

Emotional Calibration Effects on Consumer Choice

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This research extends the knowledge calibration paradigm to include *emotional calibration*. Two studies were conducted to investigate the effects of emotional calibration on consumer decision making. Emotionally calibrated consumers made higher-quality food choices, and these effects were predictive beyond cognitive ability and cognitive calibration. In a field experiment, emotional calibration enhanced obese consumers' decision quality by attenuating the impact of impulsive eating on caloric intake and reducing the effect of a vivid presentation of food choices. Theoretical implications are discussed for consumer emotional ability, confidence, and calibration, along with a motivation explanation for our findings. The significance of emotional calibration to future research is addressed along with a discussion of consumer well-being.

Although it is important to possess the knowledge required to achieve some threshold of competency, research suggests that people should also believe that they possess this knowledge if they are to make unbiased judgments critical for high-quality decision making (Lichtenstein, Fischhoff, and Phillips 1982). This correspondence, typically referred to as *calibration*, focuses on the accuracy of individuals' confidence judgments (i.e., subjective knowledge) relative to their objective knowledge (Alba and Hutchinson 2000). Knowledge calibration has been demonstrated to be an important condition in discriminating consumers who perform better on various tasks (Gershoff and Johar 2006). Recent interest in the area of emotional ability (i.e., ability-based emotional intelligence; Kidwell, Hardesty, and Childers 2008; Mayer, Salovey, and Caruso 2000) and emotional aspects of consumer self-confidence (Bearden, Har-

desty, and Rose 2001) has highlighted the need to examine potential emotional miscalibration biases on decision making and consumer outcomes.

Consumers' decisions are susceptible to both cognitive and emotional miscalibration as a result of estimations of their knowledge. These estimations can be biased in relation to product attributes and nutrition information (Alba and Hutchinson 2000) or to knowledge about emotions (i.e., how one thinks about and uses emotion in a consumption setting). It is likely that consumers overestimate or underestimate how well they perceive, understand, use, and manage emotional information. For example, when perusing a restaurant menu, many consumers may not be aware of the subtle implicit feelings of arousal elicited by visually appealing presentations of unhealthy food choices. Faced with choices between healthy and unhealthy food options, individuals who are confident that they can appropriately interpret and employ their emotions, but who do not actually possess these emotional abilities, are likely to make low-quality decisions. These poor decisions are perpetuated because miscalibrated consumers receive no regular feedback regarding the quality of their decisions (Alba and Hutchinson 2000).

In the current research, a framework of emotional calibration is developed, extending the cognitive calibration paradigm (Alba and Hutchinson 2000), to examine its effects on consumer decision making. This work extends Kidwell et al.'s (2008) research on consumer emotional ability by demonstrating the impact of emotional confidence, relative to one's emotional ability (i.e., emotional calibration), on the quality of consumer decisions. Two studies are conducted to examine these calibration effects (see fig. 1). Study 1 provides an

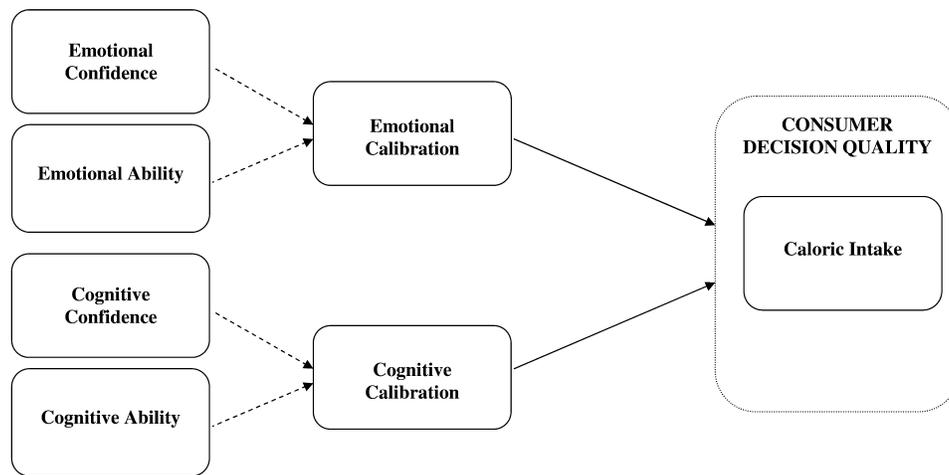
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FIGURE 1

CONCEPTUAL MODEL OF EMOTIONAL (AND COGNITIVE) CALIBRATION ON CONSUMER DECISION QUALITY



NOTE.—Dashed lines represent linear combination of subjective and objective variables.

assessment of emotional calibration on consumer food choices while considering the effects of cognitive ability and cognitive calibration. Four levels of calibration/miscalibration are examined in support of our theoretical framework. In study 2, a field experiment is conducted with a high-risk group of obese consumers to examine the moderating influence of emotional calibration on the relationship between impulsive eating and caloric intake. Additionally, we examine whether obese consumers are vulnerable to vivid presentations of food choices (Keller and Block 1997) and whether emotional calibration mitigates the impact of these vivid food presentations. In the next sections, emotional calibration is described in terms of its two components, emotional ability and emotional confidence, and that is followed by a motivational explanation of emotional calibration and its influence on consumer decision making.

THEORETICAL BACKGROUND

Emotional Ability

Mayer and Salovey (1997) introduced a mental ability framework of *emotional intelligence* (also known as *emotional ability*; the two terms are used interchangeably) that captures multiple abilities to reason about emotional information. Kidwell et al. (2008) have extended this framework to the domain of consumer behavior to capture emotional ability related to consumer outcomes. Consumer emotional intelligence (CEI) represents a person's ability to skillfully use emotional information to achieve a desired consumer outcome. It comprises a set of first-order emotional abilities that allow individuals to recognize the meanings of emotional patterns that underlie decision making and to reason and solve problems on the basis of these abilities (Kidwell et al. 2008; Mayer and Salovey 1997). It encompasses con-

sumers' ability to interpret their own emotions, understand how a decision or purchase might make them feel, and regulate their emotions in a consumption setting. Emotional ability is distinct from cognitive ability, which is defined as the amount of domain-specific knowledge that is acquired over time through experience or innate individual differences (Wood and Lynch 2002).

