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Mindful feeding: Associations with COVID-19 related parent stress and child eating behavior

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ABSTRACT

Parent perceived stress has been associated with child obesogenic eating, as parents who are stressed may be less responsive to their children during mealtimes (Gemmill et al., 2013). More recently, mindfulness-based interventions have successfully reduced people’s stress levels. However, less is known regarding the role of mindfulness in the child feeding context. In this study, 249 parents of children between the ages of 3 and 12 completed a 20-minute online study to examine the associations among COVID-19 related parent stress (hereby referred to as parent stress), mindful feeding, and child obesogenic eating (i.e., food responsiveness, enjoyment of food, emotional overeating, and desire to drink). As hypothesized, we found that greater parent stress was associated with lower mindful feeding and greater child obesogenic eating. Furthermore, findings showed that parent stress interacted with mindful feeding to predict certain child obesogenic eating (i.e., food responsiveness, emotional overeating). Emotional overeating and food responsiveness were higher in children among parents with higher stress levels and lower levels of mindful feeding when compared to children of parents with greater mindful feeding. Taken together, these findings suggest the potential of mindful feeding in buffering the association between parent stress and child obesogenic eating.

1. Introduction

Childhood obesity is a prevalent health issue in the U.S. Approximately 18.5% of children and adolescents in the U.S. (roughly 13.7 million) are overweight and obese (Centers for Disease Control and Prevention, 2021). Without prevention, childhood obesity persists into adulthood with lifelong health complications (e.g., cardiovascular diseases, diabetes, and psychosocial problems; Jansen et al., 2012). Hence, it is important to identify factors to reduce childhood obesity risk. One of the factors that has been examined extensively is the role of parents.

1.1. Parent stress

Stressful experiences are associated with poorer health outcomes (Hill et al., 2018). For parents, stressors, such as unemployment, major life events, food insecurity, and child illnesses, can result in changes to parents’ eating behavior (i.e., adoption of poor eating habits). As of the recent COVID-19 pandemic, families have been introduced to an additional stressor, given its novelty and unpredictability. In a study conducted by Brown et al. (2020), the associations between the COVID-19 pandemic and parental perceived stress were examined. Results showed that greater COVID-19 related stressors were associated with higher parenting stress. In addition, it was also found that parental perceived control over stressors was negatively correlated with parenting stress, with lower parental perceived control being associated with more parenting stress. Furthermore, Adams et al. (2021) found that parents reported change in children’s daily routines, anxiety related to the COVID-19 pandemic, and children’s online schooling as common stressors that influenced their parenting during the COVID-19 pandemic. Parents reported an increase in parenting-specific stress compared with before the COVID-19 pandemic (Adams et al., 2021). Taken together, the COVID-19 pandemic experiences are perceived as stressful for many families.

Prior research has also shown associations between parent stress and food parenting. For example, higher parent stress in response to household food insecurity was associated with more controlling food parenting practices (e.g., restriction; Berge et al., 2020; Gemmill et al., 2013). In addition, other research also found that parents who reported
chronic elevated stress levels served significantly less portions of fruit and vegetables than parents who reported resolved life events (Berge et al., 2018). Ultimately, parent stress is an important characteristic to consider when addressing food parenting due to its associations on child dietary health and food-related behaviors. By understanding factors associated with parent stress and parent food parenting, researchers and interventions may be able to conduct potential interventions for at risk eating behaviors and weight status in childhood.

1.2. Child eating and weight outcomes

Given that parent stress was associated with poorer food parenting, it is not surprising that findings also showed that parent stress was associated with unhealthy eating in children. Jansen et al. (2021) conducted a study with 318 parents of children between 2 and 12 years of age and found that higher levels of COVID-19 stress were associated with greater child intake of sweet and savory snacks. Paris et al. (2012) also conducted a study with 2119 caregivers and their children between the ages of 3–17, and similar findings showed that parent stress was associated with higher levels of fast-food consumption and child obesity rate. Further, other research showed that the associations between parent stress and child unhealthy eating were stronger among children with certain characteristics (Baskind et al., 2019). Specifically, Baskind et al. (2019) observed 689 parent-child dyads of children between the ages of 2–12 and found that amongst children with overweight or obesity, parental perceived stress was correlated with increased fast-food consumption and lower physical activity. Additionally, this association remained most significant among children who were in lower-income households and identified as non-Hispanic black. Taken together, when parents are stressed, parents may utilize less child-centered food parenting such as more coercive food parenting, pay less attention to their children’s hunger and satiety cues, and provide less healthy food options, which subsequently relate to unhealthy eating behaviors in children.

