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## SOCIOLOGY | RESEARCH ARTICLE

# Evaluation of a mindfulness-based stress management and nutrition education program for mothers

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**Abstract:** Background: Maternal stress is implicated in obesity and obesity-related chronic disease. This can have consequences for their children's weight status and disease development. Interventions are needed that target both psychological stress and diet using evidence-based approaches. Objective: The objective of this study was to evaluate the perceived impact of the Slow Down intervention on participants' self-efficacy for practicing mindfulness and the barriers and perceived benefits to adopting intervention target behaviors. The ways that knowledge was brokered and transferred provided guidance on the translation of mindfulness within dietary interventions. Design: This was a qualitative evaluation of a mixed-methods quasi-experimental pilot intervention. A focus group was conducted post-intervention and a follow-up semi-structured individual interview took place 4–6 weeks post-intervention. Results: Self-efficacy for practicing mindfulness skills was generally high or described as mixed by participants. Reported benefits from participating in the intervention included increased social support, improved sleep, and improved reaction to stressors, among others. Participants reported barriers to making changes, including family or partner buy-in. Participants cited several ways

### ABOUT THE AUTHOR

Lauren Kennedy is an Assistant Professor and Health Extension Specialist at Tennessee State University in Nashville, Tennessee. Her research examines policy, systems, and environmental changes that support healthy lifestyle behaviors. She is also interested in decreasing the research-to-practice gap through the application of dissemination and implementation science frameworks and methods. As an Extension Specialist, she develops and tests community-based public health programs that address social determinants of health and builds the capacity of Tennessee Cooperative Extension to address health equity. Her previous work includes evaluating the Partnership for a Healthier America's Fruit-N-Veggies (FNV) Campaign pilot and developing nutrition education curricula for Virginia's Supplemental Nutrition Assistance Program (SNAP-Ed).

### PUBLIC INTEREST STATEMENT

Recently, mindfulness has become a very popular tool, recommended to people for a variety of conditions and ailments—ranging from diseases like obesity, to pain management, and even as a strategy to reduce school conduct issues for youth. This paper describes mothers' experiences participating in a mindfulness-based stress management and nutrition education intervention. Based on the results, participants revealed the impact from participating included benefits like improved sleep and increased social support. Additionally, they offered insights on the barriers to adopting mindfulness and healthy eating behaviors, such as lack of family buy-in and limited time. The results of this paper could help inform public health-interested organizations to design or implement mindfulness-based stress management programming. It also contributes to the ongoing conversations in behavioral economics, neuroscience, psychology, and other related disciplines concerning the use of mindfulness practices to encourage health behavior changes.

that knowledge was gained and transferred throughout the intervention that could improve the translation of mindfulness research into practice. Conclusions: With increasing evidence supporting the use of mindfulness in public health nutrition interventions, there are gaps in describing the benefits of participation in mindfulness interventions and the barriers to making health behavior changes as a result of participation. This study demonstrates the potential for nutrition interventions that include psychological health and provides guidance on how to implement mindfulness practice into public health practice settings.

**Subjects:** Women; Community Health; Health Education and Promotion

**Keywords:** Mindfulness; psychological stress; mothers; dietfood nutrition; public health practice

### 1. Introduction

The influence of chronic life stress on eating behaviors that contribute to weight gain may be a causal factor in obesity and chronic disease (Torres & Nowson, 2007). For mothers caring for young children, this relationship may be of increased importance because they often report higher levels of stress and stress-related eating behavior compared to their male counterparts (Adam & Epel, 2007). For example, Chang et al reported that stressful experiences triggered higher levels of emotional eating in a sample of low-income overweight and obese mothers (Chang, Nitzke, Guilford, Adair, & Hazard, 2008). Moreover, associations exist between maternal stress and child weight status during toddler years, mediated by dietary habits, highlighting the importance of developing interventions that target mothers caring for young children (Tate, Wood, Liao, & Dunton, 2015). In spite of a well-documented relationship between stress and eating for mothers and their children, there are no known interventions that aim to affect both stress and diet for mothers.