Prior psychological research has suggested that higher emotional ability is associated with increased performance and often predicts beyond cognitive ability (Matthews, Zeidner, and Roberts 2003). Recently, Kidwell et al. (2008) reported that consumer emotional ability predicted healthy food choices and superior product selection beyond knowledge about nutrition and product attributes, respectively. In addition, they demonstrated that CEI (i.e., emotional ability) predicted consumer outcomes better than an assessment of general emotional intelligence using the Mayer Salovey Caruso Emotional Intelligence Test (MSCEIT; Mayer et al. 2003). Consumer emotional ability provides an objective assessment of emotional knowledge and plays an important role in emotional calibration.

Emotional Confidence

Despite the importance of emotional ability, it is also important to understand how consumers' confidence in their emotional ability (i.e., subjective emotional knowledge) affects decision making. Research has indicated that confidence can play an important role in how consumers think and behave (Bearden et al. 2001; Brucks 1985). Confidence in knowledge refers to individuals' certainty of estimates or predictions of future performance based on their perceptions of their knowledge and experience (Raju, Lonial, and Mangold 1995); it confers one's level of ambiguity and pre-

sumption inherent in judgments and decisions (Russo and Shoemaker 1992).

While the consumer literature has explored cognitive confidence (Moorman et al. 2004), the concept of emotional confidence is just beginning to gain attention. New conceptualizations of confidence are emerging that suggest that confidence may exhibit both cognitive and emotional components. For example, Bearden et al. (2001) have suggested that self-confidence comprises consumers' perceptions that they are able to acquire and use information (cognitive element) as well as their confidence in being protected from harm resulting from being misled, deceived, or treated unfairly (emotional element).

While cognitive confidence, which is based on past self-knowledge, provides the individual with information about future behavior (Alba and Hutchinson 2000), there exist unknown aspects of future behavioral performance that cannot be calculated based on cognitive knowledge. These unknown elements of a decision can evoke feelings of uncertainty, making perceptions of cognitive knowledge less relevant. To engage in future behavior, individuals must overcome uncertainty toward outcomes by overcoming feelings about their own capacities to come to terms with the emotions they feel toward the behavior (Barbalet 2001). These feelings can include doubt, frustration, distrust, safety, and even pride. Those who struggle with feelings of doubt, frustration, and distrust toward potential negative consequences associated with their behaviors will likely exhibit lower emotional confidence.

Emotional Calibration

While the influence of confidence on decision making is important, research suggests that people are "wrong too often when they are certain that they are right" (Fischhoff, Slovic, and Lichtenstein 1977, 561). Alba and Hutchinson (2000) posit that judgments are routinely biased, posing several problems, including lower-quality decisions. Miscalibrated individuals typically receive no feedback regarding their judgments; thus, their poor decisions are reinforced and then become routine. Similarly, consumers who believe that they possess high levels of emotional ability but who are wrong in their perceptions may be even more disadvantaged in making effective consumer-related decisions because emotions have such power to influence daily decisions (Schwarz and Clore 1996). Thus, consumers who are emotionally calibrated not only possess high levels of emotional ability but also are confident in their feelings toward these emotional abilities, including feelings of self-assurance and conviction. Emotionally calibrated individuals are likely to be more motivated because their heightened confidence and objective emotional ability support their confidence. Consequently, these consumers are better equipped to make high-quality decisions.

Motivational Impact of Emotional Confidence

Confidence may have an adaptive value in providing motivational effects in various settings. For example, Moorman

et al. (2004) reported that consumers were motivated to locate themselves in healthy food aisles when they were confident in their nutrition knowledge. Motivation was attributed to their desires to be consistent in their decision making. Those who were confident were likely to make higher-quality decisions as a result of increased motivation to be consistent. Simmel (1964) suggested that confidence is a basic foundation of motivation and can be thought of as a specific form of self-understanding about one's abilities, feelings, and knowledge. This self-understanding represents individuals' feelings about their capacities to achieve their goals, which is essential for engaging in all forms of action (Barbalet 2001).

Researchers have acknowledged that emotional experiences powerfully alter individuals' perceptions of the world (Schwarz and Clore 1996). For example, emotions such as anxiety, shame, dejection, and despair are associated with inactivity; they can raise levels of uncertainty and reduce inclinations toward action (Loewenstein et al. 2001). In contrast, emotions of self-assurance and conviction motivate an individual to work hard toward achieving a goal to be consistent with those emotions. Heightened confidence generates an assured expectation, which is the basis of, and a motive for, behavioral performance (Ortony, Collins, and Clore 1988). Thus, increases in confidence are often associated with increases in motivation levels. Consumers who feel little doubt, anxiety, or shame are better able to project their conviction and confidently apply their objective knowledge toward a decision within that domain of confidence.

HYPOTHESES

Emotional Calibration on Decision Quality

Considerable support is available to show that food choices affect consumers' health—an observation that is particularly salient as obesity prevalence rises (Livingstone and Black 2003; Nestle 2003). The obesity epidemic represents one of the most challenging public health problems of our time (Flegal et al. 2002), and its prominence underscores the need to address the unhealthy food choices of all consumers with preventive and treatment-oriented goals.

Researchers have focused on explaining why people make poor food choices by examining biased estimates of meal size (Chandon and Wansink 2007a) and biased underestimates of caloric intake relative to body mass index (BMI; Livingstone and Black 2003). These studies have provided important insights into caloric underestimation biases, but a growing body of research has suggested that poor food choices are influenced by the emotions felt or anticipated in the consumption setting (Tice, Bratslavsky, and Baumeister 2001). For example, people who are upset often indulge their impulses by eating high-caloric snacks to make themselves feel better (Tice et al. 2001). These biases in emotional processing, while not well understood, can have an important impact on consumer food choices; such biases often lead to overeating, particularly among obese individuals (Chua, Touyz, and Hill 2004). Consumers are likely to

make better food choices when they possess higher levels of emotional ability and higher levels of confidence in those abilities. These emotionally calibrated consumers are expected to make higher-quality decisions relative to miscalibrated consumers. Thus, we predicted the following:

H1: Emotionally calibrated versus miscalibrated consumers will make higher-quality food decisions.

To provide a strong test of this relationship, cognitive ability was included in our analysis as a control variable to account for objective cognitive knowledge about nutrition (i.e., caloric contents of various foods). In addition to the effects of cognitive knowledge, we included the influence of cognitive calibration to account for what consumers think they know and what they actually know about caloric contents of foods (Alba and Hutchinson 2000). As such, we assessed cognitive calibration to provide empirical evidence for the effects posited by Alba and Hutchinson (2000) and to show that emotional calibration operates beyond cognitive calibration to affect decision quality.