1.3. Mindful feeding

Mindful feeding is defined as a parent’s approach to feeding and mealtimes, with higher mindful feeding indicating that parents are attentive and responsive to their child’s emotional and behavioral cues during mealtimes (Emley et al., 2017). Albeit limited, findings showed that mindful feeding has been associated with positive food parenting (Emley et al., 2017). Specifically, in Meers’s 2013 study with parents of 3- to 6-year-old children, it was found that higher mindful feeding was associated with lower use of food as a reward, increased healthy food options at home, and increased encouragement for well-balanced diets. Hence, for this study, we focused on parent stress and child obesogenic eating. From the ages of 3–12 years old, children still typically rely on their parents to prepare and provide them with food. Therefore, for this study, we hypothesized that mindful feeding would mitigate the association between parent stress and child obesogenic eating. Third, we examined whether mindful feeding moderates the association between parent stress and child obesogenic eating. Based on existing literature (Goodman et al., 2020; Jordan et al., 2014), we hypothesized that greater mindful feeding is associated with less child obesogenic eating. Thus, we conducted a study with 2119 caregivers and their children between the ages of 3–17, and similar findings showed that parent stress was associated with higher levels of fast-food consumption and child obesity rate.

1.4. The current study and hypotheses

The objective of this study was to examine the associations among parent stress, mindful feeding, and child obesogenic eating. First, we examined the association between parent stress and mindful feeding. Based on the existing literature (Goodman et al., 2020; Gouveia et al., 2019), we hypothesized that greater parent stress is related to lower mindful feeding. Second, we examined the association between mindful feeding and child obesogenic eating. Based on existing literature (Goodman et al., 2020; Jordan et al., 2014), we hypothesized that greater mindful feeding is associated with less child obesogenic eating. Third, we examined whether mindful feeding moderates the association between parent stress and child obesogenic eating. From the ages of 3–12 years old, children still typically rely on their parents to prepare and provide them with food. Hence, for this study, we focused on parent stress and child obesogenic eating. The objective of this study was to examine the associations among parent stress, mindful feeding, and child obesogenic eating. First, we examined the association between parent stress and mindful feeding. Based on the existing literature (Goodman et al., 2020; Gouveia et al., 2019), we hypothesized that greater parent stress is related to lower mindful feeding. Second, we examined the association between mindful feeding and child obesogenic eating. Based on existing literature (Goodman et al., 2020; Jordan et al., 2014), we hypothesized that greater mindful feeding is associated with less child obesogenic eating. Third, we examined whether mindful feeding moderates the association between parent stress and child obesogenic eating. From the ages of 3–12 years old, children still typically rely on their parents to prepare and provide them with food. Hence, for this study, we focused on parent stress and child obesogenic eating. The objective of this study was to examine the associations among parent stress, mindful feeding, and child obesogenic eating. First, we examined the association between parent stress and mindful feeding. Based on the existing literature (Goodman et al., 2020; Gouveia et al., 2019), we hypothesized that greater parent stress is related to lower mindful feeding. Second, we examined the association between mindful feeding and child obesogenic eating. Based on existing literature (Goodman et al., 2020; Jordan et al., 2014), we hypothesized that greater mindful feeding is associated with less child obesogenic eating. Third, we examined whether mindful feeding moderates the association between parent stress and child obesogenic eating.

