveness $M=67.34$, $SD=3.19$; video 2 attractiveness $M=67.46$, $SD=3.60$; on a 100-point Visual Analogue Scale). The videos were in a slideshow format, containing an introductory slide, food images shown for 10 seconds each, and a three-second transition between each image. The image sets were matched in sweetness and savouriness.
2.4.2. Control and Decentering Instructions

The normal viewing (control) and decentering instructions were similar in structure and approximately three and five minutes in duration, respectively. The instructions were narrated by BT and presented to participants as audio recordings. To prevent demand effects, the terms “mindfulness” and “meditation” were not used. To check comprehension, participants were asked to summarise what they understood from the instructions. The interviewer then repeated any key details of the instructions that were missing from the summary, corrected mistakes in understanding, and addressed any further questions.

The normal viewing control instructions were based on instructions by Tatar et al. (in preparation). Participants were asked to view foods in the way that they normally would, and to follow up on any thoughts, feelings or physical sensations that may come up. The metaphor of a river was used, where the participants were asked to let their “mind flow freely as a river, full of clear, flowing water”.

The decentering instructions were based on instructions by Tatar et al. (in preparation). Participants were asked to observe their thoughts, feelings and physical experiences in response to food as transient mental events that come up and go away on their own. The metaphor of a waterfall was used to further explain this concept, where the constant stream of water was likened to one’s stream of thoughts. Participants were asked to “step behind the waterfall”, rather than getting carried away in the water, trying to resist the stream, or pretending that it does not exist.

See Supplementary Material 2 for the full instruction scripts.

2.4.3. Food Thoughts Overlap Measure (FTOM)

We adapted the Inclusion of Other in the Self Scale (IOS; Aron et al., 1992) (see Figure 1; see also, Schubert & Otten (2002)). We assumed that lower levels of decentering would be
reflected in a higher perceived overlap of food thoughts with the self. The FTOM served as a qualitative tool in the current study to further explore participants’ experiences.

The interviewer explained to the participants that the pictures represent the distance between them and their food thoughts. They were asked to pick the picture that best represents how they related to their food thoughts during each of the food videos from 1 (complete overlap of circles) to 7 (maximum distance between circles), and to state the number next to the image that they have picked. The interviewer then probed the participants to explore their reasons for choosing this picture.

**Fig. 1** Food Thoughts Overlap Measure (FTOM)

### 2.5. Procedure

All study sessions were conducted by RP (female, age: 22 years, referred to as the “interviewer”) between June and July, 2020. They were done online using Zoom video communications software, audio-recorded using the interviewer’s mobile device with...
participants’ consent, and deleted after transcription. Both parties were in a quiet, private space, unless (minor) disruptions occurred. All sessions with interruptions (e.g., connectivity, doorbell) were resumed and completed. Both the interviewer and participants were at a personal residential setting during the interview. The sessions ranged from 36 to 71 minutes in duration ($M=51$ minutes).

For an overview of the study procedure, see Figure 2. Participants were invited to take part in a study entitled, “Exploring experiences with food”, between 12 noon and 7 pm. Qualtrics software (Qualtrics, Provo, UT) was used to deliver the information, consent and debriefing forms, to ask demographical questions, and to present audio instructions and food videos.

First, participants viewed the study information form to confirm again that they meet the inclusion criteria. Eligible participants read and signed the consent form. The interviewer emphasised that participants may leave the study or choose to omit any questions that they do not feel comfortable answering. The audio recording of the study session started once participants completed these forms. They were notified before starting to record.

Next, participants described their current levels of hunger and confirmed compliance with the fasting instructions. They listened to the normal viewing instructions. Then, participants were shown the first food video and asked to apply the instructions that they received while viewing the foods. Participants were interviewed about their experiences.

Next, participants listened to the decentering instructions. Participants viewed the second food video while applying the instructions. They were interviewed again and asked if there was anything else they wanted to share. They then provided demographic information (age, allergies for foods shown in the study), and were debriefed and thanked for their participation.
participation. The audio recording of the session stopped after the demographic questions, but before debriefing. Participants were notified when the recording had stopped.

