

Jean L. Kristeller

Introduction

Most, if not all of us, eat mindlessly at times. We may overeat at a meal, choose foods without reflection, too often eat to handle stress, or more painfully develop an eating disorder. Cultivating mindfulness to create more balanced eating may therefore have widespread application, both for disorders such as binge eating or bulimia, or to help people create more balanced eating for other reasons, including better health and a decreased sense of struggle.

Eating engages complex self-regulatory processes, most fundamentally responding to needs for food energy, nutrition, and physical satiety processes. Such basic needs are also complemented by many other uses of food—to soothe and comfort, to celebrate, to socialize, or to obtain pleasure. Maintaining a balance between physical needs for food and the psychological value of eating often occurs flexibly and without much awareness. Among the physiological systems in the body that are necessary for survival, eating is perhaps unique in its flexible nature. In contrast, it is possible to override needs for sleep

or fluids for only a few hours before it becomes difficult to function effectively. Yet people overeat or undereat regularly for extended periods of time, overriding feedback signals of physical hunger and satiety, and fluctuating tremendously in the nutritional value of their food intake. Overriding internal signals may be more exaggerated in individuals with eating disorders but also occurs in individuals without any eating-related problems. Such variation was protective from an evolutionary perspective, but with ready access to highly palatable food has become problematic (King, 2013).

The process of eating also involves virtually all the other systems that are being explored in regard to the impact of mindfulness on self-regulation, usefully understood from a multi-domain model of meditation effects (Kristeller, 2003, 2007). Eating is inherently a behavioral process, but it also involves emotions, thought processes, self-judgment and self-identity, and social relationships. The meaning of food may also engage spiritual experience, as beautifully addressed in several books on mindful eating (e.g., Altman, 2002; Bays, 2009; Hanh & Cheung, 2010; Kabatznick, 1998). This chapter explores a range of mindfulness practices both in regard to the clinical development and research evidence for the Mindfulness-Based Eating Awareness Training (MB-EAT) program (Kristeller, 2016; Kristeller & Wolever, 2011; Kristeller, Wolever, & Sheets, 2013; Kristeller & Wolever, 2016), and in regard to broader theoretical issues. The clinical

J.L. Kristeller (✉)
Department of Psychology, Indiana State University,
Terre Haute, IN 47809, USA
e-mail: jkristeller@indstate.edu

focus will extend from milder levels of dysregulated eating, experienced at times by most individuals, to the extreme degree of dysfunction observed in those with binge eating disorder (BED).

Self-Regulation Theory, Mindful Eating, and Meditation

From its inception, MB-EAT was informed by self-regulation theory, linked with early models of food intake regulation that acknowledged the complex interplay of psychological and physiological control processes (Rodin, 1978, 1981; Schachter, 1971; Schachter & Rodin, 1974). Early psychobiological formulations of self-regulation theory (Schwartz, 1975; Shapiro & Schwartz, 2000) focused on the importance of interoceptive awareness, particularly of physiological processes, as a core element of internal regulatory processes. These perspectives on self-regulation expanded on early theories of physiological homeostasis (e.g., Cannon, 1932) and systems theory (e.g., Bertalanffy, 1968; Miller, 1978).

A hallmark expression of early self-regulation theory were the biofeedback-based therapies (Schwartz, 1975; Patel, 1977). Biofeedback is effective because it facilitates interoceptive attention and awareness to assist individuals to manage stress-related physical symptoms. The link was then made to parallel aspects of meditation-based “relaxation training” that also facilitates psychobiological self-regulation by cultivating processes of attention and awareness (Cuthbert, Kristeller, Simons, Hodes, & Lang, 1981; Davidson, Goleman, & Schwartz, 1976; Kristeller, 1977; Schwartz, 1975). Although meditation practice has not been shown to be adequate to facilitate awareness of very subtle signals, such as heart rate (Khalsa et al., 2008), meditators have been shown to better track respiratory processes, a system more available to interoceptive awareness (Daubenmier, Sze, Kerr, Kemeny, & Mehling, 2013). Even though there are no easily applied external monitors, such as electrodes, to magnify subtle body signals of hunger and satiety, the self-regulatory value of using mindfulness techniques to cultivate atten-

tion to body signals that are generally available to awareness is clearly parallel.

Self-regulation theory further posits that even complex systems can be maintained and re-regulated with relatively little sense of effort or struggle (Carver & Scheier, 1982, 1998) if appropriate feedback mechanisms are engaged. This is in contrast to willpower models that assume the need for ongoing vigilance for extended periods of time, or in the case of some addiction models, indefinitely. Within the weight regulation area, “willpower” or abstinence-based models abound; while some individuals internalize recommended constraints, many individuals rebound in regard both to behavior and to weight regain. Although self-control models related to weight management (e.g., Brownell, 2000; Cooper, Fairburn, & Hawker, 2004) have contributed substantially to understanding how individuals can recondition long-standing eating patterns, they have tended to focus on managing externally or emotionally triggered impulses to eat, rather than engaging use of internal feedback systems. One notable exception to this is Linda Craighead’s Appetite Awareness model (Brown, Smith, & Craighead, 2010; Craighead, 2006) in which a core part of treatment involves cultivating attention to hunger and satiety signals.

Regulation and Dysregulation of Food Intake

The importance of interplay between external or non-nutritive triggers for eating vs. internal signals related to physiological feedback systems has long been recognized within experimental and social psychology (Schachter, 1971; Schachter & Rodin, 1974). Decades of research on physiological hunger and satiety mechanisms indicate that such signals are easily overridden by non-nutritive influences, including both psychological and environmental triggers (Capaldi, 1996). It is important to emphasize that this complex interplay is part of normal food intake regulation. Wansink (2007), in his work on mindless eating, has found that individuals make over 200 decisions per day about food, including when to eat, what to eat, choices within a given meal, and

decisions to stop eating, increasing to about 300 decisions for those with significant weight problems (Wansink & Sobal, 2007). Given that complexity, cultivating self-regulatory balance in a flexible rather than constrained manner may be particularly desirable.

The elements involved in physiological regulation of food intake and weight are surprisingly complex. Those most available to interoceptive awareness include hunger signals, such as low blood sugar and stomach growling, taste sensitivity, and signals to terminate eating a particular food (sensory-specific satiety) or an entire meal (fullness, rise in blood sugar) (Capaldi, 1996; Ogden, 2010). Regardless of weight, people vary considerably in their underlying patterns (Drewnowski, 1996; Kristeller & Rodin, 1989) in regard to whether they initiate eating without being physically hungry, eat in response to emotional distress, or continue eating even when sated. In addition, individuals who are obese and report compulsive eating patterns show marked oversensitivity to “external” or “non-nutritive” cues to eat (social, emotional, or conditioned craving for certain foods), and a concomitant desensitization to “internal” cues, particularly related to normal satiety processes. While some models of this imbalance are grounded in biological (e.g., genetic or epigenetic) explanations (Appelhans, 2009), an alternative perspective is that most individuals can become “disconnected” from internal experience, creating patterns of “mindless” eating. Individuals with BED generally acknowledge frequently using eating to manage stress (Goldfield, Adamo, Rutherford, & Legg, 2008), and negative emotions (Chua, Touyz & Hill, 2004; Dunkley & Grilo, 2007), but this may range from relatively benign use of food as a source of comfort to extreme patterns in which eating facilitates dissociation from overwhelming feelings or reflects virtually their only coping mechanism, a significant failure of self-regulation. Individuals with BED also exhibit higher reactivity to food cues (Sobik, Hutchison, & Craighead, 2005), often expressing a sense of incapacity to control urges to eat when appealing food is available.