Mindfulness is typically defined as the nonjudgmental awareness of the present moment (Davis & Hayes, 2011). Mindfulness-based programs are a safe, cost-effective, evidence-based way of managing stress (Grossman, Niemann, Schmidt, & Walach, 2004). Manualised programs like Mindfulness-based Stress Reduction (MBSR) (Kabat-Zinn, 2011) have demonstrated stress reductions, among other reported benefits, for participants with a variety of health statuses and chronic conditions (Baer, 2006; Kabat-Zinn, Massion, & Kristeller et al., 1992; Kristeller & Hallett, 1999). Because of the evidence that mindfulness practice can improve overall well-being and reduce chronic stress, there has been growing interest in intervention research to determine if practicing mindfulness may benefit dietary quality and eating behavior. A 2014 review confirmed the efficacy of mindfulness-based interventions for obesity-related eating behaviors, although more evidence is needed to improve translation of these programs into practice-based settings (O'Reilly, Cook, Spruijt-Metz, & Black, 2014).

As the evidence for using mindfulness practice to affect dietary behaviors and patterns grows, there must be greater attention paid to understanding the barriers and facilitators for practicing mindfulness and the self-efficacy that participants possess for adopting those behaviors (Bandura, 1998; Strecher, McEvoy DeVellis, Becker, & Rosenstock, 1986). Moreover, little is known about how to successfully translate existing research on mindfulness for dietary behavior change into real-world public health practice settings. Understanding the process of translating effective interventions is critical for improving uptake and sustainability for any target population and highlights the importance of evaluating intervention participants' self-efficacy, facilitators, and barriers to adopting intervention target behaviors.

In order to address the gap in available interventions and contribute to preliminary evidence for successful translation of mindfulness in community-based nutrition education settings, the Slow

**Table 1. Outline of the mindfulness topics, activities, and nutrition discussion topics covered during each of the four weeks in the Slow Down intervention**

Week	Key Mindfulness Topics	Experiential Mindfulness Activity	Nutrition Topics
Week One	Introduction to mindfulness; inner wisdom vs. outer wisdom; definition of mindfulness	Mindful Eating Raisin Exercise	Mindful Eating
Week Two	Emotional/stress eating; pausing mid-meal for hunger and satiety checks; deep breathing	Progressive muscle relaxation	Sugars (added sugars, artificial sweeteners, Nutrition Facts Label)
Week Three	Mind-body connection; taste satiety; sensory awareness	Guided Imagery; Mindful Eating Raisin Exercise using other foods	Fats (solid fats, oils, Nutrition Facts Label)
Week Four	Stress management, nonjudgmental awareness, critical self-talk	Self-forgiveness meditation	Picky Eating, Healthy food selection, Healthy food selection on a budget

Down intervention was developed and piloted with mothers who had young children ages five and younger. The Slow Down intervention aimed to increase participant knowledge and skills with mindfulness practices for stress management, healthy eating patterns and self-efficacy for those practices using a facilitated discussion structure (Abusabha et al., 1999). This approach allows the participant to act as knowledge broker during the intervention, sharing tacit knowledge of their lived experiences, in addition to the evidence-based information provided by the facilitator/researcher (Ward, Smith, House, & Hamer, 2012). The Slow Down pilot was a non-randomised quasi-experimental mixed-methods study (Kennedy et al., 2018). The intervention was piloted twice within a four-month period. Thirteen mothers participated in the first wave and six in the second wave (n = 19). All participants received the same intervention, with some content adjusted for individual group differences in nutrition knowledge assessed at baseline. The intervention consisted of four consecutive weekly sessions, lasting 1.5 hours each. The two main objectives were:

- (1) Build participants' self-efficacy for practicing mindfulness and healthy eating behaviors, including child feeding behaviors
- (2) Increase participants' knowledge on healthy eating patterns for themselves and when feeding their families, such as incorporating more fruits and vegetables, limiting solid fats and added sugars, and practicing mindful eating behaviors at mealtimes.

The structure of the four weekly program sessions is described in Table 1. Main outcomes of this pilot study included changes in self-efficacy for mindfulness, eating behavior, and perceived stress. The theoretical framework and results of the pilot study's main outcomes, including program acceptability and feasibility, have been described previously in detail (Kennedy et al., 2018).