The interviewer documented study experiences and reflexive thoughts as soon as possible after each session, and regularly discussed these with BT (see Supplementary Material 3; Langdridge, 2007; Lazard & McAvoy, 2020). The recordings were transcribed verbatim by RP (participants 1, 2, 3, 4, 7, 8, 10) and BT (participants 5, 6, 9), using pseudonyms assigned by RP (see Supplementary Material 4 for the transcripts). RP and BT cross-checked transcripts for participants 1-4 for quality assurance. Any discrepancies in transcription were discussed and resolved.

Since no personally identifying information was shared in any of the interviews, we did not redact information.

Fig. 2 Overview of study procedure. Dashed lines denote when the audio recording will start and end

2.6. Analysis

Reflexive thematic analysis (TA) was used (Braun & Clarke, 2006, 2014, 2019; Clarke et al., 2016; Clarke & Braun, 2017). The data were analysed and managed using NVivo software (Mac version 12). Reflexive TA involves six phases: data familiarisation, initial code generation, theme search, theme review, theme definition and naming, and report writing (see, for example, Braun & Clarke, 2006). This analytic method is not restricted to a
specific theory or epistemology (Braun & Clarke, 2006). Further, it is compatible with our
critical realist approach. Critical realists explore tendencies in data, termed “demi-
regularities” (Danermark et al., 2002; Fletcher, 2017). Here, these demi-regularities are
identified as themes.

BT and RP individually performed phases one and two (i.e. code generation) of
reflexive TA for four transcripts (participants 1-4). They then discussed the initial codes,
resolving any discrepancies and duplicates (i.e. different code names for the same
interpretation). Following initial coding, BT and RP completed coding and theme search
individually for all transcripts. They collaboratively identified a thematic framework (phases
three to five). All others discussed and modified this framework to reach its final version (see
Findings). See Supplementary Material 5 for a description of how we established
trustworthiness.

3. Findings

We identified three themes from the data. Theme 1 captures the experiences of learning
and the immediate application of the decentering instructions. Theme 2 captures the potential
future daily application of these instructions. Theme 3 captures consumption and reward
simulations associated with the food images shown to participants. For further descriptions of
the themes and sub-themes, see Table 1.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-theme</th>
<th>Essence of the sub-theme</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Learning and applying decentering instructions</td>
<td>1.1 Specific factors and processes facilitate learning of instructions.</td>
<td>Factors (e.g., instructions that are appropriately challenging) and processes (e.g., discussing the instruction with the interviewer) facilitate the learning process.</td>
<td>All participants</td>
</tr>
<tr>
<td></td>
<td>1.2 Instructions change the experience of viewing the foods.</td>
<td>Food stimuli are viewed differently (e.g., as less tempting) when applying the instructions.</td>
<td>All participants</td>
</tr>
<tr>
<td></td>
<td>1.3 The application of instruction fluctuates.</td>
<td>Applying instructions was effortful and successful to varying degrees for different food stimuli.</td>
<td>2, 5, 7, 8</td>
</tr>
<tr>
<td></td>
<td>1.4 Normal viewing instructions increase awareness, which may be experienced as mindfulness.</td>
<td>The process of learning decentering may start with normal viewing, through an increased awareness of one’s experiences.</td>
<td>2, 3, 4, 6, 7, 9, 10</td>
</tr>
<tr>
<td>2. Potential daily application of decentering instructions</td>
<td>2.1 Instructions would be used based on need.</td>
<td>If there is a perceived need to achieve a goal (e.g., losing or maintaining weight), decentering may be used.</td>
<td>5, 6, 8, 9</td>
</tr>
<tr>
<td></td>
<td>2.2 Challenges are anticipated.</td>
<td>It may be challenging to apply the instructions in daily life (e.g., finding time).</td>
<td>1, 4, 5, 6, 7, 8, 9, 10</td>
</tr>
<tr>
<td></td>
<td>2.3 Instructions may be applied across domains.</td>
<td>The instructions may be relevant and useful beyond the domain of food (e.g., in stressful situations).</td>
<td>2, 3, 4, 5, 8, 10</td>
</tr>
<tr>
<td>3. Consumption and reward simulations</td>
<td>3.1 Simulations arise spontaneously.</td>
<td>The re-experiences of eating and enjoying foods arise automatically.</td>
<td>All participants</td>
</tr>
</tbody>
</table>
3.2 Simulations vary in intensity. The intensity of simulations varies based on contextual factors (e.g., current levels of hunger) and personal factors (food preferences).

