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*Published in:*  
International Journal of Healing and Caring

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*Recommended citation(APA):*  
Stapleton, P. B., & Smith, H. I. (2013). Health locus of control, self-awareness, and integrative eating styles in university students. *International Journal of Healing and Caring*, 13(2), 1-23. <http://www.ijhc.org/2013/05/health-locus-of-control-self-awareness-and-integrative-eating-styles-in-university-students-stapleton-smith/>

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## Health Locus of Control, Self-Awareness, and Integrative Eating Styles in University Students

Peta Stapleton, BA, PGDipPsy, PhD and Hayley Irene Smith, PGDipPsy

### Abstract

The psychological and physical well-being of students is a cause for concern. For the majority of the student population this means substantial changes in healthy behaviours including eating habits. The current research was aimed at investigating integrative eating in 170 Australian university students. Self-awareness and health locus of control were measured in order to assess their relative impact on positive integrative eating practices. The self-report measures included Your Personal Eating Style Profile, Forms A and B of the Multidimensional Health Locus of Control Scale, and the Situational Self-Awareness Scale. Hierarchical multiple regression analyses provided tentative support for the hypothesis that an internal locus of control is a significant predictor of integrative eating total, as opposed to beliefs in powerful others and chance, which were not found to be significant. Private self-awareness was found to be a significant predictor of integrative eating total, after controlling for age, gender, social desirability and health locus of control. An unexpected finding was that awareness of surroundings was also found to be a significant predictor of positive integrative eating. No significant interaction was identified between self-reported private self-awareness and self-reported internal locus of control. Methodological implications of the current investigation and suggestions for future research are discussed.

Keywords: health, locus of control, self-awareness, social desirability, eating, integrative eating, students

### Integrative Eating

Modern society's relationships and experiences with food and health continue to be defined by epidemic proportions of obesity, emotional challenges that countless individuals endure with food, preoccupations with physical attractiveness, and unhealthy obsessions with body shape and weight. Problematic eating behaviours are reflective of, though not limited to, these governing factors, but continue to be extensively explained in terms of the normative acceptability and internalization of societal messages which, in particular, condemn overweight and. Highlighting the diversity and complexity of eating behaviours typical of today's population are the following factors: dieting and

unhealthy weight loss practices; eating alone and away from home; poor meal planning; eating on the go and task snacking; meal skipping; stress-induced and emotional hunger; poor food selection; and the increasing intake of processed and fast foods.

Health and dietary resources provided by diverse health professionals are forever evolving but have unfortunately contributed to the confusion and frustration concerning what healthy eating really entails. Interventions used to combat the medical and psychological conditions that accompany problem eating behaviours are not impacting on society as a whole. We continue to be inundated by pharmaceutical corporations, the Western media, and medical media advertisements for dieting products, drug therapies, surgical treatments, and restrictive dietary programs as effective treatment approaches (Garner & Wooley, 1991; Kesten et al., 2005). Unfortunately, these health messages and resources are often targeted at unhealthy and vulnerable groups, which, in turn, leads to a lack of awareness of personal healthcare responsibility and the need for individuals to alter their own eating behaviours and make health dietary decisions (de Almeida, et al., 1997).

Clearly, more insight is required to develop a broader, more integral approach to food and nutrition (Kazaks & Stern, 2003; Kesten et al., 2005). Kesten et al., (2005), identified and measured the underlying elements of eating behaviours that are related to overeating, overweight and obesity. Instead of endorsing the typical weight loss theory, the researchers give emphasis to seven problem areas to food and nutrition, including sensory and spiritual disregard, emotional eating, food fretting, task snacking, consumption of fast foods, the adversity of hectic eating environments, and solo dining. All of these act as a barrier against mindful eating and successful weight control.

Research relating to the development of both healthy and problematic eating behaviours highlights the importance and interplay of contributions from individual and collective determinants of personality, psychology, family, society and culture. All of these influence individuals in making healthy or unhealthy choices in their food intake and dietary behaviours (Creedon, Harkins, & Ray, 2009; Elfhag & Morey, 2008; Evers, Taylor, & McKenna, 2005). Research suggests that rather than exploring a single source of influence to unhealthy eating, the emphasis is better placed on the unifying importance of not only having food knowledge, but awareness of the environmental cues, emotional triggers and learned food behaviours, social situations, in addition to personal attitudes that encourage poor eating habits and styles (Benitez et al., 2009; Birch, et al., 1998; Davis & Levitan, 2010; Kesten et al., 2005).

The extensive body of research on the determining factors pertaining to eating practices has historically given much emphasis to the multitude of developmental experiences characteristic of child and adult populations. Little attention has been given to young Australian adult populations (Gan et al., 2011). While there is a collective emphasis placed by and across the health professional domains that poor eating habits and behaviours continue to be a major public health concern (Baranowski, Berenson, Cullen, & Nicklas, 2001; Grace, 1997), this study will seek to examine the eating styles among a student population, with much importance given to the notion that unhealthy habits and behaviours that are acquired during young adulthood often persists into later life (Al-abed, Al-Dubai, Aljunid, Ganasegeran, Qureshi, & AM, 2012).

Evaluations of the transition into university life often highlight the collective impact of having to adjust to a new educational and social environment, having to establish new social support networks, the academic stress, lack of time and work-life balance, financial pressures students typically endure, the experiences of many living away from the family home, and having to make independent health and dietary decisions for the very first time (Berry et al., 2009; Dempsey & Khawaja, 2007; Garcia, Leipert, Martin, Matthews, & Sykes, 2010). Subsequently, how one chooses to deal with the competing and conflicting demands typical to university life means substantial changes in healthy behaviours for the

majority of the student population (Berry et al., 2009; Gan et al., 2011). This has been found to be particularly true in terms of physical activity, sleep patterns, tobacco smoking, alcohol consumption, and the use of illicit substances (Adetunji, et al., 2011), all of which bear a significant relationship to food consumption patterns, dietary decision-making, nutritional status and overall health-outcomes (Al-abed et al., 2012).