Levels of Emotional Miscalibration

Four levels of emotional miscalibration were examined to provide a more systematic and complete understanding of the interplay between emotional ability and confidence. The combinations of emotional confidence and emotional ability provided a means to differentiate groups along these dimensions. Alba and Hutchinson (2000) did not differentiate between calibration for low versus high ability and confidence.

Overconfident Miscalibrated: High Confidence/Low Ability. This group consisted of consumers with higher levels of emotional confidence but lower emotional ability. While emotional confidence drives motivation, decision outcomes can suffer as a result of too much confidence without the necessary emotional ability to facilitate accurate decisions. Overconfident individuals may approach food choice decisions boldly because their motivation is high, but they may ultimately perform poorly if they lack the necessary abilities to anticipate important emotions such as the regret they might feel if they deviate from their diet. These consumers were expected to make poor decisions regarding their caloric intake.

Underconfident Miscalibrated: Low Confidence/High Ability. The second group consisted of consumers who possessed relatively high levels of emotional ability but lacked confidence in their ability. Emotionally underconfident consumers suffer anxiety when they make consumer-related decisions, and this can lead to frustration and despair. This lack of emotional confidence can demotivate to the point of inactivity at which point the decision, if any, may be poor. However, because these individuals have greater emotional ability, they were expected to make higher-quality decisions than overconfident consumers.

Calibrated: High Confidence/High Ability. The third group comprised emotionally calibrated consumers, those who possessed greater levels of emotional ability and also heightened confidence in those abilities. Higher levels of confidence may motivate performance through feelings such as pride in performing well and feelings of self-assurance in making a decision that is relatively free of anxiety and frustration. In addition, these consumers possess greater emotional ability that supports their higher levels of confidence and leads to higher-quality consumer decisions (Alba and Hutchinson 2000).

Calibrated: Low Confidence/Low Ability. The fourth group consisted of consumers who were lower in emotional ability and lower in confidence. These consumers were calibrated, but they did not show the emotional ability or the confidence needed to make effective decisions. Although Alba and Hutchinson (2000) did not distinguish between types of calibration, it is important to assess this category of emotional calibration to provide evidence that the nature of emotional calibration, and not just the matching of ability and confidence, is critical for higher-quality decision making. Calibrated individuals lacking ability and confidence were expected to differ significantly from highly calibrated consumers with high ability and high confidence. Additionally, consumers with low ability and low confidence were expected to underperform relative to the miscalibrated groups. Therefore, we hypothesized the following:

H2: Highly emotionally calibrated consumers (high confidence–high ability) will make higher-quality food decisions than miscalibrated consumers or those who are calibrated at lower levels (low confidence–low ability).

STUDY 1

The influence of emotional calibration on the quality of consumer food choices (hypothesis 1) was assessed while controlling for the impact of both cognitive ability and cognitive calibration. Additionally, emotional calibration was categorized into four groups, based on higher and lower levels of confidence and ability, to more thoroughly examine the nature of emotional calibration on decision making (hypothesis 2). The following sections detail the laboratory study designed to test these hypotheses.

Method

Sample and Data Collection. Participating in a laboratory study at the University of Kentucky were 231 undergraduate business students. Each participant was provided with a Web address and password and asked to complete an online questionnaire. The questionnaire included measures of objective nutrition knowledge, emotional ability, and subjective confidence ratings, and it took approximately 25–35 minutes to complete. Once participants completed the assessment, they were given a scenario

in which they were asked to decide what foods they would eat for an entire day from a menu at a local restaurant that offered a wide range of healthy and unhealthy options (similar to tasks used by Chandon and Wansink [2007a] and Kozup, Creyer, and Burton [2003]). They were instructed to consider main courses, appetizers, drinks, and desserts as part of a daily food intake that would help them maintain a healthy diet and hold constant their dietary goals, whether to gain, lose, or maintain weight. Fixing the goal level was intended to rule out the potential alternative explanation that goal level accounted for the resulting caloric intake values. In study 2, the goal level was allowed to vary. Price considerations were removed by omitting prices. Once participants made food choices, they were debriefed.

Measures

Emotional Ability. Emotional ability was assessed using the Consumer Emotional Intelligence Scale (CEIS; Kidwell et al. 2008), which has been adapted to the domain of consumer behavior from the more general MSCEIT (Mayer et al. 2003). The CEIS is similar in structure and format to the MSCEIT and has undergone extensive psychometric evaluations. Similar to the MSCEIT, CEIS uses valid indicator scores based on expert judgments to provide an objective assessment of consumer emotional ability. Findings supported the CEIS as a reliable and valid measure of emotional intelligence in the domain of consumer behavior (Kidwell et al. 2008; <http://www.ceis-research.com>). Split-half reliability for the CEIS was 0.82.

Emotional Confidence. Emotional confidence was measured by subjective probability ratings (Kahneman and Lovallo 1993; Sniezek, Paese, and Switzer 1990). Respondents were instructed to express the degree of confidence in their answers on a percentage scale, with a range of 0%–100%, referred to as single-item judgments because they assessed confidence for each ability item (Treadwell and Nelson 1996). Similar measures were used to assess cognitive confidence.

Cognitive Ability. The cognitive ability (i.e., objective knowledge) measure was patterned after that of Moorman et al. (2004) and is based on the respondent's knowledge regarding the nutrition content of a variety of typical foods. A series of 40 true/false items was administered, comparing the nutritional content of two portions of food items. For example, participants were asked which has more calories—a 1/2 cup of spaghetti sauce or 2 tablespoons of butter. Cognitive ability scores were calculated by summing the correct items from the battery of 40 items. Reliability for this objective nutrition index was .90 and was assessed using the Proportional Reduction in Loss (PRL) index developed by Rust and Cooil (1994) and employed by Hardesty, Bearden, and Carlson (2007). The correlation between cognitive and emotional ability was 0.10 ($p = .14$).

Emotional and Cognitive Miscalibration. Calibration was based on the degree of correspondence between con-

fidence judgments and objective measures. For each item in the CEIS, subjective emotional knowledge (confidence judgments ranging from 0% to 100%, converted to .0 to 1.0) was subtracted from objective emotional knowledge (emotional ability assessments ranging from .00 to 1.00; based on expert percentages of correctness averaged across all CEIS items) to form an overconfidence/underconfidence score. The absolute value of this score was averaged across the 18 CEIS items to assess emotional miscalibration ($M = .38$, $SD = .10$). A similar measure was created for cognitive miscalibration ($M = .12$, $SD = .09$). The correlation between emotional and cognitive miscalibration was .03 ($p = .59$).