3.3 The online study environment may become a barrier against experiencing simulations. Since they cannot be accessed and eaten, the food images may be perceived as unreal, therefore not evoking simulations.

In the following section, we further illustrate each theme with supporting quotes. Where quotes are shortened, it was done so without changing the context and meaning.

3.1. Theme 1: Learning and Applying Decentering Instructions

3.1.1. Specific Factors Facilitate Learning of Instructions

We identified several factors that facilitate the process of learning the decentering instructions. Compared to the normal viewing instructions, most participants found the decentering instructions appropriately structured and challenging, which were perceived as facilitative:

“I was definitely more focused the second time around because the first time, instructions felt this sounded very easy. Whereas the second time because I wanted that extra explanation, I was... I was a bit more focused than the first time around.” – Tatiana (lines 440-442)

“I felt like... now... ehm I was asked to do something more specific rather than just look at them as you'd normally look at them, you know, and then I have to ask myself, ‘How do I look at food?’ and I, I didn't really know what to do. But in this case, I was told to... to look at them, and let thoughts come and go and you know, ground myself, so it was a bit more specific, I think.” – Katie (lines 450-454)
Another facilitative process in learning the instruction was having clarifying discussions with the interviewer:

“I, I think probably I've got about 66.6% of it and you had to fill in the extra [laugh]. Ehm, because... yeah, I think, again, it was due to me, wondering about alternative modes of delivery. Ehm, instead of listening, so... I would say, yeah… two thirds of the way there, and you had to give me that extra third [laugh].” – Steve (lines 893-896)

Importantly, almost all participants grasped the rather abstract concept of decentering through the more concrete visual metaphor of the waterfall:

“I think the using the metaphor as a comparison really helps.” – Tatiana (line 390)

“It was nice. Uh, the, the imagery was a bit more deep. So, I could, I could... more see like the waterfall in like a forest in front of me and uhm, as, as I described how you let yourself carry like, you can get carried away by the stream or step behind the waterfall like I could see, like, like in a movie sort of that happening.” – Christina (lines 556-559)

3.1.2. Instructions Change the Experience of Viewing the Foods

Compared to experiences of normal viewing, applying decentering to the food stimuli changed participants’ experiences of relating to the foods. The experiences ranged from feeling more in control and empowered to feeling less involved and letting go:

“Uhm... I felt like it was... I felt I had more control. I felt like I was looking at the food and I might want the food. I might not want the food, but I felt like I had more control as to whether I wanted it or not. I didn't feel as... uhm like unempowered to make a choice about
the food. And the thought would come up, and I could let the thought pass and it felt like I had more of a choice in that.” – Patricia (lines 439-443)

“I felt like I had a choice to think about, ‘Okay uhm, if it it's coming up, that it feels delicious, but that thought is gonna come, that thought is gonna go’. So I didn't need to act on what think about the food because the thought is gonna come and the thought is gonna go.” – Patricia (lines 449-452)

“So I’d usually say, ‘Ooh, this is a burger’. And then I'd say, ‘It's just a burger. It's just a picture of a burger. It's okay. It's just a burger’. You know not - instead of just - you know, ‘It's a burger, oh it looks good, oh I could eat that, oh… what would I put on it if I had a burger?’, or, you know. The first time around, I did think about these things. And now I was just thinking, ‘Okay, that's a picture’.” – Katie (lines 342-346)

“I was less… involved? / Uhm… I still felt, so for example that burger appeared and I'm like, ‘Yeah, I'm hungry’ [laugh]. ‘I wanna, I want to, I want to eat something’. But, … uhm like there was this, like I had to step back where because I was asked to notice that, as opposed to… uhm… limit, I don't know.” – Eleanor (lines 409; 415-418)

### 3.1.3. The Application of Instructions Fluctuates

The quality of experience when applying the decentering instructions fluctuated. This was primarily based on the aspect of the food experience that was most salient for the participants at a given time (i.e. thoughts such as food preferences, feelings or physical sensations). In other words, *which facet of their experience* participants applied decentering to continually changed, which then led to fluctuations in the quality of experience when applying decentering.