The psychological research investigating the contributing elements underlying unhealthy eating habits points out that despite student knowledge of good dietary decisions, little value is given to the sensory and nutritional value of foods, and students will instead tend to base their choices on the cost, availability and convenience of fast and processed foods (Hondros, Kapsokefalou, Papadaki, & Scott, 2007; Kesten et al., 2005).

Academic pressures and daily life stressors have profound effects on physical and psychological well-being (McKean & Misra, 2000), and are also dependent upon individual characteristics in terms of emotional and physiological responses to stressful events (Elfhag et al., 2008; Lin & Qinghai, 1995; Olivier & Wardle, 1999). Of particular importance is the bidirectional relationship that stressors have on food intake. Stress can lead to emotional increased eating, and eating too much can then result in stress for the person (as in weight issues, guilt, etc). Research continues to show that emotional arousal will often affect young adults' eating behaviours, particularly in terms of snacking, food selection, and the overall amount consumed (Adam & Epel, 2007; Ganley, 1989; Greeno & Wing, 1994; Oliver et al., 1999).

### **Health locus of control**

Individual perceptions of personal control contribute to the understanding of individual initiation, development and maintenance of various health-promoting and preventive behaviours (Wallston, 1997). Positive health outcomes are often associated with stronger perceptions of personal control in personal performance, adjustment, emotional well-being and a range of positive states. Feeling in control of one's life situation can often lead to reduced physiological impacts of stressors and improved abilities to cope with stress (Chipperfield & Menec, 1997; Cruzen, Galbraith, Schwankovsky, Sobolew-Shubin, & Thompson, 1993; Owusu-Ansah, 2008; Spacapan & Thompson, 1991). One of the most common findings of research examining the association of control with various health and psychological domains is that the more control a person perceives and feels he or she has, the more inclined that individual is to report positive experiences, particularly in terms of optimism, increased motivation and adaptive functioning (Astin et al., 1996; Burger, 1989; Wallston, 1997).

Conceptualising the relationship between control beliefs and health is, however, much more complex and often conflicts with the rudimentary frameworks that constitute the concept of control. This is because both positive and negative health outcomes have been associated with stronger perceptions of personal control (Astin et al., 1996; Dobbins, Smith, Wallston, & Wallston, 1987). For instance, those who are drawn from the general healthy population have been reported to show a high tendency to overestimate not only the amount of control they have, but their ability to achieve and maintain control (Abramson & Alloy, 1979; Astin et al., 1996; Langer, 1975; Seligman, 1991). Despite the high desire for control, when control efforts are ineffective and situational difficulty subsists, negative consequences can typically arise and can be detrimental to the individual long-term by decreasing the likelihood of their engagement and efforts in health-promoting behaviours (Astin et al., 1996).

Health locus of control and its relevance to integrative eating practices will be examined in the present study, exploring the importance of the various food dimensions that integrate affect, pleasure and sensory appeal, healthfulness, convenience and cost.

## Self-Awareness

Based upon the empirical research that has examined self-awareness as a psychological construct, the self-aware state has been measured resulting the context of manipulations of situational stimuli, in which self-awareness has been experimentally induced through the use of mirrors, cameras, television monitors, tape recordings of the participant's own voice and eye contact (Duval & Wicklund, 1972, 1973; Ferris, Ickes, & Wicklund, 1973; Wicklund, 1975; Ruganci, 1995). It has also been observed that self-awareness may be induced by the presence of another individual, specifically when the subject knows that the other is aware of him or her (Buss, Fenigstein, & Scheier, 1974, 1975).

Through these methods researchers have been able to observe the different effects on self-awareness (Ruganci, 1995). For instance, mirror manipulations have shown to heighten participants' attention to private aspects of the self such as their thoughts, feelings and motives. In contrast, television cameras and tape recording manipulations have been found to heighten attention toward public aspects of the self, which includes one's social and physical appearance (Baldwin & Holmes 1987; Buss, Buss, & Scheier, 1978; Carver & Scheier, 1981; Froming, Lopyan, & Walker 1982; Ruganci, 1995). Fundamental to such findings is the acknowledgement that both personal and non-personal stimuli can draw attention to the self, which in turn, can generate a state of self-awareness (Ruganci, 1995).

Buss et al. (1975) further proposes there may be stable individual differences in how much one may direct attention toward the self, suggesting that individuals may have a dispositional tendency to maintain self-awareness, which is theoretically conceptualised as self-consciousness. This is central to the theoretical frameworks that underlie self-awareness, as it is not only situational factors that induce self-focused attention, but also dispositional factors that are identified as predisposing an individual to reflect inward and engage in self-directed attention (Buss et al., 1975; Govern et al., 2001; Ruganci, 1995). Therefore, the underlying distinction between the two constructs is important, where both private and public self-awareness are referred to as transient states that are susceptible to manipulation, while self-consciousness is distinguished as a relatively stable trait of an individual's personality (Buss et al., 1975; Govern et al., 2001).

There is an extensive body of research that emphasises how being self-aware allows the individual to develop a broader understanding of the self across many key areas that are essential to one's individual and collective well-being and overall psychological functioning (Buss et al., 1975, Keyes, 1998; O'Brien & Silvia, 2004). First, based on the broad conceptualisation that in any given situation one can attend to either the self or to the external environment, when an individual maintains preoccupations with their surrounding environment, that person will theoretically have little awareness of the self (Govern et al., 2001). Alternatively, in a heightened state of self-awareness, an individual's self-focused attention is directed to their body, appearance, immediate thoughts and feelings, As a self-evaluative process, self awareness is said to foster the examination of one's own habits, emotions and psychological needs, all of which fundamentally underlie the drive behind one's behaviour (Buss et al., 1975; Govern et al., 2001).