Deciding when to terminate food intake is also complex. Individuals who are obese and who eat

larger amounts of food tolerate higher levels of stomach fullness and discomfort (Geliebter & Hashim, 2001; Geliebter, Hassid, & Hashim, 2001), both as a result of expanded stomach capacity and a failure to attend to distention signals as indicators for stopping eating. By definition, individuals with BED regularly eat very large quantities of food, well beyond normal feedback signals for satiety (Sysko, Devlin, Walsh, Zimmerli, & Kissileff, 2007). Individuals with BED and/or who are heavier often note that they don’t stop eating “until the food is gone,” or “when they feel too full to eat anymore.” They virtually never mention awareness of more rapidly occurring feedback signals, such as no longer tasting or enjoying the food as much; early shifts in blood sugar that relate to a sense of satiety; or moderate, rather than extreme, feelings of fullness. Sensory-specific satiety or the process by which food loses its appeal as the taste buds in our mouths habituate to specific combinations of flavors is the fastest feedback system (Remick, Polivy, & Pliner, 2009; Sørensen, Møller, Flint, Martens, & Raben, 2003). Evidence suggests that it may be disrupted in obesity or binge eating (Raynor & Epstein, 2001), but functions normally when adequate awareness is brought to the process (Brondel et al., 2007). Ironically, the hedonic value of food is often ignored in treatment of obesity and/or compulsive eating patterns, although it often informs addictive models of excessive food intake (Grosshans, Loeber, & Kiefer, 2011). However, the solution offered is often abstinence, rather than helping individuals cultivate more internalized self-regulation. Paradoxically, little comfort may actually be derived from the food being consumed, unlike for individuals without eating issues who acknowledge using food to manage negative emotions (Kristeller & Rodin, 1989).

Mindfulness Practice: A Self-Regulation Approach

Recent neurocognitive models support the value of meditation practice as a path toward re-regulation (Lutz, Slagter, Dunne, & Davidson, 2008), particularly within complex emotional

systems that require higher level neuro-processing to be brought into better balance. Ryan and Deci's (2000) Self-Determination Theory of mindfulness explicates the value of shifting from *external regulation*, such as is imposed by structured diets, to *integrated regulation* in which intrinsic processes meld with external factors for optimal self-regulation. As MB-EAT began to develop, the role of meditation was shifting from being conceptualized as a relaxation process to being a powerful way to quiet the mind and cultivate self-awareness of internal experience. Mindfulness practice also cultivates the capacity to disengage undesirable reactivity, and to engage processes that more "wisely" inform behavior, also particularly relevant to issues related to eating and food choices (Kristeller, Baer, & Quillian-Wolever, 2006; Wolever & Best, 2009). Meditation has become more appropriately viewed as a way to cultivate a particular quality of attention and awareness, which then mediates a wide range of self-regulatory processes.

Several specific aspects of meditation practice have informed the development of the MB-EAT program. These include both open and guided meditations, and both extended practice and very brief practice. All of these aspects have extensive basis in meditative traditions and play distinct roles in self-regulatory processes (Kristeller, 2007). Sitting practice, whether breath awareness or open awareness, cultivates a more general capacity for experiencing in the moment, whether that moment contains physical feelings, thoughts, or emotions. Guided practice encourages awareness of a specific targeted experience, yet in an observing, stable, nonjudgmental and curious manner. Given the complexity of our relationship to food, guided practices help individuals identify distinct aspects of their eating experience, viewing them with curiosity instead of judgment. These guided practices focus on physical vs. emotional hunger, taste, fullness, and making healthier and wiser food choices. Other therapeutic applications of mindfulness meditation, such as the Mindfulness-Based Stress Reduction Program (Kabat-Zinn, 1990), Mindfulness-Based Cognitive Therapy (Segal, Williams, & Teasdale,

2002), and Mindfulness-Based Relapse Prevention (Bowen, Chawla, & Marlatt, 2011), undertake similar goals in regard to treatment of anxiety disorders, depression, and addictions, also utilizing both mindfulness meditation training and mindfulness exercises specific to the presenting issues and associated therapeutic needs, such as depressive thoughts or urges to drink.

The concepts of "wisdom" or insight, and self-acceptance, core aspects of traditional meditation practice, are also central to the MB-EAT program. Wisdom, from a psychological perspective, has a number of definitions (Sternberg, 1990), but these generally involve exercising good judgment in complex or uncertain situations. Sternberg's balance theory of wisdom focuses on "tacit" rather than "explicit" knowledge; Baltes and Staudinger (1993) frame wisdom in terms of exercising judgment in the "fundamental pragmatics" of life. Within the context of meditation practice, wisdom can be understood from a neuroscience perspective as arising from greater access to and integration of the complexity of experience and knowledge that each person already carries within (Kristeller, 2003; Meeks, Cahn, & Jeste, 2012). Ostafin and Kassman (2012) have demonstrated that even novice meditators increase in creative or insight-oriented problem solving. We emphasize in the program that mindfulness practice can assist in accessing such "tacit" knowledge and judgment in any situation, including making apparently trivial, but often complex, decisions regarding food choice and eating.

From the first session of the MB-EAT program, participants are presented with the concept of wisdom as something accessible to them, in that wisdom emerges from their own experiences and abilities to recognize solutions to challenging situations, rather than having these proscribed from without. Self-acceptance is framed as an alternative to reacting judgmentally to every self-perceived slip from internalized norms, a hallmark of eating disorders. Instead, they are encouraged to use mindfulness first to self-observe reactive or overeating episodes, then to notice triggers, with an attitude of open curiosity,

and, finally, to access their own “wisdom” to look for alternatives. In contrast to approaches that emphasize simple solutions (i.e., highly structured diets), MB-EAT acknowledges the complexity of choices involved in eating, and that an attitude of patience, experimentation, and self-compassion goes much further in developing patterns that can be sustained indefinitely. Self-acceptance and self-forgiveness are particularly relevant to interrupting dysfunctional cycles of bingeing, self-recrimination, and over-restraint.

At the same time, the MB-EAT model is compatible with other perspectives on treating dysfunctional eating patterns, including cognitive-behavioral approaches (Apple & Agras, 1997), interpersonal therapy (Wilfley et al., 2002) for BED, and other approaches incorporating mindfulness within acceptance-based treatments (Safer, Telch, & Chen, 2009; Wilson, 2004). However, similar to Appetite Awareness Training (Allen & Craighead, 1999), MB-EAT brings more attention to processes of food intake per se. MB-EAT also incorporates recent work recognizing the complexity of hedonic drives associated with food (Appelhans, 2009; King, 2013). In sum, the MB-EAT program is designed to help individuals cultivate awareness of both internal and external triggers to eating; interrupt dysfunctional cycles of bingeing, self-recrimination, and over-restraint; and re-engage natural physiological processes of eating regulation. Moreover, the program emphasizes the pleasure and nurturing aspects of eating, in terms of both types and amount of food eaten, along with healthier patterns of food choice.

Mindful Eating and Mindfulness Practice: A Model of De-conditioning

Cultivating a Capacity for Mindfulness

As mindfulness is increasingly recognized as a general human capacity, rather than something esoteric and unique to meditation practice, it becomes easier to explain to individuals how we

are assisting them to cultivate a capacity that brings this greater sense of self-control, balance, and wisdom. Figure 15.1 represents this process of engaging mindfulness in order to produce a sense of control over previously over-conditioned patterns of triggers and reactions. Although the examples provided here reflect the struggles of someone with a clinically significant level of disordered eating, the processes involved apply to anyone who has become “mindless” about some aspect of his or her relationship to food and eating.