Decision Quality. Consumer decision quality was the dependent variable in both of our studies and was assessed as the total calories of foods chosen. Total calories was calculated based on quantities cross-referenced from nutritional guides (e.g., <http://www.calorieking.com>) and should be minimized to maintain a healthy diet. This measure is similar to measures used in recent studies on cognitive biases in food choice decision making (Chandon and Wansink 2007b).

Results

Emotional Miscalibration and Cognitive Ability. Regression results revealed that emotional miscalibration was positively related to total calories ($\beta = .23$, $p < .01$; all betas reported are standardized unless otherwise noted), suggesting that individuals who are more calibrated (i.e., less miscalibrated) selected fewer calories—in support of hypothesis 1. Emotional miscalibration explained 5.4% of the variation in total calories. Hierarchical regression was employed to determine whether emotional miscalibration predicted beyond cognitive ability. The relationship between cognitive ability and total calories was negative as expected ($\beta = -.43$, $p < .01$). Cognitive ability explained an initial 18.4% of the variance in total calories. A second regression was conducted that included both cognitive ability and emotional miscalibration. Emotional miscalibration contributed an additional 4.4% explanatory power beyond cognitive ability ($F(2, 228) = 13.12$, $p < .01$). Together, cognitive ability and emotional miscalibration explained 22.8% of the variation in total calories. No effects of multicollinearity were evidenced between cognitive ability and emotional miscalibration ($r = -.08$, $p = .22$, VIF = 1.3).

Emotional Miscalibration and Cognitive Miscalibration. Hierarchical regressions were also conducted to examine the predictive ability of emotional miscalibration beyond cognitive miscalibration. Results revealed that cognitive miscalibration was marginally related to total calories ($\beta = .12$, $p = .07$). Cognitive miscalibration accounted for an initial 1.4% of the variance in caloric intake. A regression including both cognitive miscalibration and emotional miscalibration indicated that emotional miscalibration significantly accounted for an additional 5% variance beyond cog-

nitive miscalibration ($\beta = .23$, $F(1, 226) = 12.19$, $p = .01$). No effects of multicollinearity were evidenced between cognitive and emotional miscalibration ($r = .04$, $p = .50$, $VIF = 1.7$).

Levels of Emotional Miscalibration. To further investigate the underlying components of emotional calibration and to discover how these components (i.e., ability and confidence) combine to influence food choice decision making, we evaluated the four subgroups (all combinations of high or low ability and confidence). To create these four conditions we performed a median split on emotional ability and emotional confidence. Three dummy variables were used to represent the four conditions included in table 1.

The regression analysis included cognitive ability as a control variable with the four groups coded as three dummy variables relative to the baseline category of individuals low in confidence and ability. Results revealed that the high confidence-high ability ($\beta = -.15$, $p < .05$) condition significantly predicted total calories. The low confidence-high ability ($\beta = -.11$, $p = .08$) condition was marginally related to total calories (table 1). Moreover, the high confidence and low ability condition was not significantly different from low confidence-low ability ($\beta = -.02$, $p = .72$). Importantly, hierarchical regression results revealed that the dummy variable representing high ability and high confidence predicted total calories beyond cognitive ability. By including the dummy variable for high confidence and high ability, 2% explanatory power was added. Together, these results support hypothesis 2.

Overall, study 1 provided evidence for the influence of emotional calibration on caloric intake beyond the influences of cognitive ability and cognitive calibration. Having established emotional calibration as an important predictor of food choice, the second study was conducted to assess the effects of calibration for caloric intake on a field sample of obese individuals.

STUDY 2

The goal of study 2 was to examine the potential beneficial effects of emotional calibration on a highly vulnerable population of food choice decision makers: obese consumers.

Specifically, this study was conducted to determine whether emotional calibration moderates the relationship between impulsive eating and caloric intake for obese consumers. Furthermore, we tested whether obese consumers are vulnerable to visually based food stimulation and whether emotional calibration mitigates this effect (Wansink, Painter, and North 2005).

Impulsive Eating

Increasingly, obese Americans are overindulging in unhealthy foods (Flegal et al. 2002), a tendency often attributed to the extent of their impulsivity (Ramanathan and Williams 2007; Rook and Fisher 1995; Sengupta and Zhou 2007; Vohs and Faber 2007). A recent study by Ramanathan and Menon (2006) suggests that impulsivity is characterized by generalized reward sensitivity and activation of chronic pleasure-seeking goals. Further, Ramanathan and Williams (2007) found support for impulsivity to indulge in food consumption through persistence of positive hedonic emotions. In line with this theorizing, we expected that well-calibrated motivated consumers would be more likely to temper chronic pleasure-seeking goals and to possess lowered sensitivity to short-term rewards. Thus, we examined how emotional calibration might attenuate the relationship between impulsive eating and unhealthy food choices for obese individuals. We expected higher levels of calibration to weaken the positive relationship between impulsivity and caloric intake and miscalibration to strengthen this relationship. Thus, we predicted the following:

H3: Emotional calibration will moderate the relationship between impulsive eating and caloric intake.

Vivid Menu Displays

Impulsive individuals act spontaneously and are often prompted by physical proximity to a product or through an emotional attachment (Rook and Fisher 1995). Studies have consistently reported that food consumption is influenced by various environmental stimuli, such as advertisements, promotions, and container size (Wansink 1996; Wansink and Ray 1996). New TV spots recently created by the Ad Coun-

TABLE 1
MULTIGROUP ANALYSIS OF EMOTIONAL CALIBRATION

Group	Emotional ability	Emotional confidence	D_1	D_2	D_3	Coefficient	t-value
1	Low	Low	0	0	0		
2	Low	High	1	0	0	-.02	-.33
3	High	Low	0	1	0	-.11	-1.74*
4	High	High	0	0	1	-.15	-2.12**
Cognitive ability						-.42	-7.21***

NOTE.— $R^2 = .21$.

*Significant at $p < .10$.