2. Materials and methods

2.1. Participants and procedure

Participants were recruited using Amazon’s Mechanical Turk (MTurk), which is a platform for researchers to recruit participants and administer studies. Participants interested in completing the questionnaire followed the link from Amazon’s MTurk to the survey on Qualtrics. Participants were presented with informed consent and indicated consent by clicking “next” on the survey. Responses were monitored and screened depending on survey completion, overall completion time, and incorrect responses to control questions. Inclusion criteria included 1) Participants are 18 years or older; 2) Participants have a child between the ages of 3 and 12 years old; 3) U.S. resident; 4) at least a 99% approval rating on MTurk; and 5) successful completion of attention/bot check items. Participants that met the inclusion and exclusion criteria received $4 upon completion and submission of the survey. This study was approved by the University of Toledo’s Institutional Review Board and was performed according to the principles of the Declaration of Helsinki.

A total of 249 parents (57.0% female) completed the survey between June 2021 and August 2021. Parents’ age ranged from 23.67 to 67.83 years ($M = 38.39$ years, $SD = 7.68$ years). Majority of the parents (82.7%) identified as White, 9.3% as African American, 4.8% as Asian, 2.0% as Bi-racial or Multi-racial, 0.8% as American Indian or Alaskan Native, and 0.4% as Other. Additionally, most parents (86.5%) did not identify themselves as Hispanic/Latino or of Spanish origin. Majority of the parents were married (77.9%), had a household income of $50,000 to $79,999 (42.2%), earned a 4-year college degree (53.0%), and had a monthly child (52.2%). Child’s age ranged from 3.00 to 12.83 years ($M = 7.32$ years, $SD = 2.81$ years). Parents identified the majority of the child’s eating (79.5%) as White, 9.6% as African American, 4.0% as Asian, 5.6% as Bi-racial or Multi-racial, 0.8% as American Indian or Alaskan Native, and 0.4% as Other. Parents identified that the majority of the children (83.5%) were not Hispanic/Latino or of Spanish origin.

2.2. Measures

2.2.1. Parent stress

The COVID-19 Family Stress Screener (Huth-Bock, 2020; unpublished measure; Appendix A) is an eleven-item measure that assesses COVID-19 related stress on families. Parents indicated their stress levels on the 5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). This measure has good internal reliability ($\alpha = 0.92$). Higher mean scores indicated higher levels of parent stress.
2.2.2. Mindful feeding

The Mindful Feeding Questionnaire (Meers, 2013) assesses levels of mindful food parenting. Parents completed the 4-item Present-Centered Awareness subscale (1). When I feed my child, I am often distracted by other thoughts (reverse coded), 2. When I am feeding my child, I am completely focused on what I am doing, 3. I tend to feed my child while I am doing many other things (reverse coded), 4. I rush through meals with my child without really paying attention to him or her (reverse coded). Parents responded on a 5-point Likert scale ranging from Never (1) to Always (5). Higher mean scores indicated higher levels of mindful feeding.

2.2.3. Child obesogenic eating

The Children’s Eating Behavior Questionnaire (Wardle et al., 2001) is a parent report measure which assesses the eating styles of children. Parents completed the Food Responsiveness (5 items; e.g., My child is always asking for food), Emotional Overeating (4 items; e.g., My child eats more when worried), Enjoyment of Food (4 items, e.g., My child loves food), and Desire to Drink (3 items; e.g., My child is always asking for a drink) subscales. Parents rated these items using a 5-point Likert scale ranging from Never (1) to Always (5) for each question. The subscales of food responsiveness, emotional overeating, enjoyment of food, and desire to drink have good internal reliabilities ranging from 0.80 to 0.88. Higher mean scores indicated more obesogenic child eating behaviors.

2.3. Statistical analyses

First, data were analyzed using SPSS version 27. Descriptive statistics were computed for all key study variables (Table 1). All data were inspected for normality, skewness, and kurtosis, and found to be normally distributed. Second, we examined the association between parent stress and mindful feeding using Pearson correlation analyses. Third, we examined the association between mindful feeding and child obesogenic eating using Pearson correlation analyses. Fourth, we examined whether mindful feeding moderates the associations between parent stress and child obesogenic eating. Regression analyses were conducted to examine whether parent stress interacted with mindful feeding to predict child obesogenic eating (i.e., food responsiveness, emotional overeating, enjoyment of food, and desire to drink; Table 2).