First Stage: Cultivating Nonjudgmental Awareness

The top half (A) of the figure represents a conditioned cycle of dysfunctional eating. The individual depicted here has many issues with overeating; one of them, illustrated here, is coming home from work, feeling stressed, and often overly hungry, finding a box of tempting cookies, and rather than eating just a few, as intended, eating the whole box. As trigger “X” (seeing the cookies; thinking “I deserve a couple”) leads to reaction “Y” (eating the whole box) over and over again, increasingly experienced as out of control and automatic, the individual begins to feel helpless and further distressed.

As mindfulness is introduced, the individual becomes more aware of the triggers (1), such as certain feelings, thoughts, or foods. These triggers are often more complex than first perceived. For example, someone may become aware that it’s not only seeing the cookies, but also being stressed by a particular type of work issue AND being overly hungry, combined with certain thoughts (“I’ve blown it by eating one cookie, so I might as well keep on going.”).

Second Stage: Cultivating Capacity to Interrupt Reactivity and Mindless Choice

The second stage (also depicted within the top half of the figure) emerges as the arrows of mindfulness penetrate awareness; the individual

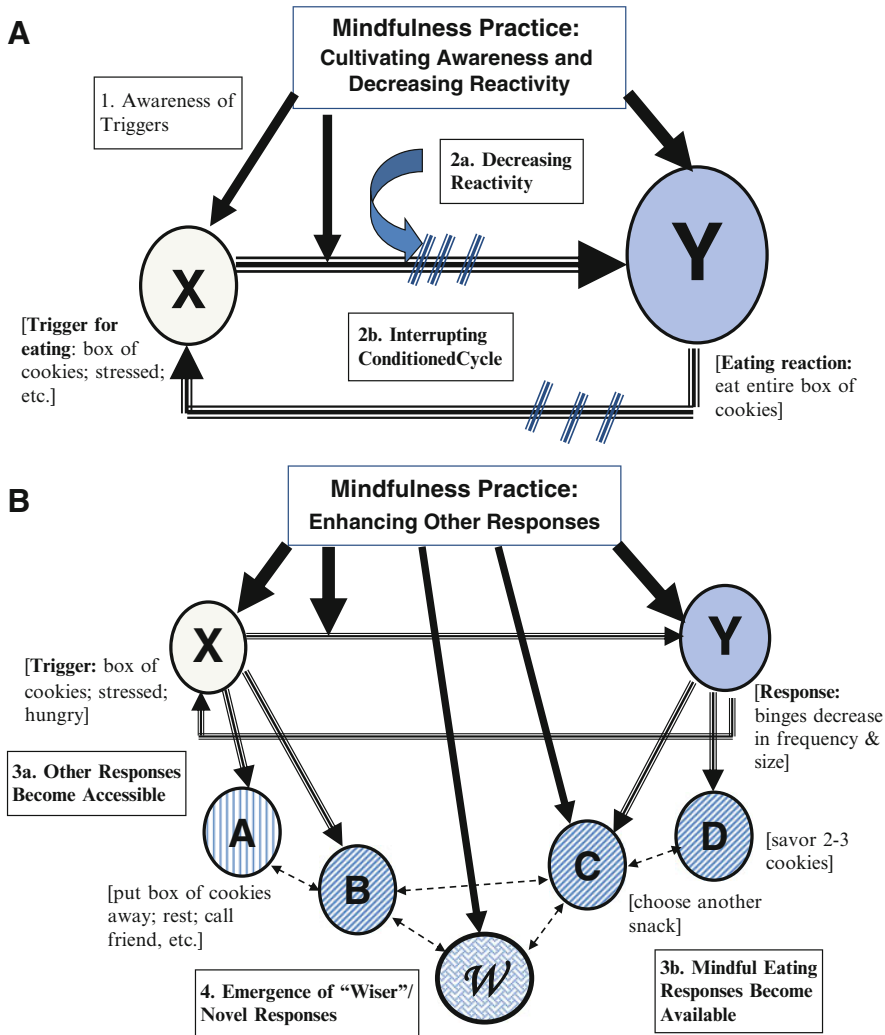


Fig. 15.1 Mindfulness practice and mindful eating: moving from awareness (A) to wise choice (B)

begins to recognize a decreasing sense of compulsion, and a weakening of the pull to react in response to the set of triggers (2a). As reaction is replaced by accepting observation, the reinforcement cycle begins to weaken (2b).

Although learning theory suggests that any decrease in pairing of “stimulus” and “response” weakens the conditioned reinforcement cycle, clinical evidence suggests that when access to the object is blocked by willpower, a vow of abstinence, or simple self-control techniques (i.e., hiding the boxes of cookies), there may be little decrease in desire nor in the perceived strength of

the reinforcement cycle. In contrast, in our clinical experience, we have found that with mindfulness, as depicted in this figure, the entire cycle weakens fairly rapidly.

Third Stage: Cultivating Awareness of Alternatives and Development of Mindful Eating

Several elements have shifted in the bottom half (B) of the figure. In this next phase, the perceived strength of both the triggers and the reaction has

gotten weaker/smaller. The response/reaction (such as eating cookies just because they are there) has not completely disappeared, and the triggers are generally still present (feeling upset; seeing cookies), but their trigger strength, and the strength of the reinforcement cycle, has decreased. The arrows of awareness connecting mindfulness to both the trigger(s) (X) and responses/reactions (Y) have gotten larger/strengthened, as individuals learn to nonjudgmentally observe these overlearned patterns.

As significantly, awareness of alternative responses (circles A and B) to trigger situations has increased (3a). Although this can also occur in response to more traditional cognitive-behavioral approaches to treating overlearned patterns, mindfulness practice may increase the sense of accessibility of these alternatives, involving less effort to engage them. Often these alternatives, such as calling a friend when stressed, rise into awareness after only a few moments of mindfulness. For individuals with long-standing eating issues, the alternatives to eating may not be clear at first, as eating has served for so long as a primary coping tool. Exploring alternatives, whether in group or individual therapy, is therefore a valuable treatment component.

Circles C and D (3b) represent ways to engage the old response system—eating for comfort—but in better balance. This involves cultivating mindful awareness of food choice, physical hunger, taste satisfaction, and satiety. Even individuals with highly dysregulated eating patterns may find that this can happen relatively quickly. In this example, that might mean giving oneself permission to slowly eat and savor a few cookies—or to choose a different “comfort food.” Over time, uncontrolled reactivity shifts into having a choice of responses. The sense of struggle decreases or even disappears, and the sense of choice and self-determination increases.

Fourth Stage: Access to Emergent Wise Mind

Finally, because mindfulness appears to act by more fully engaging neural networks, novel

options may arise into consciousness. Such insight might happen during a sitting practice or in the moment of engaging in the behavior itself. People in our program strongly resonate to the concept of cultivating the “wise” mind. The term “wisdom” often implies a profound level of insight or new understanding. However, wisdom may also be simple, involving the emergence of new choices, not offered as solutions by others (such as structured diets), but growing out of one’s own experience. For example, a woman in our group realized that she was most tempted at home by a particular type of cookie (oatmeal raisin); her previous solution had been not to buy any cookies at all, but that left her feeling deprived. She had the insight one day that she could keep a different type of cookie at home that she found far less tempting ... but which was still satisfying when she really wanted a small, sweet snack. She then indulged her desire for oatmeal raisin cookies by buying one or two at a local bakery—particularly when feeling stressed. A year later she realized she could finally have such cookies in her home without overeating on them.

Program Content: The Conceptual Framework

Details of the MB-EAT program content are further outlined in Table 15.1, organized by key theoretical principles and concepts. The treatment components reflecting the principles fall into five distinct areas of practice: cultivating mindfulness in general; the application of mindfulness to all aspects of eating; improving emotional balance; cultivating “outer wisdom” or the wiser use of the wealth of nutritional information available; and engaging self-acceptance and non-self-judgment.

