

# The Psychosocial Determinants of Obesity Associated with Food Intake (Narrative Review)

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## Abstract

Obesity is known as a major public health problem, with multi-factorial aspects. A complex interaction among genetic, physiological, and behavioral variables affects both the development and maintenance of the obese condition. Currently, there is an increasing interest in recognizing the significant role of psychosocial determinants of dietary behaviors to develop effective interventional weight loss programs. A review of the existing knowledge about the psychosocial determinants of food intake may be beneficial for developing dietary behaviors for health promotion among the populations. Differences in the psychosocial determinants of eating between obese and non-obese individuals and youth and adult groups provide a better understanding of the drivers of socioeconomic disparities in dietary intake, and how to develop targeted intervention strategies. In this review, we discussed the basic psychosocial concepts and theories related to food behaviors. Then, the psychological factors associated with the obesity-related food behaviors and the comparisons between the correlates of dietary behavior in obese and non-obese individuals were explained. Finally, the results of population-based studies which have addressed the contribution of dietary behavior among the youth and adults were presented.

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## Introduction

Obesity and its related chronic diseases, as the most serious public health concerns, have been increased dramatically in recent decades.<sup>1</sup> Since eating a healthy diet has been associated with a reduction in the probability of becoming obese and chronically ill, there is a strong motivation amongst many people to eat healthfully.<sup>2</sup>

Many factors contribute to the individual's dietary behaviors including social; environmental; cultural; and individual psychosocial and cognitive factors.<sup>3</sup> Currently, there is an increasing interest in recognizing the significant role of psychosocial determinants of dietary behaviors to develop effective interventional weight loss programs.<sup>4</sup> Some categories of social-cognitive determinants including self-efficacy and perceived behavioral control, intention, attitude and self-regulation, habit strength, subjective

norm, motivation, and goals have been found to be significantly related to dietary behaviors.<sup>5,6</sup>

The social-cognitive models and theories such as the *Theory of Planned Behavior*, *Social-Cognitive Theory*, and *Health Belief Model*, which have been implemented in nutrition knowledge interventions, explain the individual's dietary behavior based on beliefs and decisions, rational consideration of pros or cons of expectations following a behavior change, anticipated and perceived social influences, personal efficacy, and control evaluations.<sup>5</sup>

Reviewing the existing knowledge about the psychosocial determinants of food intake may be beneficial for developing dietary behaviors for health promotion among the populations. However, the validated measurements of psychosocial factors and also dietary intakes in adults may not be valid necessarily in younger populations as well because

the youth's behaviors tend to be less logical and more affect-driven. Moreover, the determinant factors correlating the dietary behaviors in obese individuals may be different from those in normal-weight adults.<sup>7</sup>

In the following sections, first, an overview of the basic psychosocial concepts and theories related to food behaviors are provided. Then, the psychological factors associated with obesity-related food behaviors are explained and the comparison between the correlates of dietary behavior in obese and non-obese individuals are presented. Finally, the results of population-based studies addressing the contribution of the dietary behavior in the youth and adults are discussed.

### *Psychosocial Theories and Predicting Health Behaviors*

The theory is considered as a framework for assessing the relationships among psychosocial constructs and evaluating the effects of various determinants on behavior change. The theory of planned behavior and social-cognitive theory are two of the widely used theories contributing to healthful behaviors like dietary behaviors. In addition, Self-determination Theory has been described as one of the theories related to health behavioral changes.<sup>8</sup>

#### *Theory of Planned Behavior*

The Theory of Planned Behavior (TPB) is one of the most widespread social-cognitive models used for predicting and changing health-related behaviors which consist of attitudes (assessment of positive or negative sides of a behavior), perceived behavioral control (confidence over controlling a new behavior), and subjective norms (perceptions of social pressure to execute a behavior). It seems that these concepts influence the intention and intention, in turn, affects behavior. Evidence supports the high potential of the TPB for predicting eating behaviors.<sup>9</sup>