The purpose of this study is to evaluate the perceived impact of the Slow Down intervention on participants' self-efficacy for practicing mindfulness, the barriers and perceived benefits to adopting intervention target behaviors, and improving the understanding of the ways that knowledge was brokered and transferred throughout the intervention and follow up period. Given the shortcomings in the literature, the results of this evaluation can provide guidance on the translation of mindfulness within dietary interventions and, in particular, interventions targeting mothers caring for young children.

## 2. Methods

### 2.1. Design

The present study qualitatively evaluated participants' experience in the Slow Down intervention. All participants who participated in the intervention were invited to participate in a focus group within 1–2 weeks after the conclusion of their intervention period. They were invited to a one-on-one interview 4–6 weeks after the focus group. The focus group and interview scripts included questions evaluating the intervention process and their thoughts about how the program affected their lives. Each focus group lasted between 60 and 90 minutes. Interviews were semi-structured and lasted 30 minutes, on average. Participants were given a small cash compensation in exchange for their participation in the focus group and interview. The Institutional Review Board at Virginia Tech approved all aspects of this study. A statement of informed consent was obtained from each participant before data collection.

### 2.2. Analysis

Audio files from each participant interview and both focus groups were transcribed and two researchers independently conducted an inductive thematic analysis to capture the frequency of themes, as well as the intensity and extensiveness of discussion in relation to each theme (Daly, Kellehear, & Gliksman, 1997). The analysis began with familiarization with data by reading and re-reading the transcripts. Following this step, relevant participant statements were marked and keywords were identified. These keywords became the codes and they were grouped together to generate themes. The researchers independently coded all text and then compared and discussed coding decisions. Subsequently, the coding of all passages by both researchers reached an acceptable intercoder reliability (Cohen's kappa = 0.81) (Cohen, 1960). After several iterative refinements, a satisfactorily robust coding scheme was established, and all transcripts were coded in detail using Microsoft Excel (for Mac, version 14, 2011). Anonymized participant quotes are used to illustrate key themes and relevant perceptions explained by participants. The selected quotes were chosen because they illustrate a range of participant perceptions and viewpoints, were unusual responses, or were a concise summary of a key theme. The Consolidated Criteria for Reporting Qualitative Research (COREQ) was used to guide the reporting of methods and analyses for this study (Tong, Sainsbury, & Craig, 2007). A complete COREQ checklist is provided in the Supplementary material.

## 3. Results

### 3.1. Subject characteristics

In total, all nineteen mothers provided evaluation data, either through the focus group, the interview or both. Focus group and interview data from both intervention waves were combined for analyses. The average age of the participants was 34.16 ( $\pm$  4.39) and they ranged in age from 24 to 43 years old. All participants except one had at least a Bachelor's degree and more than half of the sample had advanced or terminal degrees ( $n = 12$ ). Several other sociodemographics are summarised in Table 2.

### 3.2. Self-efficacy for mindfulness

The Slow Down intervention is designed to provide mothers with evidence-based resources and skills in practicing mindfulness they can use for managing stress. In order to measure this qualitatively, we asked participants to describe their confidence in things like managing stress and practicing mindfulness like they had learned during the intervention. Most mothers expressed high confidence in the focus group and their follow-up interview for making related changes and taking changes they had already initiated further (see Table 3). In spite of this improved self-efficacy, most of the moms also expressed uncertainty about the feasibility of implementing frequent, consistent practice of mindfulness. For example, one participant felt she didn't have enough time alone to focus, saying:

**Table 2. Participant sociodemographics**

Participant characteristic n = 19		n (%)
Marital Status	Single	1 (5)
	Married	17 (90)
	Separated	1 (5)
Race & Ethnicity	White/European American	14 (73)
	Black/African-American	2 (11)
	Asian	2 (11)
	Hispanic/Latina	1 (5)
Number of children	1	12 (63)
	2	5 (26)
	3	2 (11)

**Table 3. Qualitative results of changes in self-efficacy**

MAJOR THEME	SUB-THEMES	QUOTES
SELF-EFFICACY	High Low/Conflicted	<p>“I feel fairly confident that I have what I need, and I’m moving in the right direction to have the time that I need to do it.”</p> <p>“I feel like I’ve been given the tools and I can do it ... It’s just a matter of doing it. The meditation and stuff, I’m totally on board, it’s working. I know how to use it.”</p> <p>“I’m confident that I can do it, I’m just not confident that I will do it.”</p>