Cultivating Mindfulness

Mindfulness is the core capacity on which MB-EAT rests. As addressed above, it is not only central to cultivating attention and awareness, the core elements of practice (Jha, Krompinger, & Baime, 2007), but acts by softening and loosening

Table 15.1 MB-EAT: principles, practices, and targeted exercises

| Concept/principle | Practices/exercises | Session |
|--|--|------------------|
| <i>Cultivating mindfulness</i> | | |
| Cultivate capacity to direct attention, be aware, disengage reactivity, and be nonjudgmental | Mindfulness meditation practice in session. Daily practice | 1–10 |
| Cultivate ability to be mindful in daily experience, including eating | “Mini-meditation” use General use of mindfulness | 2–10 |
| Cultivating/engaging inner and outer “wisdom” | Meditation practice/mindfulness in daily life. Encouraging insight Wisdom meditation (Session 10) | 1–10 |
| <i>Cultivating mindful eating</i> | | |
| Bring mindful attention and awareness to eating experience Recognizing mindless eating | Mindfulness meditation. Mini-meditations. Wide range of eating practices. Chain reaction model | 1–10 |
| Cultivate taste experience/savoring and enjoying food | Mindfully eating a variety of food. In session: Raisins; cheese and crackers; chocolate; fruit and veggies; “favorite food”; potluck. All meals during week; buffet homework | 1, 2, 4, 6, 7, 9 |
| Cultivate awareness of hunger experience | Hunger awareness meditation. Continuing as home practice | 3 |
| Awareness and cultivation of taste satiety/taste satisfaction/food choice | Training in sensory-specific satiety, both in and out of session. Taste satisfaction “meter” Choice: Chips or cookies Potluck/buffet homework | 4, 7 |
| Awareness and cultivation of fullness and body satiety experience | Fullness awareness/ratings with water. Potluck/buffet homework. Mindfully ending all meals | 1–6 |
| Awareness of negative self-judgment/cultivating nonjudgment of eating experience | Eating challenging foods Identifying cognitive distortions and “black and white” thinking; “surfing the urge”; abstinence violation effect | 2–6, 9–10 |
| <i>Cultivating emotional balance</i> | | |
| Cultivate awareness of emotions and emotional reactivity | Learn to identify and tolerate emotional triggers. Chain reaction model | 3–5, 9, 10 |
| Meeting emotional needs in healthy ways | Mindfulness practice as stress reduction. Emotional eating visualization. Modifying comfort eating. Behavioral substitution | Most sessions |
| <i>Cultivating “outer wisdom”</i> | | |
| Decreasing amount eaten in a flexible and sustainable manner | Tracking food energy/calories 500 Calorie Challenge. Mindfully attending to caloric values of different foods | 2–6, 7 |
| Attending to nutritional needs relative to better health | Mindfully making food choices based on personal health issues | |
| Increasing energy output by increased walking/gentle exercise | Pedometers; mindful walking; exploring other exercises | |
| <i>Cultivating self-acceptance</i> | | |
| Acceptance and non-self-judgment of body/self-regulation | Improving relationship to the body. Breathe awareness; body scan; healing self-touch; chair yoga | 1, 3–5, 8 |
| Recognition of anger at self and others. Acceptance of self/others | Exploring feeling and thoughts toward self and others. Loving kindness meditation. Forgiveness meditation. Values exercise | 4, 5, 8–10 |
| Recognizing/engaging capacity for growth. Self-empowerment | Cultivating and honoring wisdom in self. Wisdom meditation. Discussion throughout | All, 10 |

long-standing conditioned reactions, as shown in the top half (A) of Fig. 15.1, and then extended toward flexible self-regulation Fig. 15.1 (B), invaluable in managing the complex daily decisions regarding eating. Training in mindfulness practice begins with breath awareness and sitting meditation. All sessions include mindfulness meditation practice. Participants are encouraged to practice daily at home, initially for 10 min, moving to 20 and then 30 min, gradually weaning themselves off use of the audio support. In Session 2, we introduce the practice of using “mini-meditations” as a way to bring mindfulness into everyday activities, and particularly to eating experiences. “Mini-meditations” are truly that; they are intended to encompass the few moments needed to stop, bring awareness to the breath, notice thoughts, and observe inner feelings of hunger, fullness, or the range of available food choices. Results from our research show that improvement in eating, emotional regulation, and weight loss occurs in direct relation to the use of practice elements, including sitting and guided eating meditations, and “mini-meditations.”

Cultivating Mindful Eating

Varied mindfulness exercises are used throughout the program to help individuals re-balance distinct aspects of eating. In the top half of Fig. 15.1, mindfulness brings awareness to highly conditioned patterns; the bottom half of Fig. 15.1 focuses on cultivating alternative eating patterns that are more mindful and balanced. Exercises target the following: bringing awareness to sensations of physical hunger vs. other triggers for eating; awareness of different types of satiety, including taste satiety (our term for “sensory-specific satiety”), stomach fullness, and “body satiety”; and awareness of making food choices, both to optimize satisfaction from smaller amounts of food and in regard to the nutritive value of food choice.

The first guided practice is borrowed from MBSR: mindfully eating several raisins. The exercise focuses on noticing and amplifying each

sensation, including thoughts and feelings, and savoring each raisin as fully as possible. Four raisins are used. After receiving guidance for the first two, individuals lead themselves through eating the third. They are given the option to eat the fourth, introducing the challenge of choice—and for many, a surprising realization that they actually don’t want this last raisin. People share amazement at the intensity of the experience, the distinct texture, and even flavor of each raisin, and how it differs from “mindlessly” eating a handful of raisins. This practice lays the foundation to explore how to eat more mindfully at home and in future exercises.

As the program progresses, the foods used are increasingly challenging in terms of hedonic and caloric value, including potential “binge” foods with lower nutritional value. These challenges often help individuals become more aware of the distinction between “liking” and “wanting” particular foods (Finlayson, King, & Blundell, 2007). Cheese and crackers are presented in Session 2, and in Session 4, rich chocolate cookies, along with an explicit focus on awareness of changes in taste experience. As with the raisins, most participants express surprise at how quickly the flavor of these foods lose their appeal when fully and mindfully savored, engaging the experiences of “taste satisfaction” and “taste satiety.” Research has extensively documented the process by which taste buds decrease their capacity for firing as food is eaten (and as physiological hunger decreases) (e.g., Heatherington & Rolls, 1996). Individuals who habitually overeat tend to ignore or override these feedback signals, “chasing the flavor” of the first few bites. Yet in our experience, they are able to quickly tune into this rapid drop in flavor when directed to do so, generally within a few bites. In Session 5, we focus on mindfully making food choices between savory and sweet snacks: corn chips vs. butter cookies. This exercise increases awareness of making food choices, the “pull” of different foods, and again, taste.

Other exercises related to mindful eating develop awareness of physical hunger and “fullness.” Session 3 introduces the experience of physical hunger, as distinct from emotional

hunger or other triggers for eating. Participants are asked to note how physically hungry they are, with 10 “as hungry as possible,” and 1 “not hungry at all.” They are then asked “How do you know that?” a powerful question that helps them explore their inner experience more fully. In Session 5, the experience of fullness is explored by having participants drink a large bottle of water. Using water separates feelings of fullness, as also noted on a 10-point scale, from the effects of high caloric intake. We also emphasize that hunger and fullness are distinct physical processes, not just opposite ends of a scale; it is possible to eat something filling (such as popcorn) and still be hungry—or eat something calorically dense, like ice cream, but not feel very full. By Session 7, which includes a potluck meal, individuals are able to face a very challenging eating situation with a new set of skills and confidence. This meal proceeds with a set of guidelines: choosing foods for “quality over quantity”; returning for seconds; and leaving food on the plate. The meal is initially in silence, highlighting the challenge of eating mindfully after returning to talking.