Partially supporting our hypotheses, regression analyses showed that parent stress interacted with mindful feeding to predict food responsiveness and emotional overeating, but not enjoyment of food and desire to drink (Table 2). Specifically, findings revealed that food responsiveness in children was higher among those who had parents with higher stress levels and lower mindful feeding compared to those with higher stress levels but higher mindful feeding (F (3, 245) = 27.26, p < .001, R² = 0.25; Fig. 1). Additionally, findings showed that emotional overeating in children was higher among those who had parents with higher stress levels and lower mindful feeding compared to those with higher stress levels but higher mindful feeding (F (3, 245) = 45.77, p < .001, R² = 0.36; Fig. 2).

4. Discussion

In this study, we examined the relationship among parent stress, child obesogenic eating, and parent mindful feeding. Findings showed that higher levels of parent stress were associated with lower levels of mindful feeding; greater levels of mindful feeding were associated with lower levels of certain child obesogenic eating. In addition, findings showed that higher parent stress interacted with lower mindful feeding to predict higher levels of child food responsiveness and emotional overeating. Consistent with the hypothesis, it was found that greater parent stress was associated with lower mindful feeding, supporting prior research by Gouveia et al. (2019) which found that greater parent stress was associated with lower mindful parenting. There are a few plausible explanations for our findings. Considering that mindful feeding requires parents to be fully present during the child feeding interaction, it is...
likely that under stressful conditions, parents may no longer have enough cognitive capacities to be fully engaged. Studies have found that continuous exposure to stressful conditions could have negative impacts on cognitive skills such as impairment of working memory, attention, and response inhibition (Griotti et al., 2019). By adopting mindfulness-based practices, parents may be able to focus on the present moment which could, in turn, help them regulate stress levels and cope with the demands of parenting. Furthermore, in examining the link between mindful feeding and child obesogenic eating, we observed that higher levels of mindful feeding were associated with lower levels of child obesogenic eating, which is consistent with prior research that found higher levels of mindful feeding were predictive of healthier child eating, such as increased fruit and vegetable intake and lower sugar intake (Emley et al., 2017). There are a few potential explanations for this finding. Parents who tend to engage in mindful feeding recognize the importance of present awareness and most likely encourage their children to eat their meals without external distractions such as television and monitors (Pyper et al., 2016). By creating an atmosphere free from distractions, parents may be better able to observe their children’s mindful eating practices such as eating slower and satiety cues, which promote healthier eating behaviors. Another possible explanation is that parents who engage in mindful feeding are able to modify their feeding practices accordingly (e.g., stop feeding if the child indicates they are full).

Lastly, we examined the interactions of parent stress and mindful feeding on child obesogenic eating. Findings showed that parent stress interacted with mindful feeding to predict child food responsiveness and emotional overeating. It was found that higher mindful feeding mitigated the association between parent stress and child obesogenic eating, such that emotional overeating and food responsiveness were higher in children among parents with higher stress levels and lower levels of mindful feeding when compared to children of parents with greater mindful feeding. It is likely that parents who utilize mindful feeding skills have better ability to cope with stress. Indeed, prior studies found that higher mindfulness and mindful parenting were associated with lower parenting stress (Gouveia et al., 2016), and that parents who experience lower levels of COVID-19 stress utilized feeding strategies that were more responsive to child hunger and satiety cues (Frankel et al., 2021; Jansen et al., 2021). In addition, other studies also showed that mindful feeding was associated with positive food parenting, such that higher mindful feeding was associated with lower use of food as a reward, increased healthy food options at home, and increased encouragement for well-balanced diets (Emley et al., 2017; Goodman et al., 2020; Meers, 2013). It is possible that the parents who are stressed and have lower mindful feeding skills may be using less responsive food parenting, thus increasing child obesogenic eating. However, given that food parenting was not examined in this study, future studies should consider including this variable to better understand these processes.

### 4.1. Limitations

The COVID-19 stress questionnaire specifically measured the effects of COVID-19 on various areas within the participants’ lives (e.g., child care, financial, work), which was prevalent during the time of data collection (June–August 2021), thus when parents have better mindful feeding skills, it may allow them to better manage their children’s eating while experiencing stress during uncertain times. Nonetheless, future research may consider replicating these findings when COVID-19 has become endemic.