Whether one does or does not attend to the self may contribute to the negative consequences accompanying a diverse range of behaviours (Duval and Wicklund, 1975; O'Brien et al., 2004). Although maladaptive aspects of self-awareness have been extensively linked to psychopathology, negative affect, self-criticism and rumination (O'Brien et al., 2004), the theoretical conceptualisations that highlight the importance of self-awareness predominantly emphasise the notion that it empowers one to become more attentive and responsive to one's thoughts, feelings and bodily sensations (Buss et al., 1975; Govern et al., 2001). This, in turn, highly empowers one to develop and gain insight into the areas of the self that may require improvement, as well as to become regularly active and

engaged in making constructive changes to those areas (Phillips & Silvia, 2004; Sedikides & Strube, 1997).

In relation to eating habits and styles, it is assumed that people who habitually engage in private self-awareness and, in turn, monitor their behaviours, are in a better position to identify thought patterns associated with loss of control over food intake and poor meal planning, as well as to adapt and respond to situations, feelings, and other stimuli rationally, rather than just responding emotionally (Alberts, de Vries, & Martijn, 2011; Baer, Fischer, & Huss, 2005; O'Brien et al., 2004).

In the context of tertiary education, students are faced with numerous challenges and stressors that result from interactions with both external and internal pressures, combined with the high academic demands for productivity and meeting recurring deadlines (Barkham, Bewick, Koutsopoulou, Miles, & Slaa, 2010; Graf & Welle, 2011). Consequently, these individuals are placed at greater risk of negative changes in health on both a mental and physical level that include feelings of frustration and irritability, sleep fragmentation and fatigue, anxiety and troubles in concentration.

For many, these stressors and their responses to stress often lead as well to changes in appetite and weight (Barkham, et al., 2010; Graf & Welle, 2011; Heckert, Niebling, & Ross, 1999). With an under-awareness of internal signals such as hunger and fullness, many appear to be operating automatically and mindlessly when it comes to food and nutrition, which is also greatly reflected in today's fast-paced society that predominately limits the time one can take to eat, let alone prepare home-cooked meals (Kesten et al., 2005; Wansink, 2010).

It would therefore be beneficial to encourage students to increase their self-awareness prior to the commencement of their studies, as this would provide the foundation for identifying and addressing changes in their functioning on both a psychological and physical basis (Jack et al., 2008; Kearney & O'Sullivan, 2003). The emphasis would be placed on providing techniques to identify what triggers mindless eating, and how attending to or ignoring messages that come from within the body relates to various food-related decisions (Herman, Vartanian, & Wansink, 2008). To a great extent, it appears that health food choices and eating behaviours are greatly reliant upon one's regular engagement in private self-awareness, which ultimately will limit the extent to which one is unknowingly influenced by their environment when it comes to determining when to eat and how much to eat (Herman et al., 2008; Kesten et al., 2005). Self-evaluations of eating behaviours can be prompted through reflections upon changes in health-related choices, which in turn, can lead one to identify and reassess one's approach to food and nutrition, and increase one's willingness to eat in ways that provide adequate nourishment without overeating (Jack et al., 2008; Kearney et al., 2003; Kesten et al., 2005).

Self-focus is conceptualised as holding both a private and public component (Govern et al., 2001). Private self-awareness refers to the awareness in which one's focus is directed to the internal aspects of the self such as one's motivations, natural inclinations and tendencies, personal feelings and thoughts (Buss et al., 1975; Govern et al., 2001). It was predicted in the current study that self-awareness would have a positive and profound impact upon an individual's eating styles. This is based upon the assumption that a heightened state of private self-awareness would enable an individual to identify particular situations, accompanying feelings and influential thought and behavioural patterns that they associate with food and eating (Buss et al., 1975; Govern et al., 2001; Heatherton, et al., 1989).

Public self-awareness, by contrast, involves an external self-valuation by directing attention to features that are observable to others (Buss et al., 1975; Govern et al., 2001). This involves attentiveness to one's mannerisms, social behaviour and physical appearances, which often results in experiences of discomfort and a preoccupation with the impression one makes on others (Govern et

al., 2001). Public self-focus would appear to have a significant impact in determining individuals' non-integrative eating style as a consequence of the impact that others have on the amount that is consumed, which can be considered a reflection of a preoccupation and over concern with self-presentation (Govern et al., 2001; Herman, Roth, & Polivy, 2003; Kesten et al., 2005). Low self-awareness has been shown to result in reduced self-control and consequent reductions in self-monitoring behaviours, leading to recurring instances of overeating (Baumeister & Heatherton, 1991). In turn, it was predicted in the current study that a heightened awareness of surroundings, which reflects attention focused on anything other than the self (Govern et al., 2001), would significantly predict the extent to which students practice non-integrative eating.

## **The current study**

### ***Overall assumptions***

It was hypothesised that perceptions of control would significantly predict individuals' integrative eating style, such that those who indicate an internal locus of control would report healthier eating practices than those who indicate an external belief in powerful others and chance. In order to investigate the importance of self-awareness in normal, healthy populations and to assess the positive facets of this construct, it was hypothesised that awareness would significantly predict integrative eating styles, such that self-reported private self-awareness would be more likely to significantly predict integrative eating than self-reported public self-awareness and awareness of surroundings.

### ***Hypotheses***

1. Perceptions of control would significantly predict individuals' integrative eating style, such that those who indicated an internal locus of control would report healthier eating practices than those who indicated an external belief in powerful others and chance.
2. Awareness would significantly predict integrative eating styles, such that self-reported private self-awareness would be more likely to significantly predict integrative eating than public self-awareness and awareness of surroundings.
3. There would be a significant interaction between self-reported private self-awareness and self-reported internal locus of control, such that those who reported a high self-awareness and high internal health locus of control would also report more positive integrative eating practices than those who reported low private self-awareness and low internal locus of control.