Home practices parallel the group experiences (i.e., attention to hunger, taste, fullness, food choice), plus the expectation starting in Week 1 of eating one meal or snack mindfully each day, increasing to eating all meals and snacks mindfully. Over the program, individuals are also encouraged more and more to attend to thoughts and feelings before and throughout eating. After the potluck meal, they are asked to go to a commercial buffet, perceived as a singular challenge, but one which most individuals find, with surprise, that they can now manage very well.

Cultivating Emotional Balance

Eating meets emotional needs, more for some individuals than for others. We explore throughout the program how common such patterns are, and that awareness of these patterns is important to eating in a mindful, self-accepting way. Participants are also encouraged to explore alternatives to eating as ways to meet their emotional needs (see Fig. 15.1-B-3a); some individuals

report virtually no other coping approaches. At the same time, they are also encouraged to identify and to savor their own preferred “comfort” foods, with a focus on quality rather than quantity, instead of adding to their distress by worrying about “being bad” or “losing control” when eating such foods (see Fig. 15.1-B-3b). We have also adapted a chain reaction exercise from Dialectical Behavior Therapy for eating disorders (Wisniewski & Kelly, 2003), to help participants explore the complexity of the patterns they have developed in using food to manage experiences such as stress, anger, or anxiety. The concept of the chain also addresses links between harsh self-judgment, overeating, and negative affect, along with addressing such common types of distorted thinking as the abstinence violation effect (“I’ve blown it, so I might as well keep going.”) (Marlatt & Gordon, 1985). We emphasize that the “chain reaction” can be interrupted at any point, even in the midst of a binge. Of note, our research has found that even when binges continued to occur, they are notably smaller (Kristeller et al., 2013).

Cultivating “Outer Wisdom”

Most people come into the program with an “all or nothing” attitude toward food choices. Almost all have been on multiple diets, of all different types, and when asked to describe a “healthy” way of eating, they can generally do so—but with a caloric value (e.g., approximately 1,200 calories) that is usually far too restrictive for a maintenance level of eating. They readily acknowledge consuming large amounts of “unhealthy” foods, such as cheese, pizza, doughnuts, or other sweets, while generally avoiding noting the caloric values of such foods, a task perceived as burdensome or self-punishing. They also express feeling overwhelmed by the amount of information bombarding them regarding nutrition, and acknowledge ignoring much of it.

Throughout the program, we introduce the value of engaging “outer wisdom”—a healthier yet flexible attitude toward making food choices—in combination with “inner wisdom.” “Outer wisdom” is distinct from “outer knowledge,” in

that “knowledge” is familiarity with relevant information, while “wisdom” is knowing how to make use of that information to suit particular needs and preferences. In the second week, we provide them with a calorie guide, and encourage them to check labels on packaged foods. We draw the analogy to financial management, asking the question “If you were on a budget, would you shop at a store that didn’t have price tags on anything?” to emphasize that this caloric information is simply a way to inform choices, given reasonable limitations. We ask them to identify the caloric value of typical foods eaten during the week, and to begin considering which they might either take out of their regular diet or cut back on serving size. We ask them to take on these tasks both to inform themselves and in order to find ways to cut out approximately 500 calories from their daily pattern of eating (the “500 Calorie Challenge”), an amount that, on average, will initially result in a gradual weight loss of 1 lb/week (500 cal \times 7 days=3,500 cal). We continuously emphasize the need to be flexible, to experiment with different possibilities—and to only cut out foods entirely that they are willing to take out of their regular eating programs on a permanent basis—not just to “lose weight.”

We also address both healthier nutritional patterns in general (i.e., introducing national guidelines such as “MyPlate”), and those specific to personal dietary needs such as diabetes or cardiac disease, but in a flexible way. For the potluck meal, we ask everyone to bring two dishes, one a favorite food that is “less healthy” but that they want to continue to eat in moderation (like macaroni and cheese), and the other that reflects “healthier” eating. We repeatedly emphasize the need for self-regulation in regard to meshing personal desires with knowledge-based guidelines.

Increasing exercise is another component of “outer wisdom.” Many individuals coming into the program are extremely sedentary, avoiding physical activities as much as possible, related to lifelong patterns, or due to increasing issues with joint pain, lack of flexibility, or shortness of breath. Although we acknowledge the contribution of physical activity to weight management, we expand the discussion more broadly to cultivating

better physical health and sense of well-being. In addition to gentle chair yoga, we emphasize increasing walking, both mindfully and for exercise. In the service of self-awareness and self-regulation, we provide pedometers to all participants, first asking them to establish a baseline, and then gradually to increase their walking by 10 % per week. Most people expand on this, becoming quite excited about using the pedometer to track their own improvement.

Cultivating Self-Acceptance

Cultivating self-acceptance is placed last in Table 15.1, not because it is least important, but in some respects most important. Critical self-judgment is a key target for mindfulness, in that self-judgment entails an emotionally valenced (and generally negative) reaction to experience, and is endemic to struggling with obesity and eating issues. For many individuals throughout the weight spectrum, self-identity becomes absorbed by preoccupation with eating, weight, and appearance. Therefore, an important aspect of the program is encouraging individuals to notice when such self-judgment has occurred and whether it is out of proportion to the trigger (for example, feeling like a failure after eating a small amount of a “forbidden” food). In general, the goal is to create a more accepting and flexible relationship with the self, in regard both to eating and broader self-identity.

Several exercises explicitly help individuals engage self-acceptance in relation to their bodies. A body scan exercise encourages distinguishing between experiencing and judging the body. Both gentle chair yoga in Session 5 and mindful walking in Session 8 further increase awareness of the body while cultivating an attitude of kindness and compassion. Chair yoga is used instead of floor yoga because heavier individuals may have difficulty getting down to—or up from—the floor; it is also easier to incorporate into usual daily routines (such as at a desk). Finally, a healing self-touch exercise¹ often has profound impact; participants

¹The healing self-touch exercise was developed by Sasha Loring, MS, MEd, at Duke Integrative Medicine.

are asked to fill their hands with loving kindness, and place them on parts of their bodies, moving from areas they like and appreciate to areas of their body with which they struggle.

Self-acceptance is extended beyond the body to other aspects of the self. Throughout, the program encourages nonjudgmental exploration of thoughts, feelings, and physical experiences, including taking pleasure in eating, without swamping that experience with self-blame. This delicate balance between accountability and self-blame is explored in a forgiveness meditation in Session 5. It is not unusual that individuals recognize how anger at self and others drives overeating. As noted earlier, also core to engaging self-acceptance is encouragement in all sessions to explore their own “inner wisdom,” including a values exercise to shift focus away from preoccupation with eating and weight as core elements of self-identity, and culminating in Session 10 with a guided wisdom meditation. The emphasis is on recognizing one’s own inner wisdom, creating a path to wise choice, informed by general knowledge, but shaped by internal resources, and always in the service of supporting greater self-regulation (see Fig. 15.1-B-4).

Empirical Support for MB-EAT

Although the clinical development of MB-EAT included both men and women with a range of eating and weight issues, we focused the first systematic study on obese women who met criteria for BED. The original proof-of-concept study used a non-randomized, extended baseline/extended follow-up design (Kristeller & Hallett, 1999), well suited to exploratory clinical outcome research, in that if group results are not consistent, changes in individual responses can be validly analyzed as in an A-B-A design.

Treatment was delivered in a 7-session group program over 6 weeks. The sample was primarily middle aged (avg. age=46.5) with a mean BMI of 40 (mean weight=238 lbs). Experience with a pilot group had suggested to us the need to provide individual orientation sessions to address personal anxieties about the meaning and pur-

pose of the required meditation practice, in that several individuals who dropped out almost immediately had shared concerns that a “Buddhist” practice was incompatible with their Christian beliefs and practices. We therefore emphasized that we were drawing on Buddhist psychology rather than on Buddhism as a religion, and ended up with a completion rate of 18 out of 20 individuals.