The cross-sectional design in this study precluded us from drawing causal connections. Research has shown the food parenting tends to be bi-directional, hence both parents and children influence food parenting and food intake. A longitudinal design may help to explore how mindful feeding, parent stress, and child eating behavior influence each other over time. Additionally, since the questionnaires utilized in this study were self-report, the results we obtained may be prone to self-report bias.
and social-desirability bias, amongst others. Thus, future research may also consider utilizing observational designs to validate self-report questionnaires. Furthermore, experimental designs may be utilized, so causation can be established between the variables.

Another limitation of this study is that majority of the parents that participated identified as White and reported earning a college degree. Thus, the results from this study cannot be generalized to individuals of different races and educational backgrounds. For example, prior research has found that racial and ethnic differences play a role in parenting stress (Nam et al., 2015). Future studies should include a more diverse parent population to aid in the generalization of results. Another limitation to consider is that only the Present-Centered Awareness subscale of the Mindful Feeding Practices Questionnaire was utilized in this study. The low reliabilities of the other subscales (Present-Centered Emotional Awareness, Regulate-Reactivity, and Nonjudgmental Receptivity) within the Mindful Feeding Practices Questionnaire precluded us from using these subscales. Yet, it is important to note that the Present-Centered Awareness subscale had the highest reliability and had been used in prior work to capture parent mindful feeding (Emley et al., 2017). Nonetheless, future studies may consider other measures and methods to measure mindful feeding for a more robust analysis.

We did not collect food parenting and parenting styles variables, which precluded us from exploring its associations with parent stress, mindful feeding, and child eating behaviors. Studies have shown that parents with higher levels of stress may tend to engage in more controlling food parenting such as pressure to eat (Frankel et al., 2021; Gouveia et al., 2019; Jansen et al., 2021). Hence, controlling food parenting could be another potential covariate to be explored in relation to mindful feeding. Certain parenting styles (authoritarian and permisive) have also been associated with lower mindful feeding and food parenting strategies associated with fewer healthy outcomes (Goodman et al., 2020; Gouveia et al., 2019). Thus, different parenting styles (authoritative, authoritarian, and permissive) may also be potential covariates to explore in relation to parent stress, mindful feeding, and child eating behavior. Stress may affect parents’ abilities to provide proper attention and care to their children in the feeding context and may explain why parents who reported higher levels of stress engaged in lower mindful feeding when tending to their children in our study.

5. Conclusion

Considering the great influence parents have on child eating behavior, parent characteristics can potentially play a major role in the development of their child’s eating behaviors. Throughout the years, research has shown that parent stress is one such parent characteristic that has been associated with child obesogenic eating. Mindfulness based practices, especially within the feeding context, have become an area of interest in hopes that it could be a potential point of intervention for negative child eating behaviors and the development of childhood obesity. In our study, we examined the relations between mindful feeding, parent stress, and child eating behavior. Our findings supported past research and further provided insight into the potential role of mindful feeding as a moderator of parent stress and child eating behavior. The association between high parent stress and child obesogenic eating was mitigated by higher levels of parent mindful feeding. With further validation, developing mindful feeding skills may be a promising way to improve child health outcomes and use parent-based interventions to reduce the likelihood of childhood obesity.

Author contributions

M.V. drafted the first manuscript and all authors edited later versions of the manuscript. M.V. and C.T. conceptualized this research study. M. V. and C.T. performed data analyses. All authors approve of the final article.

Declaration of interests

None.

Ethical statement

Data and Code Availability. The data that support the findings of this study are available from the corresponding author, M.V., upon reasonable request.

Studies in humans. This research involving human participants have been performed in accordance with the Declaration of Helsinki. This research was reviewed and approved by the University of Toledo Institutional Review Board. All participants provided informed consent before participating.

Submission Declaration. This manuscript has not been published previously or is not under consideration for publication elsewhere.

Submission Verification. All authors have approved the manuscript’s content.

Declaration of competing interest

The authors declare no conflicts of interest in preparing this article.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

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