RESEARCH
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The Mindful Eating Behavior Scale: Development and Psychometric Properties in a Sample of Dutch Adults Aged 55 Years and Older

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ABSTRACT

Background Earlier scales on mindful eating do not measure mindful eating independent from emotional or external eating, or mindful eating in common situations.

Objective The objective was to develop a new instrument to measure the attention element of mindful eating, the Mindful Eating Behavior Scale (MEBS), and to compute the internal structure, reliabilities, and convergent validity of this scale.

Design A cross-sectional ancillary study within the Longitudinal Aging Study Amsterdam was conducted between fall 2014 and spring 2015.

Participants/setting Participants were 1,227 Dutch adults aged 55 years and older from the Longitudinal Aging Study Amsterdam.

Main outcome measure A selection of 20 items from existing instruments was used to design an initial version of the MEBS.

Statistical analyses performed The internal structure of the MEBS was evaluated using an exploratory structural equation modeling approach on half of the sample and confirmatory factor analysis on the whole sample to develop the final version of the scale. The measurement invariance of the scores was tested with respect to sex, age, and body mass index. Reliabilities of subscales were determined with Cronbach's α. To test convergent validity, the scores of the new scale were correlated with theoretically relevant variables.

Results Two items were deleted because of low item loadings and one item because of high correlated uniqueness. The final confirmatory factor analysis model with 17 items and four domains (Focused Eating, Hunger and Satiety Cues, Eating with Awareness, and Eating without Distraction) showed good fit (comparative fit index=0.97, Tucker-Lewis index=0.96, and root mean square error of approximation=0.04). Measurement invariance was found for sex, age, and body mass index. Cronbach's α values were medium to high (.70 to .89). Most correlations were in the expected directions, which indicated good preliminary convergent validity.

Conclusions The MEBS was successfully developed consisting of 17 items and four domains. Because of low interfactor correlations, a total score combining the four domains should not be computed. The MEBS showed good internal consistency and preliminary convergent validity in a sample of Dutch adults aged 55 years and older.
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MINDFULNESS INTERVENTIONS HAVE BEEN SUGGESTED for a range of health issues. Reviews show that mindfulness-based therapies and interventions are among others effective in treating eating disorders,[1] reducing symptoms of depression and/or anxiety in clinical populations,[2,3] reducing emotional reactivity,[4] and increasing subjective well-being and behavior regulation.[4]

Interventions that are based on the concept of mindfulness can be applied to various aspects of life. One of the areas being explored in relation to health is the area of nutrition and food-related behavior. Mindful awareness toward eating may minimize automatic reactions and impulsive reactions, thereby fostering self-regulation.[5,6] Reviews of mindfulness-based interventions specifically focused on eating behavior showed improvements in binge eating,[7,8] emotional and external eating,[7] restrained eating and interoceptive awareness,[9] weight management,[5] mental well-being,[9] and dietary intake.[9]

Studies of mindfulness-based interventions that did not have content related to eating behavior reported smaller effect sizes[8] or no effect on these outcomes.[7] These results

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indicate that domain-specific mindfulness related to eating behavior may play an important role in the prevention and treatment of health issues related to overweight and disordered eating. Mindfulness is a difficult state to fully achieve, so focusing strictly on eating can make it easier to adapt to and more relevant for eating-related behavior.[5]

Mindfulness that is related to eating behavior can be termed mindful eating. At present there are two mindful eating scales: the Mindful Eating Questionnaire (MEQ)[10] and the Mindful Eating Scale (MES).[11] Recently an abbreviated version of the MEQ[12] was developed. For the development of the MEQ[10] six constructs were selected to construct subscales on, including the three constructs emotional eating, external eating, and disinhibition. The MES[11] was developed with the aim of including a subscale to measure nonjudgment—which the MEQ was lacking— and was inspired by two existing general scales for mindfulness. The abbreviated version of the MEQ was developed with the aim of obtaining a shorter tool that would be suitable in health contexts where time constraints are at play.[12] Although these scales make it possible to measure mindfulness specifically targeted at eating behavior, some issues arise that need to be addressed.