Results were consistent enough to analyze by group effects. Binges per week dropped from an average of over 4 to about 1.5, with the amount of food consumed during remaining binges decreasing substantially. Overall, scores on the Binge Eating Scale (BES) (Gormally, Black, Daston, & Rardin, 1982) fell from the “severe” range to just higher than having “little or no problem” with binge eating. Depression also decreased from clinical to subclinical levels. Individuals also tracked their meditation practice daily, including both sitting meditation and guided eating meditation practices. The strongest predictor of improvement in eating control was time spent using eating-related meditations.

Based on these results, we obtained funding from the National Center for Complementary and Alternative Medicine at NIH for a clinical trial with Duke University (Kristeller et al., 2013), expanding the sample to include men, but overall highly similar in weight and age to the pilot study. Participants (total $N=140$; 15 % men) were randomized to three conditions: MB-EAT; a psycho-educational/cognitive behavioral (PECB) treatment based on the Duke Diet and Fitness Center obesity treatment program; or a waiting list control, with follow-up at 1 and 4 months. The treatment was expanded to nine sessions, with greater emphasis on self-compassion and cultivation of self-acceptance. The interventions were again primarily focused on improving relationship to eating, rather than on weight loss. As has been reported in other studies comparing interventions for BED to other active interventions, the two active interventions showed similar improvements in behavior and on the BES. However, the MB-EAT group improved more on other measures of self-regulated eating (e.g., the Hunger scale of the

Three-Factor Eating Questionnaire (TFEQ) (Stunkard & Messick, 1985)).

Depression improved in both groups but apparently for different reasons. In the PECB group, less depression was associated with decreased bingeing, and improvement on most other measures of self-control, suggesting that improved mood may have followed from a greater sense of self-efficacy. In contrast, the improvement on depression in MB-EAT was generally independent of other measures but was linked to amount of meditation practice, suggesting a broader nonspecific value of such practice. Again, amount of meditation practice, calculated as a total index of sitting, guided, and “mini-meditations,” predicted improvement on other indicators of self-regulation, including amount of weight lost. However, to our concern, neither group showed any average weight loss, with some individuals gaining weight and others losing. Although no predictors of weight loss could be identified (other than meditation practice), interviews suggested that some individuals perceived the message (within either treatment) as being one of “permissiveness” around food and eating, as long as binges were decreased.

Based on this study, we expanded MB-EAT to include an increased focus on weight loss. The program was extended to ten sessions (as referred to in Table 15.1), with two follow-up sessions at 1 and 2 months (Kristeller & Wolever, 2011). As discussed above, we systematically added elements that we refer to as cultivating “outer wisdom”: i.e., helping participants engage with information about food energy (calories), nutrition, and exercise that is flexible, targeted to their personal needs, and likely to be sustainable. Because we wanted to evaluate the effects of such elements on individuals with significant weight issues, independent of binge eating patterns, we enrolled those with a BMI of 35 or above, a level at which a meaningful proportion of participants would meet criteria for BED. We wanted to address two complementary concerns: whether individuals with compulsive eating patterns might react adversely to tracking calories, perhaps perceiving that we were encouraging them in a dieting approach that had so often

failed them, and whether individuals without such compulsive eating patterns, but still moderately to morbidly obese, would respond to approaches originally designed to modulate compulsive overeating patterns.

Individuals were randomized to the MB-EAT condition or to a waiting-list control. Preliminary analyses have been encouraging. Effects were highly parallel between the two sets of participants (those with BED and those without), and consistent with those observed in our previous research. Furthermore, both groups showed a weight loss of about 7 lbs at immediate post, largely sustained during follow-up. This was approximately one pound per week from when they were asked to begin cutting back 500 cal/day. Also encouraging was that only one individual (someone with BED) showed an increase in weight at immediate post. However, at the next follow-up point, she had lost this weight, noting that it had “taken her a little longer” to really “get it.” Also consistent with introducing the “outer wisdom” components was more substantial improvement than in the previous study for both those with and without BED on the Cognitive Restraint scale of the TFEQ, primarily an indicator of “healthy restraint.” Improvement on this measure was sustained through the 6-month follow-up.

A modified MB-EAT program is currently under investigation in an even broader range of individuals, with relatively lower levels of binge eating problems and obesity, and with more focus on the “stress management” effects of mindfulness meditation-based treatment. Pilot data provides preliminary evidence for this approach to this population, and for the specific value of addressing stress-related aspects of obesity (Adam & Epel, 2007; Daubenmier et al., 2011). Another group of investigators (Dalen et al., 2010) incorporated elements of MB-EAT into a 6-week program linking healthier eating with exercise, referred to as Mindful Eating and Living (MEAL), and also found significant improvement in healthy restraint, and decreases in weight and other indicators of dysregulated eating. Timmerman and Brown (2012) enrolled women who reported regularly overeating in

restaurants and focused their 6-week intervention, adapted from MB-EAT, solely on that context, showing improvement in weight and nutritional balance. Singh has reported several case studies (Singh et al., 2008, 2011) in which they very creatively incorporated mindful eating components, including meditation training, hunger awareness, and healthy nutrition, into treatment for adolescents with Prader-Willi syndrome with classic symptoms of mild intellectual disability, hyperphagia, and mild to morbid obesity. Each of them responded positively to the interventions, gradually losing substantial weight maintained over several years. Tapper (Tapper et al., 2009) has evaluated a workshop-based mindful eating intervention in a randomized trial for women with a wide range of weight levels, finding significant weight loss at 6 months mediated primarily by change in binge eating patterns.

MB-EAT has also been modified and adapted for use with an overweight/obese population with non-insulin-dependent diabetes (Miller, Kristeller, Headings, Nagaraja, & Miser, 2012). That study compared MB-EAT-D to a relatively intensive medical nutrition group program (Smart Choices). In general, both interventions showed improvement on most variables, with few differences between them. As might be expected, the Smart Choices program showed more specific nutritional improvements, consistent with the targeted goals. It may be that for some individuals the Smart Choices program followed by the MB-EAT-D program would be more effective. For heavier individuals with more mindless or compulsive overeating patterns, it might be advisable to provide the MB-EAT-D program prior to Smart Choices. For example, a morbidly obese woman with BED enrolled in one of our earlier trials lost little weight during the course of the MB-EAT program, but became much more aware of the emotional and social triggers contributing to her overeating. She then rejoined Weight Watchers, losing over 100 lbs during the following year, noting that she was now able to use those guidelines to meet her needs more flexibly and more effectively.

Conclusion

The MB-EAT program combines well-understood principles of food intake regulation and principles of mindfulness meditation to provide a novel approach to re-regulating eating behavior. While conceptually compatible with other effective approaches to treating eating disorders, it is unique in several respects. First, training in mindfulness meditation serves as a foundation for cultivating a capacity to bring nonjudgmental awareness to the complex processes involved in food choice, the decision to initiate eating, and the decision to stop eating. Second, the training appears to help people systematically re-engage innate abilities to use hunger and satiety signals. Third, the training purposefully cultivates drawing pleasure from eating, by emphasizing “quality over quantity” in doing so. Finally, MB-EAT encourages an attitude of nonjudgmental acceptance of self to daily living, body awareness, and emotional experiences, beginning with food-related experiences and expanding to the whole self.

Research has demonstrated the effectiveness of MB-EAT in treating compulsive eating patterns associated with BED. Ongoing research further suggests that MB-EAT can be adapted to address weight loss, without losing its effectiveness for treating the associated symptoms of binge eating. Further work is needed to explore its application to normalizing relationship to food and eating for the both compulsive and restrictive aspects of food intake associated with bulimia nervosa and anorexia nervosa.