## **Methods**

### ***Participants***

The final sample for this research study included a total of 170 respondents. Two participants were excluded on the basis that they were under the age of 18 years. Approximately 27% of the sample was male and 73% female. Participants included 60 first year psychology students from Bond University, Queensland, Australia, who were awarded course credit for their participation. The remaining university students were recruited from the general public. Participants ranged in age from 18 to 52 years, with a mean age of 22 years ( $SD = 5.82$  years). The participants' highest levels of completed education were organised under the following categories: did not finish high school (.6%); finished high school (50.6%); vocational (50.6%); undergraduate degree (31.2%); postgraduate degree (4.1%); master's degree (2.4%); and doctorate (.6%). Respondents were also required to

report the race that they most identified with and their current relationship status. The demographics included Caucasians (82.4%), with the majority reporting to be single (75.9%) and undertaking their undergraduate tertiary studies (61.8%), with 31.2% of the sample enrolled in a postgraduate degree.

### **Materials**

*The Situational Self-Awareness Scale* (SSAS; Govern et al., 2001) is a nine-item self-report measure of self-awareness, which has been designed to quantify and discriminate between states of public and private self-awareness (Govern et al., 2001). Private self-awareness is the focus one gives to the internal aspects of the self (e.g., thoughts and feelings), whereas public self-awareness is conceptualised as the focus one places on the external and observable aspects of the self, (physical appearance and behaviours). The respondents' awareness of surroundings are also assessed (Govern et al., 2001). Responses were recorded on a seven-point scale, which ranges from one (*strongly disagree*) to seven (*strongly agree*). Scores for each of the three subscales were calculated by summing the responses of the three items that constituted that factor. Higher scores for both public and private subscales are indicative of greater levels of self-awareness (Govern et al., 2001).

The SSAS has a reliable factor structure, which strengthens the utility of the SSAS to identify and discriminate between both private and public states of self-awareness (Govern et al., 2001). Moderate levels of internal alpha reliabilities of .70 are reported for private self-awareness, .82 for public self-awareness and .72 for awareness of immediate surroundings (Govern et al., 2005). Intercorrelations between the three components have a range of .19 to .39 (Govern et al., 2001), confirming the relative independence that each factor has from one another. The SSAS is sensitive to situational changes within individuals' levels of self-awareness over time and across situations (Govern et al., 2001).

*The Multidimensional Health Locus of Control Scale* (MHLC; DeVellis, et al., 1978) is a situation-specific measure of control expectancies, containing three 18-item scales (Forms A, B and C) that designed to assess the respondents' personal beliefs about his or her ability to control health outcomes. This is further analysed in terms of the degree to which the respondent believes that their health is controlled by personal internal contingencies or external factors (Wallston, 2005). Externality is divided into two separate subscales, which provide information about the extent to which the respondent believes their health is largely determined by powerful others (for example, health professionals, family, or friends), or otherwise by chance, fate, or luck (Wallston, 2005). For the purpose of this study, only Forms A and B were utilised in combination with each other, as these were designed to measure perceived control of overall health for generally healthy populations (Ghofranipour & Moshki, 2011; DeVellis et al., 1978). Respondents are instructed to indicate their level of agreement to each belief statement on a six-point Likert response format, from (1) *Strongly Disagree* to (6) *Strongly Agree*. There is no total score for the MHLC as each subscale is evaluated independently (DeVellis, et al., 1978). However, higher scores on the subscales reflect a stronger perception of control and inclination on that particular dimension (DeVellis, et al., 1978; Hartke et al., 1982).

The reliability and validity of the MHLC has been evidenced by extensive research, which supports the predictive value of the measures in explaining and determining individual differences across contexts pertaining to health-related behaviours and outcomes (Luszczynska & Schwarzer, 2005). In a sample of 115 healthy adults, alpha reliabilities of .83 to .86 were reported (Wallston et al., 1978) for the combination of Forms A and B. Strong support for the three-factor structure of the MHLC has been consistent across non-clinical populations and various treatment studies (Collins, Crooks, & Marshall, 1990; Robinson-Whelen & Storandt, 1992; Bowden, Casey, Corbett, & Kingery, 1993).

*Your Personal Eating Style Profile questionnaire* (Kesten et al., 2005) is a 76-item measure that was developed to examine the influence of seven defined eating styles to overeating, overweight and obesity (Kesten et al., 2005). The seven eating style subscales include: (1) Sensory-Spiritual Nourishment, (2) Emotional Eating, (3) Fresh Food, Fast Food, (4) Food Fretting, (5) Task Snacking, (6) Eating Atmosphere and (7) Social Fare.

Respondents are instructed to specify their responses on a six-point frequency Likert scale with a score range of 0 (*Never*) to +5 (*Always*) for positively phrased items, and 0 (*Never*) to -5 (*Always*) for negatively phrased items (Kesten et al., 2005). As part of a larger research project, the seven eating styles are presented as separate subscales for the purposes of calculating individual scores for each profile (Kesten et al., 2005). Test items are organised through the separation of positive scored items from the negative. All negatively phrased items were reverse-scored for the purposes of obtaining an overall positive integrative eating score, which is calculated by summing the totals from each of the seven subscales.

*The Social Desirability Scale* (MCSDS; Ray, 1984) assesses the tendency of respondents to over-report or under-claim desirable and undesirable behaviours, respectively, so as to present a favourable image of themselves (Chung & Monroe, 2003). Topics that are sensitive to social desirability biases, which have been examined and detected within research, include self-reports of various preventive health behaviours (Harding & Kristiansen, 1984), dietary intake (Baglio, Baxter, Guinn, Litaker, Shaffer, & Smith, 2004), physical activity (Adams, Cunningham, Ebbeling, Fulton, Hebert, Matthews, & Moore, 2005), self-worth (Crocker, Luhtanen, & Sargent, 2006), and attitudes toward obese people (Latner & Puhl, 2007).