**Significant at $p < .05$.

***Significant at $p < .01$.

cil and the U.S. Department of Health and Human Services focus on obesity, but critics already claim that the ads “don’t address the obesity problem in a *vivid* enough way to get people’s attention” (Stobbe 2007, emphasis added). Supporting this concern is research reporting that vivid presentations of information can influence consumption (Keller and Block 1997). Similarly, visual cues such as portion or container size can guide consumption; when this cue is removed, food consumption can increase without the consumer being aware of increased satiation (Wansink et al. 2005). Likewise, individuals exposed to more vivid presentations of food, such as tantalizing depictions of dishes displayed on a menu cover, would more likely select higher-caloric foods. Consistent with this research, we predicted that vividness should also have an impact on the caloric intake of obese consumers and that those with higher emotional calibration would be better able to resist the temptations of vivid menu presentations.

H4: Emotional calibration will moderate the relationship between vividness and caloric intake.

Method

Pretest. Keller and Block (1997) manipulated vividness by constructing a message that included pictures and text so as to avoid confounding modality with vividness. We followed their guidelines in developing a vivid menu cover that presented selected foods available from a restaurant. A pretest of 26 individuals was conducted to develop this vividness manipulation. Participants completed items assessing the vividness of various combinations of vivid and nonvivid menu covers. Five items similar to those used in Keller and Block (1997) were included on a 5-point scale ($\alpha = .91$) to measure vividness. Based on the pretest, we selected a menu cover that featured vivid pictures and descriptions of available foods, some healthy and some unhealthy. To maintain comparability in manipulating vividness without confounding modality, the nonvivid condition also contained pictures and text. The vividness means for these two menu covers were 4.40 and 3.10 ($t(24) = 5.52, p < .01$), thus providing evidence that our vividness manipulation was perceived as intended.

Sample and Procedure. We used a panel of obese consumers that was maintained by a professional marketing research firm (Survey Sampling; <http://www.surveysampling.com>). A total of 105 adult obese consumers were recruited and participated in this online experiment. Panel members were not informed in Survey Sampling’s e-mail invitation that they were selected because of their obesity. To verify that they would be classified as obese, we required them to first complete two online interactive screening questions asking their height in inches and their weight in pounds. Software was programmed to intercept this information and compute their BMI. Only individuals with a BMI of 30 or greater were included in the study. This criterion represents an accepted cutoff for obese individuals (Nestle 2003). In-

dividuals satisfying this criterion were automatically passed to one of two Web sites containing the manipulations and materials for the study. The software also contained an algorithm that randomly assigned participants across conditions. The Web sites contained the two vividness manipulations for a hypothetical restaurant. Participants initially read a brief cover story indicating that they were to select foods from a restaurant that may open in their area in the coming months, based on what they would eat in a typical day. Following this, participants made food selections (as in study 1) and completed the measures contained in the online survey.

Measures. Emotional ability and confidence were assessed, as in the prior study, through CEIS (split-half reliability = 0.76) and through subjective probability estimates of the CEIS items. Participants responded to a scale using a 5-point semantic differential anchored by uninformative/informative to assess the degree to which they processed the menu cover (Petty, Cacioppo, and Schumann 1983). Five items similar to those from Keller and Block (1997) were again used to measure the vividness of the menu covers ($\alpha = .89$). After the participants had completed the food choice task, a 9-item impulsive eating scale adapted from Rook and Fisher (1995; $\alpha = .86$) was administered. Emotional miscalibration and caloric intake were calculated as in study 1.

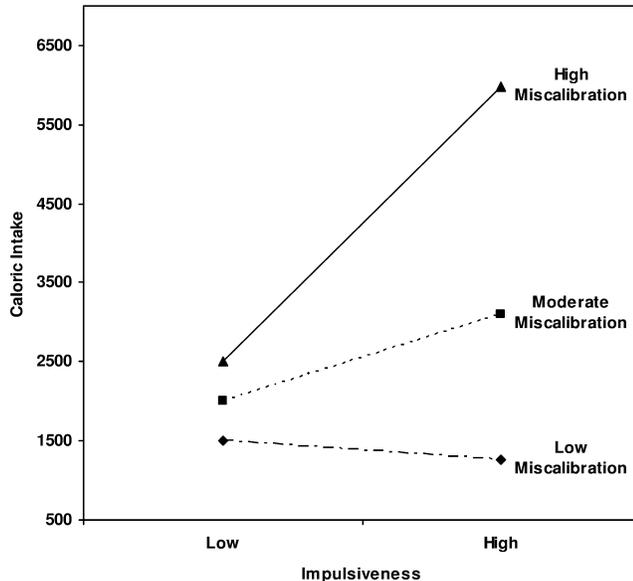
Results

Manipulation Checks. Average ratings for the vivid condition were significantly higher (4.47) than those for the nonvivid condition (3.76; $t(103) = 4.26, p < .01$), supporting the effectiveness of the manipulation. The vividness conditions did not vary in terms of the reported amount of processing of the menu covers (2.83 vs. 2.90; $t(103) = .76, p = .45$). Additionally, respondents were asked at the end of the survey to report their eating goals: whether they wanted to lose weight (75%), gain weight (0%), maintain weight (14%), or had no eating goals (11%). Levels of miscalibration exhibited no differences across goals, suggesting that calibrated and miscalibrated consumers reported similar eating goals.

Tests of Hypotheses. To test the moderated influence of emotional miscalibration on the relationship between impulsivity and caloric intake, regression analyses were conducted in which impulsive eating, emotional miscalibration, and the miscalibration \times impulsive eating interaction were regressed onto total calories. The regression accounted for 12% of the variation in total calories. Importantly, results revealed a significant interaction between impulsive eating and emotional miscalibration ($\beta = .22, t(98) = 2.33, p < .05$), which supports hypothesis 3. With emotional miscalibration as the moderator, a simple slopes analysis was conducted (i.e., the slopes at the mean and one standard deviation above and below the mean; Aiken and West 1991). Results revealed, as expected, that higher levels of emotional

FIGURE 2

SIMPLE SLOPES ANALYSIS AT LEVELS OF EMOTIONAL MISCALIBRATION (IMPULSIVENESS \times MISCALIBRATION ON CALORIC INTAKE)



NOTE.—A low level of miscalibration is one standard deviation below the mean (more calibrated). A medium level is at the mean, and a high level is one standard deviation above the mean (more miscalibrated): high miscalibration ($\beta = 3,479.40$, $t(98) = 2.92$, $p < .01$), moderate miscalibration ($\beta = 1,093.46$, $t(98) = 1.24$, $p > .10$), and low miscalibration ($\beta = -231.29$, $t(98) = .27$, $p = .79$). Betas are unstandardized.

miscalibration strengthened the positive influence of impulsivity on the amount of calories selected (more unhealthy decisions), whereas emotional calibration reduced this effect (fig. 2). These results suggest that emotional calibration aids obese consumers by attenuating the impact of their impulsive eating tendencies on caloric intake. In contrast, miscalibrated consumers were less able to regulate their impulsiveness.