References

- Adam, T. C., & Epel, E. S. (2007). Stress, eating and the reward system. *Physiology & Behavior, 91*, 449–458.
- Allen, H., & Craighead, L. (1999). Appetite monitoring in the treatment of binge eating disorder. *Behavior Therapy, 30*, 253–272.
- Altman, D. (2002). *Art of the inner meal*. Los Angeles, CA: Moon Lake Media.
- Appelans, B. M. (2009). Neurobehavioral inhibition of reward-driven feeding: Implications for dieting and obesity. *Obesity, 17*, 640–647.

- Apple, R. A., & Agras, W. S. (1997). *Overcoming eating disorders: A cognitive-behavioral treatment for bulimia and binge-eating disorder*. New York, NY: Psychological Corporation.
- Baltes, P. B., & Staudinger, U. M. (1993). The research for a psychology of wisdom. *Current Directions in Psychological Science*, 2, 75–80.
- Bays, J. (2009). *Mindful eating*. Boston, MA: Shambala Publications.
- Bertalanffy, L. V. (1968). *General systems theory*. New York, NY: Braziller.
- Bowen, S., Chawla, N., & Marlatt, A. (2011). *Mindfulness-based relapse prevention for addictive behavior: A clinician's guide*. New York, NY: Guilford Press.
- Brondel, L., Romer, M., Van Wymelbeke, V., Walla, P., Jiang, T., Deecke, L., et al. (2007). Sensory-specific satiety with simple foods in humans: No influence of BMI? *International Journal of Obesity*, 31, 987–995.
- Brown, A. J., Smith, L. T., & Craighead, L. W. (2010). Appetite awareness as a mediator in an eating disorders prevention program. *Eating Disorders: The Journal of Treatment and Prevention*, 18, 286–301.
- Brownell, K. (2000). *The learn program for weight management*. Dallas, TX: American Health.
- Cannon, W. (1932). *The wisdom of the body*. New York, NY: Norton.
- Capaldi, E. D. (Ed.). (1996). *Why we eat what we eat: The psychology of eating*. Washington, D.C.: American Psychological Association.
- Carver, C. S., & Scheier, M. F. (1982). Control theory: A useful conceptual framework for personality–social, clinical, and health psychology. *Psychological Bulletin*, 92, 111–135.
- Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York, NY: Cambridge University Press.
- Chua, J. L., Touyz, S., & Hill, A. J. (2004). Negative mood-induced overeating in obese binge eaters: An experimental study. *International Journal of Obesity*, 28, 606–610.
- Cooper, Z., Fairburn, C., & Hawker, D. (2004). *Cognitive-behavioral treatment of obesity: A clinician's guide*. New York, NY: Guilford Press.
- Craighead, L. W. (2006). *The appetite awareness workbook*. Oakland, CA: New Harbinger.
- Cuthbert, B., Kristeller, J. L., Simons, R., Hodes, R., & Lang, P. J. (1981). Strategies of arousal control: Biofeedback, meditation, and motivation. *Journal of Experimental Psychology: General*, 110, 518–546.
- Dalen, J., Smith, B. W., Shelley, B. M., Sloan, A. L., Leahigh, L., & Begay, D. (2010). Pilot study: Mindful eating and living (meal): Weight, eating behavior, and psychological outcomes associated with a mindfulness-based intervention for people with obesity. *Complementary Therapies in Medicine*, 18, 260–264.
- Daubenmier, J., Kristeller, J., Hecht, F. M., Maninger, N., Kuwata, M., Jhaveri, K. et al. (2011). Mindfulness intervention for stress eating to reduce cortisol and abdominal fat among overweight and obese women: An exploratory randomized controlled study. *Journal of Obesity*, 2011, [vol], 651936–651936.
- Daubenmier, J., Sze, J., Kerr, C., Kemeny, M., & Mehling, W. (2013). Follow your breath: Respiratory interoceptive accuracy in experienced meditators. *Psychophysiology*, 50, 777–789.
- Davidson, R. J., Goleman, D. J., & Schwartz, G. E. (1976). Attentional and affective concomitants of meditation: A cross-sectional study. *Journal of Abnormal Psychology*, 85, 235–238.
- Drewnowski, A. (1996). The behavioral phenotype in human obesity. In E. D. Capaldi (Ed.), *Why we eat what we eat*. Washington, D.C.: American Psychological Association.
- Dunkley, D. M., & Grilo, C. M. (2007). Self-criticism, low self-esteem, depressive symptoms, and over-evaluation of shape and weight in binge eating disorder patients. *Behaviour Research and Therapy*, 45, 139–149.
- Finlayson, G., King, N., & Blundell, J. E. (2007). Liking vs. Wanting food: Importance for human appetite control and weight regulation. *Neuroscience and Biobehavioral Reviews*, 31, 987–1002.
- Geliebter, A., & Hashim, S. A. (2001). Gastric capacity in normal, obese, and bulimic women. *Physiology & Behavior*, 74, 743–746.
- Geliebter, A., Hassid, G., & Hashim, S. A. (2001). Test meal intake in obese binge eaters in relation to mood and gender. *International Journal of Eating Disorders*, 29, 488–494.
- Goldfield, G. S., Adamo, K. B., Rutherford, J., & Legg, C. (2008). Stress and the relative reinforcing value of food in female binge eaters. *Physiology & Behavior*, 93, 579–587.
- Gormally, J., Black, S., Daston, S., & Rardin, D. (1982). The assessment of binge eating severity among obese persons. *Addictive Behaviors*, 7, 47–55.
- Grosshans, M., Loeber, S., & Kiefer, F. (2011). Implications from addiction research towards the understanding and treatment of obesity. *Addiction Biology*, 16, 189–198.
- Hanh, T. N., & Cheung, L. (2010). *Savor*. New York, NY: HarperCollins.
- Heatherington, M. M., & Rolls, B. J. (1996). Sensory-specific satiety: Theoretical frameworks and central characteristics. In E. D. Capaldi (Ed.), *Why we eat what we eat* (pp. 267–290). Washington, D.C.: American Psychological Association.
- Jha, A. P., Krompinger, J., & Baime, M. J. (2007). Mindfulness training modifies subsystems of attention. *Cognitive Affective and Behavioral Neuroscience*, 7, 109–119.
- Kabat-Zinn, J. (1990). *Full catastrophe living*. New York, NY: Delacorte Press.
- Kabat-znick, R. (1998). *The Zen of eating*. New York, NY: Penguin Putnam.
- Khalsa, S., Rudrauf, D., Damasio, A., Davidson, R., Lutz, A., & Tranel, D. (2008). Interoceptive awareness in