Ray's (1984) short form of the MCSDS (1960) is an eight-item self-report measure of social desirability. Deriving from the analyses performed by Greenwald and Satow (1970), the four negatively and four positively keyed items included in Ray's (1984) short social desirability scale held the highest Likert item-total correlations. Respondents were instructed to rate their agreement to each item on a three-point scale (1 = *yes*, 2 = *not sure*, and 3 = *no*). By totalling responses, scores range from eight to twenty-four, with higher scores indicating a greater degree of socially desirable responding (Ray, 1984). A moderate to high correlation between the Social Desirability Scale (Ray, 1984) and the other selected measures is indicative of whether participants' are responding in a socially desirable manner, which provides a basis for determining the inclusion and exclusion of cases (Davis, Wester, & Willse, 2008; Fidell & Tabachnick, 2007).

## **Ethics committee approval**

The Bond University Human Research Ethics Committee approved all materials and procedures selected for the current research. Participants were recruited on the basis of purposive sampling, through a social networking site and at the Bond University campus. Students were ensured that all identifying information obtained via email would remain confidential. A unique online survey program web address was emailed to participants for the administration of the questionnaires. All information recorded online remained solely accessible to the primary researchers in this study.

## **Results**

### ***Descriptive statistics***

The means, standard deviations, and intercorrelations between all focal variables are presented in Table 1. Inspection of the variable means indicates that all measured forms of awareness were

above the midpoint of the scale. This suggests that overall the participants had moderately high awareness across all levels. Inspection of the variable means also indicated that only internal health locus of control was above the midpoint of the scale. This suggests that the overall group had strong perceptions of internal health locus of control. Chance health locus of control and powerful health locus of control were found to be below the midpoint of the scale, suggesting that the overall group had moderately weak beliefs in chance and powerful others. Inspection of the variable means further indicated that integrative eating style was above the midpoint of the scale. This suggests that the overall group practiced relatively positive integrative eating.

**Table 1. Means, Standard Deviations and Zero Order Correlations between all Continuous Focal Variables in the Model**

Variable	Mean (SD)	1.	2.	3.	4.	5.	6.	7.
1. Private Self-Awareness	5.02 (1.33)							
2. Public Self-Awareness	4.41 (1.69)	.44**						
3. Awareness of Surroundings	4.93 (1.28)	.64**	.33**					
4. Internal HLC	4.34 (.78)	.26**	-.06	.21**				
5. Chance HLC	2.87 (.79)	.02	.09	-.01	.23**			
6. Powerful Others HLC	2.64 (.81)	.08	.17*	.16*	-.11	.40**		
7. Integrative Eating	3.71 (.42)	.30**	-.03	.35**	.22**	-.15	-.08	

\*p < .05, \*\*p < .01

### ***Focal analyses***

Nine hierarchical regression analyses were conducted to evaluate the effects of self-awareness on integrative eating. Analyses were run on integrative eating regarding positive and adaptive eating styles. Age, gender and social desirability were entered in Step 1. All three health locus of control dimensions were entered separately in different analyses in Step 2, and the three subscales of the SSAS (Govern et al., 2001) were entered separately in different analyses in Step 3.

A hierarchical regression analysis was also conducted to test the prediction that private self-awareness would moderate the relationship between internal health locus of control and integrative eating. Private self-awareness and internal health locus of control were entered in Step 1, and the two-way interaction term between these predictors were entered in Step 2. Prior to conducting the regression analyses, the continuous variables of private self-awareness and internal health locus of control were mean-centred (as recommended by Aiken & West, 1991).

### ***Effects of private self-awareness and health locus of control on integrative eating***

At Step 1 in all analyses, the variables of age, gender and social desirability contributed significantly to the variance in integrative eating style, and social desirability was found to be a significant predictor of the variance.

### **Internal HLC**

The results of the regression analyses are presented in Table 2. At Step 2, internal health locus of control contributed significantly to the variance in integrative eating, but did not emerge as a significant predictor of variance. Social desirability however, remained a significant contributor of the variance.

At Step 3, private self-awareness significantly contributed to the variance in integrative eating, over and above the variance accounted for by age, gender, social desirability, and internal health locus of control. Private self-awareness emerged as a significant predictor of variance, along with social desirability and internal health locus of control.

**Table 2. Hierarchical Regression Analysis Predicting Integrative Eating: Assessing Effects of Age, Gender, Social Desirability, Internal HLC, and Private Self-Awareness**

Step	Predictor	R <sup>2</sup>	R <sup>2</sup> <sub>change</sub>	F <sub>change</sub>	df	Sig	Step 1 β	Step 2 β	Step 3 β
1.	Age	.05	.05	3.10	3, 166	.028	.07	.04	.01
	Gender						.09	.10	.09
	Social Desirability						-.21**	-.20**	-.21**
2.	Internal HLC	.10	.05	8.56	1, 165	.004		.22**	.16*
3.	Private Self-Awareness	.16	.06	12.21	1, 164	.001			.26***

\*p < .05, \*\*p < .01, \*\*\* p < .001

### **Chance HLC**

The results of the regression analyses are presented in Table 3. At Step 2, chance health locus of control did not contribute significantly to the variance in integrative eating, and did not emerge as a significant predictor of variance. Social desirability, however, remained a significant contributor of variance.

At Step 3, private self-awareness significantly contributed to the variance in integrative eating, over and above the variance accounted for by age, gender, social desirability and chance health locus of control. Private self-awareness emerged as a significant predictor of variance, as did social desirability and chance health locus of control.