“Uhm… well, at first when I saw that first picture, I thought because I have so many thoughts, I felt a bit like, uff, so many I… thoughts rushing through. And then when I was slowing down I was... I gue-, I guess it was... at the very end there was a bit more emotion rather than
a thought because I thought... when, when seeing the brownie, I thought, ‘Oh my god, that
must be like a 1000 calories in that one’. / And then when I saw burger, I thought ‘Oh, I
actually like other toppings on my burger’.” – Tatiana (lines 309-313; 314-315)

3.1.4. Normal Viewing Instructions Increase Awareness, Which May Be Experienced as
Mindfulness

Although the normal viewing instructions were intended as a control condition, they
increased most participants’ awareness of their current mental and physical state. Through
heightened awareness, normal viewing might have played an active, metacognitive role in the
process of applying decentering. In other words, since normal viewing was always presented
first and decentering was always presented second, normal viewing might have brought food-
related experiences to participants’ attention, and participants might have applied decentering
to these previously identified experiences.

“[normal viewing] made me more aware of my senses.” – Eleanor (line 171)

“Uhm… so, since the [normal viewing] instructions... said to like look at the food nat.. like,
like I naturally would... ehm... so, I tried to be like well, nat.. like how does that ‘naturally’
mean? Eh, [pause] and... but I don't know if I still... paid more attention to the food... than if
I would actually, like how I would naturally pay attention to food.” – Elizabeth (lines 313-316)

For some participants, the experiences of normal viewing resembled their preconceived
notions of mindfulness, especially around the cultivation of awareness. If normal viewing
was indeed perceived as mindfulness, this may indeed suggest that the normal viewing
instructions played an active role in the decentering process:
“And uh… it [normal viewing] did remind me a bit of, of meditation apps. It’s… I had to close my eyes and then it was almost like the story and it was inviting me to, encouraging me to… to, to look at these foods. It made me excited. It made me… look forward to seeing the pictures of the foods and looking at them.” – Katie (lines 116-119)

“I think mindfulness is… in a way it’s awareness, trying to be aware of the surroundings.” – Katie (lines 640-641)

3.2. Theme 2: Potential Daily Application of Decentering Instructions

3.2.1. Instructions Would Be Used Based on Need

Participants were confident that they would use the decentering instructions in their daily lives if they felt the need for it.

“Uhm… if I were, if I were trying to watch my food intake, yes.” – Katie (line 602)

“I don't think I would just blanket sort of apply it to anything. But if I thought there was something that I personally didn't feel like I had control of or had control of me, I think I would remember this and be like, ‘Well, actually, I can use this technique. And I can apply this if I want to’.” – Patricia (lines 763-766)

3.2.2. Challenges Are Anticipated

Most participants expected challenges if they were to apply the decentering instructions in their daily lives. Specifically, remembering to apply the instructions was a common barrier:

“I think that just you need to… train yourself to… remember to think like that. So, whenever you see something, food, which has been presented to you, train yourself just to think of it in a different way. / I think it's just training, I think it's training. I don't think there's something
you can do or, or something maybe a cue word which you can use, which will then trigger eh, something else.” – George (lines 715-717; 723-724)

“I think when you're stressed, you're not very relaxed, very relaxed, relaxed enough in your stress. I'd have to do something that made me calm down first. Then to, to even remember, to remind me that I've done this and I know this, and then I'd have to apply it.” – Patricia (lines 790-793)