Because the MEQ[10] was developed based on existing eating behavior constructs, overlap between these different constructs may exist. For example, the MEQ contains the items "I recognize when food advertisements make me want to eat" and, "When I'm sad I eat to feel better," which assess external and emotional eating (eating in response to food-related cues or to negative mood). Furthermore, some items from the MEQ ask about very specific situations (ie, restaurant, parties, and all-you-can-eat buffets), which makes it difficult to measure general mindful eating in common situations.

The abbreviated version of the MEQ already deals with some of these issues by deleting items that were evaluated by experts as poorly representative of the construct of mindful eating.[12] Although this shortened version of the MEQ thus measures mindful eating conceptually better, it still contains items on external eating (eg, "I notice when I'm eating from a dish or candy just because it's there"), items that ask about specific situations (eg, party or all-you-can-eat buffet), and two items with cross-loadings above 0.20. The test–retest validity and convergent validity were adequate. However, participants from specific settings such as yoga centers or weight-loss centers were overrepresented in the sample. This strategy is useful for allowing comparisons between different groups, although it leads to a composition of the sample that is not representative of the general population.

The MES was developed to be more in line with standard definitions of mindfulness, but a limitation is that the factor analysis was conducted on 127 predominantly female students, and a confirmatory factor analysis in a nonstudent sample was not conducted.[11] Cronbach's α for the unstructured eating factor was only .60,[11] and the items "I snack when I'm bored" and, "I eat between meals" from this factor do not seem to measure mindful eating. The factor nonreactivity is more likely an outcome of having learned mindfulness skills as opposed to being implicit in the construct.[13]

For these reasons, the aim was to develop a new instrument to measure mindful eating that does not contain items on emotional and external eating—to open up the possibility to assess the independent effects of mindful eating, asks about general situations, and is evaluated in a large sample that includes people with different socioeconomic backgrounds.

The definition of mindful eating that was used for this new scale is: Eating with attention and awareness. This was based on the definition of mindfulness by Brown and Ryan:[14] "An enhanced attention to and awareness of current experience or present reality." Mindfulness is most often divided into two separate elements: self-regulation of attention in the present moment (the attention element) and paying attention nonjudgmentally (the acceptance element). The focus of this scale is on the attention part because this element is essential: Present moment awareness is needed to be able to pay attention nonjudgmentally.[15] In some earlier studies on the development of mindfulness instruments, an acceptance factor was not found[16] or provided no extra exploratory advantage in the prediction of criterion measures.[17] A recent review showed that there is no conclusive evidence that acceptance could promote changes in eating behavior.[18]

The aim of this study was to develop a new scale to measure the attention element of mindful eating, the Mindful Eating Behavior Scale (MEBS), and test the internal structure and reliabilities. Correlations with relevant variables were computed to establish convergent validity. Because the MEBS should be able to measure mindful eating separately from the eating styles emotional, external, and restrained eating, it was tested whether mindful eating was metrically distinguishable from these eating styles.

RESEARCH SNAPSHOT

Research Question: What is the internal structure, reliability, and convergent validity of the Mindful Eating Behavior Scale, a new instrument to measure mindful eating?

Key Findings: The final confirmatory factor analysis model with 17 items and four domains (Focused Eating, Hunger and Satiety Cues, Eating with Awareness, and Eating without Distraction) showed good fit (comparative fit index=0.97, Tucker-Lewis index=0.96, and root mean square error of approximation=0.04) in a cross-sectional study in a sample of 1,227 Dutch adults aged 55 years and older. Cronbach's α values were medium to high (.70 to .89) and most correlations were in the expected directions, which indicated good preliminary convergent validity.

METHODS

Participants and Procedure

All data were collected within the Longitudinal Aging Study Amsterdam (LASA).[19,20] The LASA sample consists of a representative sample of older adults aged 55 years and older, living in three geographic regions in the Netherlands: Amsterdam, Zwolle, Oss, and the suburbs of these regions. The LASA study started in 1991 with the primary aim to follow physical, cognitive, emotional, and social functioning in relation to ageing.[20] The first cohort of participants participated in 1992-1993 and consisted of 3,107 participants aged 55 to 85 years. The second cohort in 2002-2003 included 1,002 participants aged 55 to 65 years and the third cohort started in 2012-2013 with 1,023 participants aged 55 to 65 years. Follow-up measurements by a main interview,

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