**Table 3. Hierarchical Regression Analysis Predicting Integrative Eating: Assessing Effects of Age, Gender, Social Desirability, Chance HLC, and Private Self-Awareness**

Step	Predictor	R <sup>2</sup>	R <sup>2</sup> <sub>change</sub>	F <sub>change</sub>	df	Sig	Step 1 β	Step 2 β	Step 3 β
1	Age	.05	.05	3.10	3, 166	.028	.07	.06	.02
	Gender						.09	.09	.08
	Social Desirability						-.21**	-.21**	.21**
2	Chance HLC	.07	.02	3.66	1, 165	.057		-.14	-.15*
3	Private Self-Awareness	.16	.09	17.33	1, 164	.000			.30***

\*p < .05, \*\*p < .01, \*\*\* p < .001

### **Powerful others HLC**

The results of the regression analyses are presented in Table 4. At Step 2, powerful others health locus of control did not contribute significantly to the variance in integrative eating, and did not emerge as a significant predictor of variance. Social desirability, however, remained a significant contributor of variance.

At Step 3, private self-awareness significantly contributed to the variance in integrative eating, over and above variance contributed by age, gender, social desirability and powerful others health locus of control. Private self-awareness and social desirability emerged as significant predictors of variance.

**Table 4. Hierarchical Regression Analysis Predicting Integrative Eating: Assessing Effects of Age, Gender, Social Desirability, Powerful Others HLC, and Private Self-Awareness**

Step	Predictor	R <sup>2</sup>	R <sup>2</sup> <sub>change</sub>	F <sub>change</sub>	df	Sig	Step 1 β	Step 2 B	Step 3 β
1	Age	.05	.05	3.10	3, 166	.028	.07	.06	.01
	Gender						.09	.09	.08
	Social Desirability						-.21**	-.22**	-.22**
2	Powerful Others HLC	.06	.01	1.65	1, 165	.200		-.10	-.13
3	Private Self-Awareness	.16	.09	18.12	1, 164	.000			.31***

\*p < .05, \*\*p < .01, \*\*\* p < .001

### **Effects of public self-awareness and health locus of control on integrative eating**

At Step 1 across all analyses, the variables of age, gender and social desirability contributed significantly to the variance in integrative eating style, and social desirability was found to be a significant predictor of the variance.

### **Internal HLC**

The results of the regression analyses are presented in Table 5. At Step 2, internal health locus of control contributed significantly to the variance in integrative eating, and emerged as a significant predictor of variance, as did social desirability.

At Step 3, public self-awareness did not significantly contributed to the variance in integrative eating. Social desirability and internal health locus of control emerged as significant predictors of variance.

**Table 5. Hierarchical Regression Analysis Predicting Integrative Eating: Assessing Effects of Age, Gender, Social Desirability, Internal HLC, and Public Self-Awareness**

Step	Predictor	R <sup>2</sup>	R <sup>2</sup> <sub>change</sub>	F <sub>change</sub>	df	Sig	Step 1 β	Step 2 β	Step 3 β
1	Age	.05	.05	3.10	3,166	.028	.07	.04	.04
	Gender						.09	.10	.11
	Social Desirability						-.21**	-.20**	-.20**
2	Internal HLC	.10	.05	8.56	1,165	.004		.22**	.22**
3	Public Awareness	.10	.00	.02	1,164	.904			.01

\*p < .05, \*\*p < .01, \*\*\* p < .001

**Chance HLC**

The results of the regression analyses are presented in Table 6. At Step 2, chance health locus of control contributed significantly to the variance in integrative eating style, but only social desirability emerged as a significant predictor of the variance.

At Step 3, public self-awareness did not significantly contribute to the variance in integrative eating, and only social desirability emerged as a significant predictor of variance.

**Table 6. Hierarchical Regression Analysis Predicting Integrative Eating: Assessing Effects of Age, Gender, Social Desirability, Chance HLC, and Public Self-Awareness**

Step	Predictor	R <sup>2</sup>	R <sup>2</sup> <sub>change</sub>	F <sub>change</sub>	df	Sig	Step 1 β	Step 2 β	Step 3 β
1	Age	.05	.05	3.10	3, 166	.028	.07	.06	.06
	Gender						.09	.09	.09
	Social Desirability						-.21**	-.21**	-.21**
2	Chance HLC	.07	.05	3.66	1, 165	.06		-.14	-.14
3	Public Self-Awareness	.07	.02	.01	1, 164	.92			.01

\*p < .05, \*\*p < .01, \*\*\* p < .001

**Powerful others HLC**

The results of the regression analyses are presented in Table 7. At Step 3, public self-awareness did not significantly contribute to the variance in integrative eating style, and only social desirability emerged as a significant predictor of variance.

**Table 7. Hierarchical Regression Analysis Predicting Integrative Eating: Assessing Effects of Age, Gender, Social Desirability, Powerful Others HLC, and Public Self-Awareness**

Step	Predictor	R <sup>2</sup>	R <sup>2</sup> <sub>change</sub>	F <sub>change</sub>	df	Sig	Step 1 β	Step 2 β	Step 3 β
1	Age	.05	.05	3.10	3, 166	.028	.07	.06	.06
	Gender						.09	.09	.10
	Social Desirability						-.21**	-.22**	-.22**
2	Powerful Others HLC	.06	.01	1.65	1, 165	.20		-.10	-.10
3	Public Self-Awareness	.06	.00	.03	1, 164	.87			.01

\*p < .05, \*\*p < .01, \*\*\* p < .001

**Effects of awareness of surroundings and health locus of control on integrative eating**

At Step 1 across all analyses, the variables of age, gender and social desirability contributed significantly to the variance in integrative eating style, and social desirability was found to be a significant predictor of the variance.

### **Internal HLC**

The results of the regression analyses are presented in Table 8. At Step 2, internal health locus of control contributed significantly to the variance in integrative eating style and emerged as a significant predictor of variance along with social desirability.

At Step 3, awareness of surroundings significantly contributed to the variance in integrative eating style. Awareness of surroundings emerged as a significant predictor of variance, along with social desirability and internal health locus of control.