As an initial test of vividness effects, we assessed the direct relationship of vividness onto caloric intake. We found that vivid menu displays resulted in participants choosing modestly higher levels of total calories as compared with the effects of nonvivid menus ($\beta = .23$, $p < .05$). Next, vividness, emotional miscalibration, and the emotional miscalibration \times vividness interaction were regressed onto total calories. The regression accounted for 18% of the variation in total calories. Importantly, results revealed a significant interaction between vividness and emotional miscalibration ($\beta = .27$, $t(98) = 2.52$, $p < .05$) in support of hypothesis 4. These results suggested that a vivid presentation of food selections affected obese individuals who lacked emotional ability and/or confidence, while such presentations did not affect emotionally calibrated obese individuals. A simple slopes analysis (Aiken and West 1991) conducted at levels of miscalibration revealed that vividness was more positively related to total calories when miscalibration was high

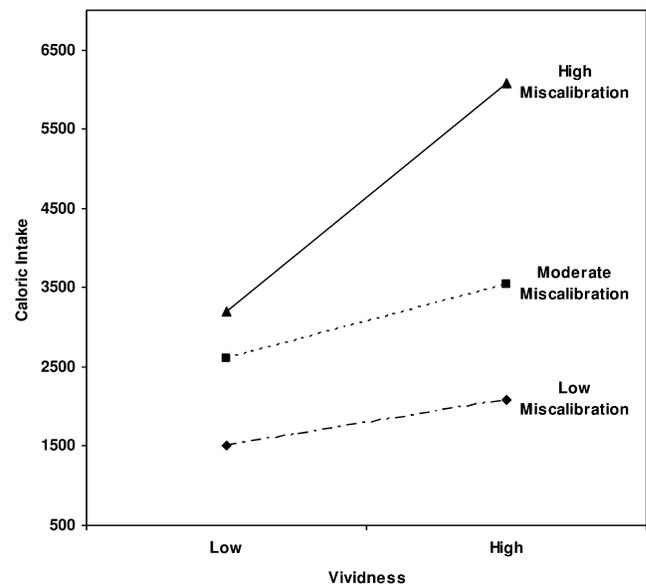
versus low (fig. 3). These results indicated that obese individuals who are high in miscalibration are particularly vulnerable to vivid menu covers.

GENERAL DISCUSSION

We extend the knowledge calibration paradigm (Alba and Hutchinson 2000) to examine the influence of consumer emotional calibration. In doing so, we develop a framework of emotional calibration that incorporates the influence of consumer emotional ability (Kidwell et al. 2008) and the emotional component of confidence (Bearden et al. 2001). Our research sheds light on how consumers think about and use their emotional knowledge in making food choice decisions. We have shown that emotional calibration is an important consumer variable that had significant effects beyond the well-established cognitive calibration framework. Additionally, we expand on the research of Alba and Hutchinson (2000) by distinguishing between types of calibration in order to better understand the relationships of levels of ability and confidence on consumer choice outcomes. Our results demonstrate that calibration should differentiate between those who are calibrated but vary in their levels of confidence and ability.

FIGURE 3

SIMPLE SLOPES ANALYSIS AT LEVELS OF EMOTIONAL MISCALIBRATION (VIVIDNESS \times MISCALIBRATION ON CALORIC INTAKE)



NOTE.—A low level of emotional miscalibration is one standard deviation below the mean. A medium level is at the mean, and a high level is one standard deviation above the mean: high miscalibration ($\beta = 2,882.29$, $t(98) = 2.95$, $p < .01$), moderate miscalibration ($\beta = 1,148.37$, $t(98) = 1.75$, $p < .10$), and low miscalibration ($\beta = 591.27$, $t(98) = 1.08$, $p = .25$). Betas are unstandardized.

Summary of Findings

Results reveal that emotional calibration aids food choices when consumers possess both significant emotional confidence and ability. Emotional calibration predicts caloric intake beyond the effects of both cognitive ability and cognitive calibration (study 1). In study 2, a vulnerable consumer population of obese individuals is also investigated to assess the quality of their food choices relative to impulsive eating and emotional calibration. Emotional calibration moderates impulsive eating, resulting in higher-quality food decisions. For obese miscalibrated individuals, impulsivity increases caloric intake; for those who are calibrated, this influence is mitigated. Additionally, results reveal that vividness influences caloric intake for miscalibrated individuals, while calibrated individuals are not affected. These results suggest that obese consumers with decreased motivation are more likely to attend to the enticing aspects of a vivid menu cover and thus make lower-quality food choices.

Directions for Future Research

Cognitive Calibration versus Emotional Calibration.

Our research finds that both emotional calibration and cognitive calibration affect decision quality. Research is now needed to understand how the interaction among cognitive and emotional calibration will enhance future decisions. For example, to what degree does overconfidence in cognitive ability relate to overconfidence in emotional ability? Does knowledge at a cognitive level lead to emotional understanding, or do the two develop separately? Does cognitive and emotional confidence evolve from or drive the acquisition of this knowledge? Are there common strategies situationally invoked across cognitive and emotional domains driven by an overlapping set of antecedent precursors, or are they perhaps strategically motivated by individual differences? Alba and Hutchinson (2000) discussed cognitive miscalibration as occurring across domains and even exhibiting “traitlike” qualities. Can the same be said for emotional calibration?

Necessary and Sufficient Conditions of Emotional Calibration. Our research extends Kidwell et al.’s (2008) research by demonstrating that it is necessary to have substantial emotional ability but that commensurate high confidence is also needed for consumers to make the best decisions. Specifically, we have found that possessing greater ability (for both low- and high-confidence groups) is necessary and fundamental to better decisions; however, we find that consumers must also possess sufficient levels of heightened confidence to capitalize on those abilities. Gershoff and Johar (2006) have shown that the mechanism underlying cognitive calibration is motivation based. Future research is needed to demonstrate that the underlying mechanism for emotional calibration has a motivational mechanism. We have suggested that emotional confidence is also based in motivation and represents a specific form of self-understanding about one’s feelings and abilities. When confronted with a

decision, consumers must access their feelings toward the outcome and marshal those feelings toward action or inaction. One’s self-assurance in his or her emotional knowledge can be a powerful means to motivate behavior that is consistent with the goals of the individual. While we have theorized this effect underlying emotional confidence, future research should provide further evidence to support this mechanism and empirically demonstrate its effects. In addition, future research must explore the interaction between confidence and ability to identify thresholds of emotional knowledge and confidence in emotional knowledge that consumers possess to achieve the benefits of emotional calibration.