- experienced meditators. *Psychophysiology*, 45, 671–677.
- King, B. M. (2013). The modern obesity epidemic, ancestral hunter-gatherers, and the sensory/reward control of food intake. *American Psychologist*, 68, 88–96.
- Kristeller, J. (1977). Meditation and biofeedback in the regulation of internal states. In S. Ajaya (Ed.), *Meditational therapy*. Glenview, IL: Himalayan International Institute Press.
- Kristeller, J. (2016). *The Joy of Half a Cookie*. New York: Perigree/Penguin Books.
- Kristeller, J. L. (2003). Mindfulness, wisdom, and eating: Applying a multi-domain model of meditation effects. *Constructivism in the Human Sciences*, 8, 107–118.
- Kristeller, J. L. (2007). Mindfulness meditation. In P. Lehrer, R. Wookfolk, & W. E. Simes (Eds.), *Principles and practices of stress management* (3rd ed.). New York, NY: Guilford.
- Kristeller, J. L., Baer, R. A., & Quillian-Wolever, R. (2006). Mindfulness-based approaches to eating disorders. In R. A. Baer (Ed.), *Mindfulness-based treatment approaches*. Burlington, MA: Academic.
- Kristeller, J. L., & Hallett, C. B. (1999). An exploratory study of a meditation-based intervention for binge eating disorder. *Journal of Health Psychology*, 4, 357–363.
- Kristeller, J. L., & Rodin, J. (1989). Identifying eating patterns in male and female undergraduates using cluster analysis. *Addictive Behaviors*, 14, 631–642.
- Kristeller, J. L., & Wolever, R. Q. (2011). Mindfulness-based eating awareness training for treating binge eating disorder: The conceptual foundation. *Eating Disorders*, 19, 49–61.
- Kristeller, J. L., & Wolever, R. (2016). *Mindfulness-based eating awareness training: A professional guide*. New York, NY: Guilford Press.
- Kristeller, J. L., Wolever, R. Q., & Sheets, V. (2013). Mindfulness-based eating awareness training (MB-EAT) for binge eating: A randomized clinical trial. *Mindfulness*, 5(3), 282–297.
- Lutz, A., Slagter, H. A., Dunne, J. D., & Davidson, R. J. (2008). Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences*, 12, 163–169.
- Marlatt, G. A., & Gordon, J. R. (Eds.). (1985). *Relapse prevention: Maintenance strategies in the treatment of addictive behaviors*. New York, NY: Guilford Press.
- Meeks, T. W., Cahn, B., & Jeste, D. V. (2012). Neurobiological foundations of wisdom. In C. K. Germer & R. D. Siegel (Eds.), *Wisdom and compassion in psychotherapy: Deepening mindfulness in clinical practice* (pp. 189–201). New York, NY: Guilford Press.
- Miller, J. (1978). *Living systems*. New York, NY: McGraw Hill.
- Miller, C. K., Kristeller, J. L., Headings, A., Nagaraja, H., & Miser, F. (2012). Comparative effectiveness of a mindful eating intervention to a diabetes self-management intervention among adults with type 2 diabetes: A pilot study. *Journal of the Academy of Nutrition and Dietetics*, 112, 1835–1842.
- Ogden, J. (2010). *The psychology of eating* (2nd ed.). Chichester, UK: Wiley-Blackwell.
- Ostafin, B., & Kassman, K. (2012). Stepping out of history: Mindfulness improves insight problem solving. *Consciousness and Cognition*, 21, 1031–1036.
- Patel, C. H. (1977). Biofeedback-aided relaxation and meditation in the management of hypertension. *Biofeedback and Self-Regulation*, 2, 1–41.
- Raynor, H. A., & Epstein, L. H. (2001). Dietary variety, energy regulation, and obesity. *Psychological Bulletin*, 127, 325.
- Remick, A. K., Polivy, J., & Pliner, P. (2009). Internal and external moderators of the effect of variety on food intake. *Psychological Bulletin*, 135, 434–451.
- Rodin, J. (1978). Stimulus-bound behavior and biological self-regulation: Feeding, obesity, and external control. In G. E. Schwartz & D. Shapiro (Eds.), *Consciousness and self-regulation* (Vol. 2, pp. 215–239). New York, NY: Plenum.
- Rodin, J. (1981). Current status of the internal-external hypothesis for obesity: What went wrong? *American Psychologist*, 36, 361–372.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development and well-being. *American Psychologist*, 55, 68–78.
- Safer, D. L., Telch, C. F., & Chen, E. Y. (2009). *Dialectical behavior therapy for binge eating and bulimia*. New York, NY: Guilford Press.
- Schachter, S. (1971). Some extraordinary facts about obese humans and rats. *American Psychologist*, 26, 129–144.
- Schachter, S., & Rodin, J. (Eds.). (1974). *Obese humans and rats*. New York, NY: John Wiley.
- Schwartz, G. E. (1975). Biofeedback, self-regulation, and the patterning of physiological processes. *American Scientist*, 63, 314–324.
- Schwartz, G. E. (1976). Self-regulation of response patterning: Implications for psychophysiological research and therapy. *Biofeedback and Self-Regulation*, 1, 7–30.
- Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse*. New York, NY: Guilford Press.
- Shapiro, S. L., & Schwartz, G. E. (2000). The role of intention in self-regulation: Toward intentional systemic mindfulness. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 253–273). San Diego, CA: Academic.
- Singh, N. N., Lancioni, G. E., Singh, A. N., Winton, A. S. W., Singh, J., McAleavey, K. M., et al. (2008). A mindfulness-based health wellness program for an adolescent with Prader-Willi syndrome. *Behavior Modification*, 32, 167–181.
- Singh, N. N., Lancioni, G. E., Singh, A. N. A., Winton, A. S. W., Singh, A. D. A., & Singh, J. (2011). A mindfulness-based health wellness program for individuals with Prader-Willi syndrome. *Journal of Mental Health Research in Intellectual Disabilities*, 4, 90–106.

- Sobik, L., Hutchison, K., & Craighead, L. (2005). Cue-elicited craving for food: A fresh approach to the study of binge eating. *Appetite, 44*, 253–261.
- Sørensen, L. B., Møller, P., Flint, A., Martens, M., & Raben, A. (2003). Effect of sensory perception of foods on appetite and food intake: A review of studies on humans. *International Journal of Obesity, 27*, 1152–1166.
- Sternberg, R. J. (Ed.). (1990). *Wisdom: Its nature, origins, and development*. New York, NY: Cambridge University Press.
- Stunkard, A. J., & Messick, S. (1985). The three factor eating questionnaire to measure dietary restraint, disinhibition and hunger. *Journal of Psychosomatic Research, 29*, 71–83.
- Sysko, R., Devlin, M. J., Walsh, B. T., Zimmerli, E., & Kissileff, H. R. (2007). Satiety and test meal intake among women with binge eating disorder. *International Journal of Eating Disorders, 40*, 554–561.
- Tapper, K., Shaw, C., Ilesley, J., Hill, A. J., Bond, F. W., & Moore, L. (2009). Exploratory randomised controlled trial of a mindfulness-based weight loss intervention for women. *Appetite, 52*, 396–404.
- Timmerman, G., & Brown, A. (2012). The effect of a mindful restaurant eating intervention on weight management in women. *Journal of Nutrition Education and Behavior, 44*, 22–28.
- Wansink, B. (2007). *Mindless eating: Why we eat more than we think*. New York, NY: Bantam.
- Wansink, B., & Sobal, J. (2007). Mindless eating: The 200 daily food decisions we overlook. *Environment and Behavior, 39*, 106–123.
- Wilfley, D. E., Welch, R. R., Stein, R. I., Spurrell, E. B., Cohen, L. R., Saelens, B. E., et al. (2002). A randomized comparison of group cognitive-behavioral therapy and group interpersonal psychotherapy for the treatment of overweight individuals with binge-eating disorder. *Archives of General Psychiatry, 59*, 713–721.
- Wilson, G. T. (2004). Acceptance and change in the treatment of eating disorders: The evolution of manual-based cognitive-behavioral therapy. In S. C. Hayes, V. M. Follette, & M. M. Linehan (Eds.), *Mindfulness and acceptance: Expanding the cognitive-behavioral tradition* (pp. 243–260). New York, NY: Guilford Press.
- Wisniewski, L., & Kelly, E. (2003). The application of dialectical behavior therapy to the treatment of eating disorders. *Cognitive and Behavioral Practice, 10*(2), 131–138.
- Wolever, R. Q., & Best, J. L. (2009). Mindfulness-based approaches to eating disorders. In F. Didonna (Ed.), *Clinical handbook of mindfulness* (pp. 259–288). New York, NY: Springer.