Other challenges were the effort required to apply the instructions, finding the time, and being in the right broader stage of life to apply them:

“I just need to get started with it and you know, it’s effort and it’s time and yeah.” – Christina (lines 875-876)

“Like, I would need the routine, the structure and the environment to make it stick. … I like the idea of it. But I also... I... I think I would need to also find the right person and the right environment and the right kind of uh mantras and the right context. And that means the right times of my life, as well.” – Patricia (lines 854-858)

3.2.3. Instructions May Be Applied Across Domains

When asked about the potential daily application of the instructions, some participants spontaneously brought up the possibility of applying them in domains other than food:

[in response to “Could you think of where or how you would apply it?”] “Ehm, Is it only about food? / well definitely about food. / but I guess with any kind of sensation or like, kind of… engaging with... like just... this idea of knowing how to like notice your thoughts and letting them go. Like that can work with anything really.” – Elizabeth (lines 978; 984; 992-
“Just, I guess, (pause) just generally like (pause) could be applied to almost anything to uhm, (pause) not only when it comes to like some stressful situations when you're thinking really fast and you have to be like sharp like fast in your actions. You could maybe sometimes, you know when people say, ‘You should think twice before you do something’.” – Tatiana (lines 634-637)

3.3. Theme 3: Consumption and Reward Simulations

This theme was identified and interpreted through our main theoretical framework of the Grounded-Cognition Theory of Desire and Motivated Behaviour (Papiès & Barsalou, 2015).

3.3.1. Simulations Arise Spontaneously

Simulations readily came up for most participants. The most salient features of these simulations were the taste and texture of the foods, and the context in which they would typically be consumed:

[normal viewing] “So, it was quite easy to imagine, you know, how the texture of eating them, the taste, uhm … and… like the context of eating these food is quite usually pleasant. This is the kind of food that you would eat with friends, probably. So, I don't know, there's like a nice feeling about it.” – Eleanor (lines 108-111)

[decentering] “so same, same I had, you know, like textures and tastes, like thoughts of what it would taste like and feel like. Uhm… but I also had [pause] uhm [pause] yeah, and I had you know, I had the image of like being eating a burger at a, a place and enjoying it.” – Eleanor (lines 427-430)

[normal viewing] “Ehm, well the chicken made me think of one of the cafes that I have been to in city centre and that serves a similar dish. So, it just made me associate that dish to that specific bar I've been to. – Tatiana (lines 54-56)
3.3.2. Simulations Vary in Intensity

Although all participants experienced simulations, the intensity of simulation varied as a function of participants’ food preferences:

“I felt like the images of some of the food for me, the some of them the intensity was more stronger in terms of what was presented. And also in terms of the food looking like it was more uhm not inviting, but sort of the burger was more open, and there was the dessert had the sauce pouring down.” – Patricia (lines 478-481)

“I first thought the, the carrot cake was quite fluffy but maybe a bit too sweet for… to, to have just now. And, and the chicken looked really good, the fried chicken. But then I thought, ‘Maybe that's too much of a, of a meal or a big snack to have just now’. Then the waffles uh seem a great idea for breakfast [laugh]. Eh, nachos weren't that exciting, and the brownie looked really nice, but again, might be too sweet for now. That's what I thought.” – Katie (lines 98-102)

3.3.3. The Online Study Environment May Become a Barrier to Experiencing Simulations

Although most participants experienced simulations, the use of food images as stimuli rather than actual food became a barrier for some of them:

“And during the video, I didn't feel any feeling in looking at the food, probably because it was... an image and it wasn't real.” – Olivia (lines 375-376)

“Well I think obviously, like I know it's just a visual. So it's not, you know, I know I'm not going to feel it. I know I'm not going to taste it.” – Eleanor (lines 324-325)

“So, like I said before, it's a different environment. It's a different medium, so you're not smelling the food, you're not, you're not touching it. It's just it's one-dimensional.” – Steve (lines 378-379)
3.4. Food Thoughts Overlap Measure (FTOM) as a Tool for Exploring Decentering Effects