*I would say my confidence that I could do it is maybe 75 percent, but finding the time to have that quiet time ... I would love to be able to just close my eyes, relax, relax my body. I like that one [progressive muscle relaxation exercise]. Even if it’s just talking to myself, “okay, you’ve got this.” I would love to have that time. It’s finding it, it’s trying to figure out how I can have that moment to do that. I know it could be something really quick. I don’t know ... it’s hard for me because I think if I felt it’s like a circle, if I felt less stressed, or if I felt like I had that moment to actually be by myself. I feel like I’m never by myself and I think that’s probably the problem. I’m never by myself.*

Some participants acknowledged that they had been given the tools they needed, but still lacked an actionable plan, the ability to remember to use the tools they had, or a way to implement their plan. Still, other participants expressed low self-efficacy for a variety of reasons, but often, they also felt conflicted. For example, one participant stated:

*I’d say I lack confidence in that arena [practicing mindfulness], but as far as generally how to deal, I’ve got tools now so I feel a little more confident.*

### 3.3. Barriers to mindfulness and diet changes

Related to self-efficacy, participants reported a variety of barriers to initiating changes or following through with changes initiated during or after the intervention (see Table 4). In the focus group, participants cited seasonal barriers to making healthy dietary choices, saying that it was easier to put healthy meals on the table during winter, compared to summer when the constraints on their time and the type of meals they served were different. Two commonly cited barriers to both mindfulness and healthy food choices were perceived or actual lack of time and lack of buy-in from the rest of the family or not having full support from the spouse or partner. Participants often explained they didn’t have enough time to practice mindful eating behaviors during family mealtimes because their young children were so reliant on them for feeding. They admitted that when their children were older and did not need to be fed or taken care of so much, they hoped to have more time to focus on their own mindful eating skills. They expressed a desire to have their

**Table 4. Qualitative results of barriers to behavior change**

MAJOR THEME	SUB-THEMES	QUOTES
<b>BARRIERS</b>	Time Equal parental responsibility	“I feel like there’s just always something in the way.” “Somebody else to be doing all the work in the house. That is what I need to be successful to be able to mindfully eat.”
	Seasonality	“That’s actually a really interesting point, because as much as we feel like ... When I get home in the winter time, it’s dark and I just want to crawl in my bed and not do anything ... It’s still for some reason easier to put a good meal on the table in the wintertime than it is in the summertime.”
	Lack of spousal support	“And now you don’t want to drink alone! You’re like, “I’m the only one drinking a beer in this house.”
	Family buy-in	“I feel like it’s harder with the kids, having picky kids. It is harder, even if both of us, we adults got on board together, you’ve still got the kids that you’re fighting against. It would be nice if we were all in it together.”
	Picky eating	“I don’t know about you, but when you do try to cook the healthier meals and they refuse to eat it, I get mad.”

partners and/or children included in the intervention, as a way to relieve them of having to be the sole person responsible for teaching everything they learned to the other family members or trying to force-implement large dietary changes in the household alone. They often expressed their feeling that it was difficult to make healthy choices if the other members of the family were not willing to make those choices too.

**3.4. Benefits**

Participants described a multitude of benefits they experienced as a result of participating in the intervention that were unintended outcomes (see Table 5). One participant became emotional during her interview, explaining how her sleep habits had improved tremendously since her participation in the intervention. Previously, she said she woke often in the middle of the night and would be unable to return to sleep, but since learning the mindfulness exercises like guided imagery (McKinney, Antoni, Kumar, Tims, & McCabe, 1997) and progressive muscle relaxation (McCallie, Blum, & Hood, 2006), she was able to relax at night and fall back asleep quickly, providing a host of mental, emotional, and physical benefits for her. A few participants told us their parenting had improved, extending their patience with their young children’s behavior and allowing them to detach from their negative or frustrating emotions. By far, the benefit sub-theme most often cited by participants during the focus group and the interviews was the experience of sharing their experiences and frustrations with each other, termed “shared humanity”. Participants benefitted from hearing that other women are struggling with the same issues they are facing as women, mothers, partners, and in other various roles they occupy through their daily lives. Some comments from the participants on this sub-theme included:

*And I got support from other moms, to find out I’m not the only one that has random things that our kids eat or I’m stressed-out at work but I’m figuring it out or whatever. It was really a beneficial encouragement.*