**Table 8. Hierarchical Regression Analysis Predicting Integrative Eating: Assessing Effects of Age, Gender, Social Desirability, Internal HLC, and Awareness of Surroundings**

Step	Predictor	R <sup>2</sup>	R <sup>2</sup> <sub>change</sub>	F <sub>change</sub>	df	Sig	Step 1 β	Step 2 β	Step 3 β
1	Age	.05	.05	3.10	3, 166	.028	.07	.04	.03
	Gender						.09	.10	.07
	Social Desirability						-.21**	-.20**	-.18*
2	Internal HLC	.10	.05	8.56	1, 165	.004		.22**	.16*
3	Awareness of Surroundings	.19	.09	17.10	1, 164	.000			.30***

\*p < .05, \*\*p < .01, \*\*\* p < .001

### **Chance HLC**

The results of the regression analyses are presented in Table 9. At Step 2, chance health locus of control did not contribute significantly to the variance in integrative eating, and only social desirability emerged as a significant predictor of variance.

At Step 3, awareness of surroundings significantly contributed to the variance in integrative eating. Awareness of surroundings emerged as a significant predictor of variance, along with social desirability and chance health locus of control.

**Table 9. Hierarchical Regression Analysis Predicting Integrative Eating: Assessing Effects of Age, Gender, Social Desirability, Chance HLC, and Awareness of Surroundings**

Step	Predictor	R <sup>2</sup>	R <sup>2</sup> <sub>change</sub>	F <sub>change</sub>	df	Sig	Step 1 β	Step 2 β	Step 3 β
1	Age	.05	.05	3.10	3, 166	.028	.07	.06	.043
	Gender						.09	.09	.06
	Social Desirability						-.21**	-.21**	-.18*
2	Chance HLC	.07	.02	3.66	1, 165	.057		-.14	-.14*
3	Awareness of Surroundings	.18	.11	21.87	1, 164	.000			.33***

\*p < .05, \*\*p < .01, \*\*\* p < .001

### **Powerful Others HLC**

The results of the regression analyses are presented in Table 10. At Step 2, powerful others health locus of control did not contribute significantly to the variance in integrative eating style, and only social desirability emerged as a significant predictor of variance.

At Step 3, awareness of surroundings significantly contributed to the variance in integrative eating style. Awareness of surroundings emerged as a significant predictor of variance, along with social desirability and powerful others health locus of control.

**Table 10. Hierarchical Regression Analysis Predicting Integrative Eating: Assessing Effects of Age, Gender, Social Desirability, Powerful Others HLC, and Awareness of Surroundings**

Step	Predictor	R <sup>2</sup>	R <sup>2</sup> <sub>change</sub>	F <sub>change</sub>	df	Sig	Step 1 β	Step 2 β	Step 3 β
1	Age	.05	.05	3.10	3, 166	.028	.07	.06	.036
	Gender						.09	.09	.07
	Social Desirability						-.21**	-.22**	-.20**
2	Powerful HLC	.06	.01	1.65	1, 165	.200		-.10	-.15*
3	Awareness of Surroundings	.19	.12	24.67	1, 164	.000			.36***

\*p < .05, \*\*p < .01, \*\*\* p < .001

### **Moderating effect of Private Self-Awareness and Internal HLOC on Integrative Eating**

The results of the regression analyses are presented in Table 11. At Step 1, the variables of private self-awareness and internal health locus of control did account for the significant variance, and both emerged as significant predictors of integrative eating.

At Step 2, the addition of the two-way interaction term did not contribute significantly to the variance in integrative eating, and the two-way interaction between private self-awareness and internal health locus of control did not emerge as a significant predictor of variance. However, the individual variables of private self-awareness and internal health locus of control remained significant predictors of variance.

**Table 11. Hierarchical Regression Analysis Predicting Integrative Eating: Moderating Effect of Private Self-Awareness and Internal HLC on Integrative Eating**

Step	Predictor	R <sup>2</sup>	R <sup>2</sup> <sub>change</sub>	F <sub>change</sub>	df	Sig	Step 1 Beta	Step 2 Beta
1.	Private self-awareness	.11	.11	10.694	2, 167	.000	.26***	.26**
	Internal HLC						.16*	.15*
2	Private self-awareness x Internal HLOC	.12	.00	.31	1, 166	.579		-.04

\*p < .05, \*\*p < .01, \*\*\* p < .001

## **Discussion**

Hypothesis 1 was supported, where an internal locus of control was found to be a significant predictor of integrative eating, whereas beliefs in powerful others and chance were not found to be of statistical

significance. Findings demonstrating the significance for which an internal health locus of control predicts integrative eating are consistent with mainstream studies that have reported a positive relationship between scores on the internal health locus of control dimension and health-promoting behaviours across health domains (Larsen & Weiss, 1990), and a negative association between scores on the external dimensions and health behaviours (Bennett & Norman, 1999).

This is further supported by conceptualisations relating to the greater likelihood of those who report an internal orientation to engage in health-maintaining behaviours (Bennett, Moore, Murphy, Norman, & Tudor-Smith, 1997). For instance, internality has been associated with the consumption of healthier foods and overall healthier diets (AbuSabha et al., 1997; Arnold, et al., 1994), as well as more positive behaviours relating to seeking information and maintaining a diet (Wallston, et al., 1978). Findings relating to external belief orientations can further be explained as a reflection of those who score high on chance or powerful others are less likely to engage in preventative health behaviours, whereas individuals holding internal expectancies predominantly show greater adaptive functioning (Bennett, et al., 1997; Bennett et al., 1999).

Findings of an internal locus of control suggest that integrative eating practices are largely, though not solely, influenced by one's perceptions of control. This must further be considered in association with the greater likelihood of individuals with high internal locus of control to maintain a sense of responsibility for their health, to engage in activities that prevent negative health outcomes and conditions, and who characteristically place greater value on their health (Cohen, et al., 1994; Kurtz et al., 1975; Oberle, 1991; Wallston, 2005). Together, such findings have clear implications with respect to health and food-related decision-making and behaviours.