The FTOM served as a self-awareness tool for participants to assess the distance between themselves and their food thoughts. Asking participants to rate and explain their perceived distance for both normal viewing and decentering sparked further discussion, including a comparison of the experience of viewing the foods while applying each of the instructions (e.g., subtheme 1.2). Some participants engaged in an elaborate thought process while providing their FTOM ratings:

[normal viewing] “I'm looking down between one and three at the moment. So, somewhere between there. And I'm gonna look more closely. So this is the first video, uhm... probably two. / Because the 'me' and the 'food thoughts' are overlapping somewhat. So there's an area of where there, the two elements are still independent, but there's overlap in the middle.” – Patricia (lines 528-530; 536-537)

[decentering] “I'm looking between five and seven. And I'm just going to see, probably I'm gonna choose a six. So... I felt that myself and the thoughts were quite separate. So there was me and there was my thoughts and they were coming up and they were going. So they felt quite independent of each other. And I did definitely felt some, some distance. So greater than the four or five. And I'm gonna go with six.” – Patricia (lines 545-549)

4. Discussion

This study was designed to provide an in-depth analysis of the personal experiences of learning to apply a decentering perspective to one’s spontaneous response to attractive food images. Through thematic analysis of qualitative interviews, we identified three themes that describe how non-meditators learn and apply brief mindfulness instructions (Theme 1), how these instructions may be used in daily life (Theme 2), and the characteristics of the vivid and
compelling consumption and reward simulations that participants apply decentering to (Theme 3).

The process of comparing the decentering instructions to the normal viewing instructions seemed key for participants’ understanding, application, and evaluation of the decentering instructions. Compared to normal viewing, participants benefitted from the structure and challenging metacognitive contents of the decentering instructions. Also compared to normal viewing, applying decentering changed the way in which participants related to their experiences of food. This altered way of relating included feeling more in control over these experiences, as well as feeling more empowered, and less involved. These findings are supported by previous quantitative research that also show how decentering alters one’s relationship to one’s urges by decoupling motivation and behaviour (e.g., Bowen & Marlatt, 2009; Keesman et al., 2017).

The decoupling process implicated in decentering can prevent the automatic enacting of impulses, and provide space for more deliberate responding based on more conscious intentions. However, it is important to note that within Western contemporary settings, the decoupling of motivation and behaviour is often conceptualised and taught in a way that does not address ethics or “right mindfulness” (Monteiro et al., 2015; Purser & Milillo, 2015). Given an ethically neutral context, decentering could potentially provide space for acting on good as well as on bad intentions, with potentially harmful consequences (Monteiro et al., 2015). The decentering instructions presented here are intended to introduce an aspect of mindfulness to non-meditators, and to enable these individuals to manage unwanted food cravings in the context of an overall healthy relationship with food.

Importantly, the active role of the normal viewing instructions in participants’ understanding and application of decentering was unexpected. Although normal viewing instructions were intended as a control condition, they seemed to actively facilitate the
process of decentering, first by increasing participants’ awareness of their current thoughts, feelings and physical sensations, and then by serving as a baseline to which participants compare the style, structure, and difficulty of the decentering instructions. This suggests that normal viewing may already have been perceived as a component of mindfulness, raising the question of whether normal viewing serves as an appropriate control condition for experimental research, especially for within-participant designs. This is also in line with findings suggesting that awareness (“attention monitoring”) and acceptance skills are key components of mindfulness that interact to improve various outcomes of health and wellbeing (Lindsay & Creswell, 2017). Acceptance skills (i.e. changing one’s relation to one’s experiences), closely relates to the concept of decentering.