*I think the main thing in this program, it made me feel like there’s others going through the same things, that are struggling with the same things. I think that was probably the most helpful for me. I needed to take that break for myself.*

*We’re all very isolated and lonely because you’re so focused on your family. You’re not taking time for yourself ... that one hour a week gives you time to just do what you want to do and be with other mothers that you know you’ve got a ton of stuff in common with. It’s huge.*

**Table 5. Qualitative results of the benefits of participation**

MAJOR THEME	SUB-THEMES	QUOTES
BENEFITS	Parenting	<i>"I find that my discipline style with the kids is getting a little more controlled. Before it wouldn't take very much to get me to blow, like full on meltdown so I'm like the third child in the room. I'm finding myself listening to them more and trying to be more calm with the way I'm speaking."</i>
	Stress Relief	<i>"I can sort of pull myself back a little bit better. It is sort of being able to pull myself back, I think is what the mindfulness training really does. It allows you that, that space to say, okay, let's think about what I am stressed about, this is what I am stressed about. That's, I think, mindfulness, it sort of helps me think about that, because you get so wrapped up into everything that is going on."</i>
	Sleep	<i>"Really, I could get emotional so I'm like 'This stuff works, it has changed so much for me, I'm actually getting rest every night.' Even on the nights when things are rough, I'm still able to get back to sleep and get a little bit of sleep in between. It's been huge."</i>
	Tools/Preparation	<i>"I think I feel pretty confident about being able to do those things. I feel confident that I've got the resources I need now, even more than I thought I did before. I was like, I've been to Weight Watchers, I know what you're supposed to eat. I feel more confident in understanding nutrition a lot better now, and I feel more confident in having, like I said, resources for when I do get stressed out that can access."</i>
	Shared Humanity	<i>"It was nice to be in a group where people said, 'I do this because I need it to be able to take care of my family.'" It was almost that encouragement that I needed to say, "Yes, for an hour my husband can keep my child twice a week and it's okay."  <i>"I think mentally, it helped me to come and see, 'I'm not the only one."                      "I think the comment about, 'We're all in this together and it's good to know that I'm not the only one that's going through this,' is important. I think that along with that self-affirmation, we need to remember, there are a whole lot of other people who are doing this very same thing right now."</i></i>

### 3.5. Knowledge brokering

In regards to knowledge brokering, the intervention demonstrated many of the intended effects, including sub-themes like Diffusion (where participants transferred knowledge and skills to other individuals), Crossover (when participants reported that the program demonstrated effects on specific areas of their life unrelated to being a mother), and Peer Education (when participants expressed that others in the group influenced their knowledge or skills, independently of the facilitators) (see Table 6). Most often, participants reported Diffusion as sharing the information they were learning with their spouses and parents. It was less common that they shared the information with their children, although several participants did, including one participant who wrote a special song about mindfulness that she incorporated into a bedtime ritual with her child. In regards to Perception Change, participants described transformations in their understanding of mindfulness, but also a greater understanding of their own reactivity to daily stressors. One participant in particular described a new understanding of self-respect and value of self and others because of her participation in the Slow Down intervention. She said:

*I guess if you'd said mindfulness before, I'd have thought hippie, flaky, things that I'm generally not. I generally didn't think about that, at all. I was just like, "I'm hungry. I'm eating all that." No regard for the long-term effects. I was a very kind of short-sighted person, but after thinking about it, it's not ... It's about the fact that what I'm putting in my body or what I'm putting in my family's bodies is important not just today to get dinner over with, but long-term and results in my own life and habits for my kids. Yeah, it's just one little meal or it's just one little snack or whatever, but it's going to have long-term consequences. I need to think about doing better things and being respectful of the fact that I should take the time to make something better, I should take a little extra money to do something as opposed to just whatever to get it done, because we're worth that.*