Consumer Well-Being and Transformative Research.

An important normative direction for future research pertains to the development of education and preventive programs to inform consumers and enhance their abilities and confidence. One important question is how individuals can be taught to better understand their emotions and how these emotions can influence important decisions that affect their well-being. For example, consumers who believe that they are good at managing their emotions but who do not possess the actual ability to be able to regulate impulsive emotions are likely to routinely make very poor quality choices. These individuals must be provided feedback about their emotional confidence or they must be provided education about how to increase their ability to manage their emotions. For individuals with higher levels of emotional ability but low levels of emotional confidence, confidence could be heightened to increase motivation through providing positive feedback about decision capabilities. This research provides some guidance, for instance, on how to develop weight control programs that enhance this confidence, as opposed to health programs that emphasize negative self-conscious emotions (e.g., guilt, shame) or negative hedonic emotions (e.g., stress, anxiety; Ramanathan and Williams 2007).

The tempering effects of emotional calibration on impulsivity may provide meaningful insights into how individuals self-regulate in the face of resource depletion. Vohs and Heatherton (2000) report that chronic dieters were more prone to lose self-control when continually tempted by ice cream and snacks. Vohs and Faber (2007) extended these results and found that temporary reductions in resource capacity resulted in greater impulsive spending for high-priced items (e.g., watches or cars) as well as smaller monetary items (e.g., gum and playing cards). Chandon and Wansink (2007a) also discuss the role of self-regulation in eating behavior and the effects that health claims might have on impulsive behavior. Chandon and Wansink (2007a) found that, when consumers considered information contradicting health claims due to a healthier restaurant image (e.g., Subway vs. McDonald’s), the halo effect of this image was reduced. Our research suggests that the ability to consider emotional information through emotional confidence and ability, as well as the ability to consider nutrition information, may further reduce susceptibility to these claims. Future research should examine whether emotional calibration might attenuate these types of biasing

effects and provide the ability to resist temptations and a loss of self-control.

In study 2, we examined only obese consumers; however, our findings have implications for a far greater range of vulnerable populations. Among these are not only consumers who are undereducated or who are poor but also shoppers who are illiterate, mentally ill, physically disabled, or addicted to drugs or alcohol. Such consumers must be able to understand and use their emotions in meeting consumption goals and, as such, this represents an enormous opportunity for future research. Many members of these vulnerable populations accomplish their goals through the assistance of others, including friends, family, salespeople, and professional assistants. This raises questions about how one's emotional calibration of abilities and confidence might relate to those assisting and advising vulnerable consumers. Thus, an area for potentially fruitful future research is to understand interpersonal emotional calibration, particularly for individuals who must interact with others when making consumer decisions, including shoppers who rely on others for assistance (e.g., visually impaired). In conclusion, it is our hope that the current research will stimulate others to investigate these issues to further reveal the importance of emotional calibration in consumer decision making.

REFERENCES

- Aiken, Leona S. and Stephen G. West (1991), *Multiple Regression: Testing and Interpreting Interactions*, Newbury Park, CA: Sage.
- Alba, Joseph W. and J. Wesley Hutchinson (2000), "Knowledge Calibration: What Consumers Know and What They Think They Know," *Journal of Consumer Research*, 27 (September), 123–56.
- Barbalet, Jack M. (2001), *Emotion, Social Theory and Social Structure: A Microsociological Approach*, Cambridge: Cambridge University Press.
- Bearden, William O., David M. Hardesty, and Randall L. Rose (2001), "Consumer Self-Confidence: Refinements in Conceptualization and Measurement," *Journal of Consumer Research*, 28 (June), 121–34.
- Brucks, Merrie (1985), "The Effects of Product Class Knowledge on Information Search Behavior," *Journal of Consumer Research*, 12 (June), 1–16.
- Chandon, Pierre and Brian Wansink (2007a), "The Biasing Health Halos of Fast-Food Restaurant Health Claims: Lower Calorie Estimates and Higher Side-Dish Consumption Intentions," *Journal of Consumer Research*, 34 (October), 301–14.
- (2007b), "Is Obesity Caused by Calorie Underestimation? A Psychophysical Model of Meal Size Estimation," *Journal of Marketing Research*, 44 (February), 21–28.
- Chua, John L., Stephen Touyz, and Andrew J. Hill (2004), "Negative Mood-Induced Overeating in Obese Binge Eaters: An Experimental Study," *International Journal of Obesity*, 28 (4), 606–10.
- Fischhoff, Baruch, Paul Slovic, and Sarah Lichtenstein (1977), "Knowing with Certainty: The Appropriateness of Extreme Confidence," *Journal of Experimental Psychology: Human Perception and Performance*, 3 (November), 552–64.
- Flegal, Katherine M., Margaret D. Carroll, Cynthia L. Ogden, and Clifford L. Johnson (2002), "Prevalence and Trends in Obesity among U.S. Adults, 1999–2000," *Journal of the American Medical Association*, 288 (14), 1723–27.
- Gershoff, Andrew D. and Gita Venkataramani Johar (2006), "Do You Know Me? Consumer Calibration of Friends' Knowledge," *Journal of Consumer Research*, 32 (March), 496–503.
- Hardesty, David M., William O. Bearden, and Jay P. Carlson (2007), "Persuasion Knowledge and Consumer Reactions to Pricing Tactics," *Journal of Retailing*, 83 (2), 199–210.
- Kahneman, Daniel and Dan Lovallo (1993), "Timid Choices and Bold Forecasts: A Cognitive Perspective on Risk Taking," *Management Science*, 39 (1), 17–31.
- Keller, Punam Anand and Lauren G. Block (1997), "Vividness Effects: A Resource-Matching Perspective," *Journal of Consumer Research*, 24 (December), 295–304.
- Kidwell, Blair, David M. Hardesty, and Terry L. Childers (2008), "Consumer Emotional Intelligence: Conceptualization, Measurement, and the Prediction of Consumer Decision Making," *Journal of Consumer Research*, 35 (June), 154–66.
- Kozup, John C., Elizabeth H. Creyer, and Scot Burton (2003), "Making Healthy Food Choices: The Influence of a Health Claim and Nutrition Information on Consumers' Evaluations of Packaged Food Products and Restaurant Menu Items," *Journal of Marketing*, 67 (April), 19–34.
- Lichtenstein, Sarah, Baruch Fischhoff, and Lawrence D. Phillips (1982), "Calibration of Probabilities: The State of the Art to 1980," in *Judgments under Uncertainty: Heuristics and Biases*, ed. Daniel Kahneman, Paul Slovic, and Amos Tversky, New York: Cambridge University Press, 306–34.
- Livingstone, Barbara M. and Alison E. Black (2003), "Markers of the Validity of Reported Energy Intake," *Journal of Nutrition*, 133 (3), 895–920.
- Loewenstein, George, Elke Weber, Christopher Hsee, and Ned Welch (2001), "Risk as Feelings," *Psychological Bulletin*, 127 (2), 267–86.
- Matthews, Gerald, Moshe Zeidner, and Richard D. Roberts (2003), *Emotional Intelligence: Science and Myth*, Cambridge, MA: MIT Press.
- Mayer, John D. and Peter Salovey (1997), "What Is Emotional Intelligence?" in *Emotional Development and Emotional Intelligence: Implications for Educators*, ed. Peter Salovey and David Slusher, New York: Basic, 3–31.
- Mayer, John D., Peter Salovey, and David Caruso (2000), "Models of Emotional Intelligence," in *The Handbook of Intelligence*, ed. Robert J. Sternberg, New York: Cambridge University Press, 396–420.
- Mayer, John D., Peter Salovey, David R. Caruso, and Gill Sitar-enios (2003), "Measuring Emotional Intelligence with the MSCEIT V2.0," *Emotion*, 3 (1), 97–105.
- Moorman, Christine, Kristin Diehl, David Brinberg, and Blair Kidwell (2004), "Subjective Knowledge, Search Locations, and Consumer Choice," *Journal of Consumer Research*, 31 (December), 673–80.
- Nestle, Marion (2003), "Increasing Portion Size in American Diets: More Calories, More Obesity," *Journal of American Dietetic Association*, 103 (1), 39–40.
- Ortony, Andrew, Allen Collins, and Gerald L. Clore (1988), *The Cognitive Structure of Emotions*, New York: Cambridge University Press.
- Petty, Richard E., John T. Cacioppo, and David Schumann (1983), "Central and Peripheral Routes to Advertising Effectiveness: The Moderating Role of Involvement," *Journal of Consumer Research*, 10 (September), 135–46.