Another factor that facilitated the learning and application of decentering was discussing the instructions with the interviewer/researcher, to clarify the meaning and goals of these instructions. The audio recording may have led to an initial understanding of the instructions, and the interviewer may have further scaffolded this learning. This is similar to qualitative research on the role of teachers in mindfulness courses, where participants emphasised the important role of a supportive teacher in their learning and engagement (van Aalderen et al., 2014). Specifically, they indicated that the teacher should be a compassionate role model who motivates them (van Aalderen et al., 2014). Similarly, participants in the Howarth et al. (2016) qualitative study indicated that the presence of someone knowledgeable was important while listening to the mindfulness recording. Participants found this to be reassuring and motivating. This may disadvantage online mindfulness studies or mindfulness applications, if the interaction with a researcher or teacher is absent. In this context, the model of Supportive Accountability may be relevant for providing human support during online mindfulness research and training (Mohr et al., 2011). This model highlights accountability (e.g., social presence, process focus) and legitimacy (e.g., expertise and
trustworthiness of teacher/coach) as factors that are essential for promoting adherence to
internet and eHealth interventions.

Finally, participants indicated that they found the visual metaphor of the waterfall
helpful, particularly when learning the instructions. We included this metaphor in the
instructions to better explain the abstract concept of decentering. This finding is in line with
research showing that metaphors enable individuals to draw on previous experiences from
concrete and familiar domains, while learning and making sense of abstract concepts
(Jamrozik et al., 2016).

Together, these factors suggest a potential multi-stage process of learning brief
mindfulness, much like manualised mindfulness-based interventions (e.g., Mindfulness-
Based Stress Reduction; Kabat-Zinn, 1982). Specifically, our findings suggest that one learns
brief decentering through the key stages of (1) increased awareness (i.e. effects of normal
viewing), (2) conceptual understanding of decentering, (3) receiving feedback from the
interviewer (similar to mindfulness teachers), (4) developing further understanding of
decentering, and (5) the use of metaphors to aid learning. All of these stages also feature in
traditional interventions.

Further, participants were confident that they would use the decentering instructions in
their daily lives, if they felt the need for it. This finding was directly linked to the
characteristics of our sample, who were generally healthy participants without a restrictive
diet and with no history of eating disorders. Most participants, however, expected to face
challenges if they were to apply decentering in their daily lives, especially challenges with
remembering to apply the instructions. This is different from Howarth et al.’s (2016)
findings, where most patients reported that they do not anticipate challenges, due to the
minimal time requirement of applying the instructions. Finally in the present study, when
asked about the situations in which they would apply decentering, some participants
spontaneously brought up domains other than food, such as stress. This may be related to the
cognitive psychological concept of transfer of learning, where previous learning of
mindfulness in one domain generalises to and facilitates its learning in a different domain
(Salomon & Perkins, 1989).

Generally, participants seemed to understand what we intended to convey through the
decentering instructions, and most of them benefited from it while viewing the video of
attractive foods. While most participants fully understood the instructions after listening to
the audio recording, some needed further guidance. Importantly, all participants correctly
understood the instructions once they discussed it with the interviewer. This highlights the
important role of the participant-researcher interaction in learning decentering, suggesting
that a lack of interaction may impede learning for some participants. Overall, these findings
elucidate key factors that contribute to learning and applying decentering. Some of these
factors are part of the decentering instructions themselves (e.g., visual metaphors), while
others relate to other aspects of the study (e.g., perceiving the control condition as
mindfulness). Thus, our findings confirm that factors other than brief mindfulness may drive
the effects or lack thereof shown in mindfulness studies. It would be important to critically
evaluate the potential impact of these factors on study outcomes, especially during the stages
of study conceptualisation and design.

In line with our theoretical framework of the Grounded Cognition Theory of Desire and
Motivated Behaviour, the thoughts, feelings and physical sensations that participants
experienced may be termed “consumption and reward simulations” (Papies et al., 2020). In
this study, these simulations came up spontaneously. The most salient features of these
simulations were the taste and texture of the foods, and the context in which they would
typically be consumed. This is in line with previous work showing that tempting foods
activate simulations, including simulations of an eating context (Papies, 2013).
One of the main limitations of this study was the online study environment. Although most participants engaged with the food images and experienced vivid simulations of consuming them, the use of online food images instead of actual food was a barrier for some. Further, participants were presented with a generic selection of tempting foods, which might not have catered to their unique food likes and dislikes. This means that the images might not have elicited the full extent or intensity of simulations that would arise if participants were presented with actual foods that were personalised to reflect their preferences. If so, it might have been easier to apply decentering here, as the experiences would have been less intense. A qualitative study that uses actual, personalised food stimuli would therefore be more informative, and would address potential concerns with the ecological validity of this study. At the same time, food cravings are often triggered by spontaneous, associative thoughts, in the absence of actual foods (Kavanagh et al., 2005). Therefore, understanding how people can apply mindfulness-based instructions in such situations has high ecological validity and practical value.