**Table 6. Qualitative results of knowledge brokering**

MAJOR THEME	SUB-THEMES	QUOTES
<b>KNOWLEDGE BROKERING</b>	Knowledge Gained	<i>"I did not know that much about trans fats, or saturated, or unsaturated. That's I'm watching a lot on. Then sugars, I'm trying to avoid as much as every sugars that I can."</i>
	Diffusion	<i>"It was helpful because then I used to go back home I was sharing whatever somebody was saying with my husband. He was like, 'That's a great resource.' Like we never get to know all this, but just meeting 10 other moms, or 5 other moms, is just helpful."  <i>"I've mentioned to him [my husband] a lot of stuff that I've learned and whatever about the nutrition facts and stuff that I've learned. We haven't been to McDonald's since then. I think we once once in the past maybe three months or so, and we were both so disgusted by it that we haven't been back since. We where going probably once a week. Like on Saturday afternoon we'd take the kids for lunch there. We're not doing that now."</i></i>
	Crossover	<i>It's every part of my life more now. Decisions that I make, choices that I make, my actions, how I communicate ... Even just, "Why am I looking at my phone? Put that down." You know what I mean? Just enjoy this time. I don't need all this technology. I feel like I'm just more aware in general, overall."</i>
	Perception Change	<i>"Now on a day to day basis, I'm still eating Oreo's. I don't want to give you that impression, but I think I've just realised that it's not so much what I deserve or what I don't deserve, it's that I deserve to respect myself and make better choices for myself."  <i>"I have thought more about being Mindful of things and I never truly understood Mindfulness until this class. I thought you were Mindful of what you ate or how much you ate; I didn't think about Mindfully just, how does this taste? Or, they didn't have to do what they did. It was a kind gesture. It taught me to broaden my definition."  <i>"Before that I always thought that meditation was something that not everybody can do."</i></i></i>
	Peer Education	<i>"I was like, 'No, this is something for slow people.' Then I went to this program the way your guys explained it, and the exercises that we had, and talking to the people, is just not being slow. It's just being enjoying the moment kind of thing. That was helpful."  <i>"Learning from other people in the program too. I think Elisabeth was the one who said, 'Mix the wheat noodles with the white noodles.' That's a tip that I've been using, so that was helpful."</i></i>

Two participants described realizations that mindfulness could be used to accept negative emotions like frustration or to make tedious activities like sweeping the floor more tolerable. Many of the participants described the increased applicability of the mindfulness skills to other areas of their lives because their definition of mindfulness had changed or broadened. They now understood mindfulness to include gratitude for short moments alone, quiet time, something desirable happening (e.g. their child gained admission to an exclusive preschool), or other small, but positive events in daily life.

#### 4. Discussion

Practical, community-based interventions are warranted to enhance the dissemination, external validity, and generalizability of mindfulness-based programs for all audiences. Audiences that have the potential to benefit the most from evidence-based stress management tools and their connection to dietary patterns, like mothers with young children, should be especially considered for study. These study findings support the translational potential of the Slow Down intervention as an innovative approach to provide holistic nutrition education and stress management tools to mothers who have young children.

In order to have an impact on public health, interventions must demonstrate effectiveness in real-world practice settings. The Slow Down intervention's effectiveness at improving participants' self-efficacy was generally high, but often included mixed statements, indicating uncertainty about maintaining intervention target behaviors long-term. Although time was spent during the

intervention to build participants' confidence by developing action plans, more attention should be given to this task during future interventions, so that participants complete the intervention with strategies that have been tested or vetted (by them or by other participants) for effectiveness and feasibility. Self-efficacy is also related to the specificity of the task or behaviors. For example, some mothers may feel confident practicing mindfulness exercises for stress management at home, but not work, or may feel confident practicing guided imagery, but not progressive muscle relaxation. Thus, it is important to determine participants' self-efficacy for performing each task or behavior and in specific environments or situations through a more comprehensive evaluation (Abusabha & Achterberg, 1997).

The results suggest there are a multitude of benefits for participants practicing mindfulness in regards to sleep, improved parenting, and emotion regulation. Increased social support was cited as a major benefit by almost every participant in this study. Previous studies have shown that social support is strongly linked to maternal stress (Mulsow, Caldera, Pursley, Reifman, & Huston, 2002). Likewise, both general and tailored social support that addresses racial discrimination improves psychological well-being for Black American and African-American women experiencing stress as a result of systemic and interpersonal racism (Seawell, Cutrona, & Russell, 2014). Given that this study and the majority of mindfulness research has been conducted with predominantly white American and European American study populations, efforts need to be dedicated to recruiting Black and other people of color into study populations and tailoring intervention content to address specific stressors related to experiencing racism and discrimination (Sobczak & West, 2013).