Hypothesis 2 was partially supported, such that private self-awareness was found to be a significant predictor of integrative eating, after controlling for age, gender, social desirability and health locus of control. This may be interpreted in terms of the role that self-awareness has in self-regulation, which is a fundamental aspect in which individuals are able to monitor, direct and evaluate various behaviours and execute habit control (Heatherston, et al., 1989; Herman et al., 2008). Those who scored higher on private self-awareness would be expected to be in a better position to regulate their health and food-related behaviours than those who may be concentrating their attention on external or public aspects of the self, or who ultimately lack or avoid engaging in processes that heighten one's self-awareness.

The implications that this can have for the development of future health treatment approaches implies that such programs ought to foster qualities that are critical for successful and positive self-awareness, which includes self-monitoring and making accurate self-assessments, setting standards relative to health status, and regularly comparing changes in health behaviours over an extended period of time. The ability of individuals to engage in self-monitoring practices could facilitate the identification of behavioural modifications that improve and maintain both physical and mental health. Attention to both internal and external cues through greater self-awareness can contribute to these improvements. (Heatherston, et al., 1989; Herman et al., 2008; Kesten et al., 2005).

An unexpected finding was that awareness of surroundings was also found to be a significant predictor of positive integrative eating, as identified in higher total scores. However, this finding may have been a function of integrative eating in terms of the extent to which it can positively influence and predict one's social eating, experience of dining and the overall atmosphere in which one eats.

Exploration of self-awareness and its relationship to integrative eating in healthy populations requires continued empirical study. Public self-awareness was not found to be a significant predictor of positive integrative eating total. This was generally consistent with this study's conceptualisation that

people's preoccupation with public image and how they are perceived by others would relate to the degree to which they engage in non-integrative eating practices. This can be considered as a reflection of the degree to which public self-awareness can restrict the amount one consumes, making these individuals at greater risk of overeating, executing poorer food choice throughout the day and increasing the frequency of task-snacking. A heightened state of public self-focus can also serve as a distraction against one's underlying thoughts and feelings, and may overall be associated with potentially harmful eating practices. The effects of public self-focus may also strengthen negative attitudes towards one's body and health, and cause extreme dieting behaviours. In a state of heightened public self-awareness, people may be more inclined to judge themselves harshly according to external standards. This could cause them to disconnect from internal hunger cues. Such disconnections are acknowledged to be extremely difficult to reverse once established (Basil et al., 2009; de Almeida et al., 1997; Garcia et al., 2010; Kesten et al., 2005).

The hypothesis that there would be a significant interaction between self-reported private self-awareness and self-reported internal locus of control was not supported, but does suggest that future research could explore the relative impact that perceptions of control have in predicting the extent to which individuals engage in private self-awareness processes. Subsequently, the external locus of control could then be explored further, clarifying how this can serve as a barrier against the development of self-awareness, how behaviour modification can modify unhealthy eating behaviors, and positive integrative eating practices.

## **Limitations**

Various methodological limitations were encountered throughout the course of this research project. First, Kesten et al., (2005) provide an extensive measure of integrative eating. However, no known studies have assessed the psychometric properties of this measure. As this measure has been primarily limited to the research undertaken by Kesten et al. (2005), it would be most beneficial to explore the measure's utility by assessing reliability estimates in other populations.

Second, prior research has suggested that health locus of control is a better predictor of health-related behaviours if studied in association with self-efficacy or health value, which is identified as an important moderator variable in understanding relationships pertaining to perceptions of control (Bennett, et al., 1997; Wallston, 2005).

Other interesting concepts to incorporate into further research may include perceptions of stress, self-esteem or self-image in consideration of various barriers to change and engagement in health-promoting behaviours, such as interpersonal influences and situational variables. Finally, as the sample obtained predominantly included a homogeneous population of Caucasian, young female adults, findings may not be generalizable to the broader student population, as well as in the general public.

## **Directions for Future Research**

As this research is predominantly reflective of female integrative eating habits, it would be beneficial to solely explore the extent to which males engage in integrative eating practices so as to determine the extent to which gender patterns in perceptions of control and self-awareness come to influence the seven eating styles defined by Kesten et al., (2005). Through the use of experimental manipulations to induce private and public self-awareness, future research should investigate the extent to which the intensity of the stimulus can make a difference in self-reported integrative eating.

The extent to which non-integrative eating comes to influence one's perception of control and private self-awareness may also be a topic of interest.

In light of the overall research, it is concluded that one's health locus of control and self-awareness are central to integrative eating practices. These can all be considered as important factors to address when assessing health and student coping capabilities over pressures typical of university life. In addition to stressing the significance of personal responsibility for health-related outcomes, this research establishes the importance of individuals' relationships and experiences with food and nutrition, as well as their overall approach to achieving optimal health.

In addition to the internalisation of health messages that place an overemphasis on what and how much one should eat, problems of unhealthy eating remain in individuals' lack of awareness of internal cues. Personal achievement entails increasing self-awareness and personal-responsibility, which will ultimately benefit individuals in knowing how to effectively address stressors, as well as knowing how to behave and respond appropriately to situational pressures. If these changes can be achieved, people will be in a better position to maintain an optimal level of health.

This research provides an array of information that should be helpful in conjunction with various treatment approaches that aim to assist in transforming individual's struggles with food and nutrition, and the social and psychological elements that accompany their negative experiences of dining and eating. Hopefully, this will enhance general awareness of what healthy eating entails.

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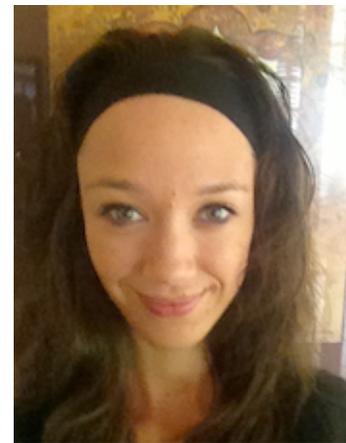
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