- Raju, P. S., Subhash C. Lonial, and W. Glynn Mangold (1995), "Differential Effects of Subjective Knowledge, Objective Knowledge, and Usage Experience on Decision Making: An Exploratory Investigation," *Journal of Consumer Psychology*, 4 (2), 153–80.
- Ramanathan, Suresh and Geeta Menon (2006), "Time-Varying Effects of Chronic Hedonic Goals on Impulsive Behavior," *Journal of Marketing Research*, 43 (November), 628–41.
- Ramanathan, Suresh and Patti Williams (2007), "Immediate and Delayed Emotional Consequences of Indulgence: The Moderating Influence of Personality Type on Mixed Emotions," *Journal of Consumer Research*, 34 (August), 212–23.
- Rook, Dennis W. and Robert J. Fisher (1995), "Normative Influences on Impulsive Buying Behavior," *Journal of Consumer Research*, 22 (December), 305–13.
- Russo, J. Edward and Paul J. H. Shoemaker (1992), "Managing Overconfidence," *Sloan Management Review*, 33 (Winter), 7–17.
- Rust, Roland T. and Bruce Cooil (1994), "Reliability Measures for Qualitative Data: Theory and Implications," *Journal of Marketing Research*, 31 (February), 1–14.
- Schwarz, Norbert and Gerald L. Clore (1996), "Feelings and Phenomenal Experiences," in *Social Psychology: A Handbook of Basic Principles*, ed. E. Troy Higgins and Arie W. Kruglanski, New York: Guilford, 433–65.
- Sengupta, Jaideep and Rongrong Zhou (2007), "Understanding Impulsive Choice Behaviors: The Motivational Influences of Regulatory Focus," *Journal of Marketing Research*, 44 (May), 297–308.
- Simmel, Georg (1964), *The Sociology of Georg Simmel*, ed. Kurt H. Wolff, New York: Free Press.
- Snizek, Janet A., Paul W. Paese, and Fred S. Switzer (1990), "The Effect of Choosing on Confidence in Choice," *Organizational Behavior and Human Decision Processes*, 46 (2), 264–82.
- Stobbe, Mike (2007), "Obesity Ads Too Soft on Fat, Critics Say," published online October 22, 2007, <http://www.foxnews.com/wires/2007Oct22/0,4670,DietObesityAds,00.html>.
- Tice, Dianne M., Ellen Bratslavsky, and Roy F. Baumeister (2001), "Emotional Distress Regulation Takes Precedence over Impulse Control: If You Feel Bad, Do It!" *Journal of Personality and Social Psychology*, 80 (January), 53–67.
- Treadwell, Jonathan R. and Thomas O. Nelson (1996), "Availability of Information and the Aggregation of Confidence in Prior Decisions," *Organizational Behavior and Human Decision Processes*, 68 (October), 13–27.
- Vohs, Kathleen D. and Ronald J. Faber (2007), "Spent Resources: Self-Regulatory Resource Availability Affects Impulse Buying," *Journal of Consumer Research*, 33 (March), 537–47.
- Vohs, Kathleen D. and Todd F. Heatherton (2000), "Self-Regulation Failure: A Resource-Depletion Approach," *Psychological Science*, 11 (May), 249–54.
- Wansink, Brian (1996), "Can Package Size Accelerate Usage Volume?" *Journal of Marketing*, 60 (July), 1–15.
- Wansink, Brian, James E. Painter, and Jill North (2005), "Bottomless Bowls: Why Visual Cues of Portion Size May Influence Intake," *Obesity Research*, 13 (January), 93–100.
- Wansink, Brian and Michael L. Ray (1996), "Advertising Strategies to Increase Usage Frequency," *Journal of Marketing*, 60 (January), 31–46.
- Wood, Stacy L. and John G. Lynch Jr. (2002), "Prior Knowledge and Complacency in New Product Learning," *Journal of Consumer Research*, 29 (December), 416–26.