Participants reported barriers to practicing mindfulness-based stress management and making healthy eating decisions, like perceived or actual time, seasonality, and family or spouse/partner buy-in. This intervention targeted mothers, similar to most of the evidence base for child feeding research that focuses on mothers as the nutritional gatekeepers (Chadwick, Crawford, & Ly, 2013). Fathers' or other caregivers' roles are, therefore, underrepresented, leading to considerable gaps in evidence of the efficacy of available interventions to other caregivers (Morgan et al., 2017). Consequently, although there are barriers that cannot be reasonably affected through the type of intervention described here (e.g. time), future studies should employ strategies to include other members of the household in the intervention and spend time during intervention education sessions to assist participants with crafting actionable plans meant to increase family buy-in.

The position of participant as knowledge broker as a result of the facilitated dialogue approach contributed to several important outcomes. First, it fostered an environment that emphasized camaraderie and shared experiences that were essential for knowledge transfer and high participation in group sessions. Peer education like this is powerful because the knowledge is typically shared by the participants because it was previously successful for them, giving it further credibility. This can often translate to greater participant-level adoption of target intervention behaviors, although future interventions should be sure to evaluate this specifically. Second, it facilitated knowledge transfer outside of the intervention setting and participants to include spouses/partners, children, and other people within and around the family structure (e.g. parents, colleagues), increasing the impact of participating in the intervention (Moestue & Huttly, 2008).

Taken together, these results are important because they expand the limited evidence of using mindfulness-based interventions to affect dietary behavior and stress management and is the first such known intervention to target mothers who have young children (Salmoirago-Blotcher, Hunsinger, Morgan, Fischer, & Carmody, 2013). The results also provide a much-needed starting point for researchers and practitioners seeking to improve dissemination and implementation of mindfulness-based stress management and dietary interventions in community-based public health practice settings (Le & Gobert, 2015). Use of program planning and evaluation frameworks like Glasgow's RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) and participatory research methods could further improve the translation of mindfulness research into effective practice (Glasgow, Lichtenstein, & Marcus, 2003).

Finally, these results add more evidence to the wide-ranging benefits participants could experience with the setting-level adoption of more holistic approaches to health promotion interventions, that include psychological health and stress management (Hobel, Goldstein, & Barrett, 2008; Jauch-Chara & Oltmanns, 2014; Rustad & Smith, 2013). Participants in this study reported health-related perceived benefits that were beyond the intent of the intervention, to include improvements in their parenting and discipline styles, sleep habits, and approaches and mindsets for self-care, enhancing the intervention's targeted behavior change outcomes and participant acceptability of the intervention.

Limitations of this study include the relative homogeneity of the study population and the lack of a control or randomised design for the intervention. There was also no specific data collected to illustrate which intervention components were most or least effective. Likewise, given the increased social support that most participants reported, we are unable to determine if the results were an effect of the mindfulness skills or the social support received through participating, or more likely, a combination of both. Data on outcome measurements for healthy eating patterns and behaviors has been reported elsewhere, but to understand the impact of mindfulness practice on these behaviors, much longer follow-up periods are required. This was a pilot, though, so these results are encouraging and warrant further evaluation of the intervention impact, both short-term and long-term, on participants representing a wider variety of sociodemographics with a larger sample. The continued use of qualitative methods is also critical to understand intervention effectiveness and how to best implement mindfulness-based interventions with diverse audiences. Future studies should focus on understanding the transferability of this type of intervention beyond mothers, to include other household members or caregivers, as a way to increase participant-level adoption of healthy behaviors and sustainability of intervention target behaviors in the long-term.

## 5. Implications for policy and practice

This study offered several implications for research and practice of mindfulness in community-based settings. The benefits of participating in a mindfulness-based stress management and nutrition education program could be helpful for a variety of different study populations and practice-based audiences. In particular, populations that experience the unique stressors of social disadvantages are a potential audience for targeted programming and research. Use of community-engaged, participatory formative research to guide adaptation of existing interventions like the Slow Down intervention would provide evidence on acceptability, feasibility, and barriers to participation for socially disadvantaged populations and improve the reach and sustainability of implementation.

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### Declaration of Interests

The authors have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript

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