Another limitation of this study was the control condition used. Although the normal viewing instructions provided unexpected and provocative insights, they did not serve as an adequate control condition. Normal viewing was initially selected to control for potential expectancy effects, without resembling mindfulness too closely (Davidson & Kaszniak, 2015; Van Dam et al., 2018). However, normal viewing was perceived as if it was mindfulness by some participants, as some of its features (e.g., the reference to thoughts, feelings, and physical experiences; the river metaphor) matched participants’ pre-existing knowledge and assumptions around mindfulness. In the future, a different control condition might be used, although a control condition might be unnecessary and omitted altogether in studies like the present work. Regardless of the decision to include a control condition or not,
it is important to recognise the difficulty of implementing adequate active control conditions, both in this study, and in general (Davidson & Kaszniak, 2015; Van Dam et al., 2018).

A final limitation was the gender imbalance in our sample. We recruited eight female and two male participants based on participants’ interest in our study and their eligibility. However, the imbalance both in the level of interest and the final sample composition may suggest a self-selection bias. Indeed, preliminary findings suggest that women may be more interested in mindfulness-based interventions than men (Katz & Toner, 2013). While gender differences were not a main focus of this study, it is important to note that male participants have been under-represented in mindfulness research more generally (Bodenlos et al., 2017), and inattention toward gender as a variable is a wider issue within the mindfulness and meditation literature (Hickey, 2010). Since there are mixed findings on gender differences in the effectiveness of mindfulness-based interventions (e.g., Katz & Toner, 2013; Rojiani et al., 2017), future research should be conducted with a gender-balanced sample. This may lead to meaningful between-gender qualitative comparisons of mindfulness experiences.

Future research should also explore how clinical or sub-clinical samples of emotional eaters and those with eating disorders learn and apply brief mindfulness. These samples may differ from a sample of healthy eaters, as they may have a more immediate and real need for improving their eating behaviours. Further, since most participants expected to face challenges when applying decentering in daily life, future research should investigate how different groups of individuals can most easily learn brief mindfulness, and apply it in their daily lives to spontaneously arising food cravings.

In conclusion, this study presents an initial qualitative account of the unique processes that are implicated in learning and applying brief decentering instructions for food cravings. These insights may influence how future experimental studies are designed by emphasizing the value of allowing researcher interaction, of providing metaphors to aid learning, and of
providing tools to increase awareness of one’s experiences before applying decentering. It may also inform the development of simple, accessible, and effective mindfulness techniques, which may be suitable for integration into daily life, as well as clinical practice.

Acknowledgements

We would like to thank Lara Wehbe for her useful feedback on the interview schedule.

Disclosure

Author contributions: All authors contributed to the study conception and design. Material preparation was performed by BT and RP, with feedback from EKP. RP collected the data. BT and RP analysed the data, with input from EKP. BT wrote the first draft of the manuscript, and EKP revised it. BT revised the manuscript further with input from RP, drafted the final manuscript, and revised it with input from EKP. All authors read and approved the final manuscript.

Funding: This work was partially supported by the Carnegie Trust for the Universities of Scotland (Vacation Scholarship; awarded to RP). This funding source had no involvement in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication.

Ethics approval: The study was approved by the University of Glasgow College of Science & Engineering Ethics Committee (Date: 10 June 2020; no: 300190247). The procedures used in this study adhere to the tenets of the Declaration of Helsinki.
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https://doi.org/10.1016/j.cpr.2016.10.011


Appendix A

Table A1  
Participant demographic information

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<th>Sex</th>
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