#### *Social-cognitive Theory*

Social-Cognitive Theory (SCT) explains behavior in a dynamic and reciprocal determinism in which personal, behavioral, and environmental factors all have interactions together. Behavior change is enhanced by beliefs about the consequences of performing a behavior in order to achieve a beneficial outcome (outcome expectations), goal intention (dedicated commitment for doing an action), self-efficacy, and self-regulation through influencing personal behavior by self-monitoring of the behavior and setting of the goals.<sup>8</sup>

#### *Self-determination Theory*

Self-determination Theory (SDT) is defined as an individual's motivation and behavior. People mostly

tend to perform a behavior according to their intrinsic motivation and less to the extrinsic motivations. The SDT proposes that the probability of engaging in a behavior highly depends on the combination of varying degrees of both intrinsic and extrinsic motivations.<sup>10</sup> Satisfaction of the innate psychological needs of the individuals for autonomy (originating from the self), competence, and relatedness to others has contributed to enhanced well-being.<sup>8</sup>

As described, these theories contain some overlapping constructs. Therefore, it is possible to design interventions in a way to combine variables of different theories according to available investigations related to the predictive value of those variables for behavioral changes.<sup>8</sup>

### *Psychosocial Determinants of Eating Behavior*

The following psychosocial constructs are related to dietary behavior. Self-efficacy, one of the widely used psychosocial constructs, is measured as an indicator of confidence and decision-making towards a healthy eating behavior. It is considered as a significant predictor of fruit and vegetable (FV) consumption in the young population.<sup>11</sup> In addition to self-efficacy, in the investigations on diet behaviors, the intention has been shown as the most important factor in behavioral performance; however, perceived behavior control (i.e., confidence in the ability to perform a new behavior) is assumed to be involved in direct behavioral change.<sup>9</sup> However, it has been found that intention is not only sufficient for eating a healthy diet, since many people had the intention to eat healthily, but few of them could achieve a healthy eating behavior. Another reason for not succeeding to perform a certain behavior despite having a strong motivation is that psychological resources, such as memory, attention, and self-control, are needed for successful goal striving. As far as these resources are limited, thus resource depletion accompanied by several self-regulatory problems may hinder the improvement of goal striving.<sup>2</sup> Other psychosocial factors including belief and knowledge have shown to be related to healthy dietary changes. A strong belief in the relationship between diet and cancer and more knowledge about cancer prevention recommendations could reduce the individual's fat intake and increase their fiber intake significantly, compared to those with no belief and little knowledge about the recommendations.<sup>12</sup>

In addition, some other potential determinants such as descriptive norms (perceptions about how people do), automaticity, self-regulation, subjective norms, and previous diet episodes have been suggested for predicting dieting intentions and dieting behavior.<sup>6</sup>

<sup>13</sup> Evidence has shown that autonomous motivation is related to a positive attitude towards a dietary behavior and higher control over eating behaviors. Thus, more

autonomously motivated individuals are more likely to have healthier food habits.<sup>14</sup> Autonomous motivation for healthful dietary eating was associated with higher FV consumption<sup>14</sup> and lower BMI, while controlled motivation was associated with higher BMI.<sup>15</sup>

The significant role of social support in health and diet-related interventions has long been identified.<sup>16</sup> It is considered as an available connection that consists of family and friends for acquiring information, receiving encouragement and emotional support, and supporting a behavior.<sup>14</sup> Among general populations, social support is regarded as a key determinant of the quality of the diet and better dietary outcomes<sup>16</sup> and also one of the strongest psychosocial constructs for FV intake in adults.<sup>11</sup> Regarding the role of habit, evidence supports the influence of habit as a variable used for predicting behavior in the future. There is a relationship between habit strength and eating behavior, as daily and frequent consumption of FV directly is a guide for future behavior.<sup>17</sup> However, it seems that automatic processes like habit strength cause the cognitive factors to be less effective in predicting future dietary behaviors,<sup>6</sup> but this variable performs differently according to socioeconomic status. The evidence has shown healthier diets in higher social level classes compared to lower ones.<sup>18</sup>

Intrapersonal influences on healthy eating are influenced by intrapersonal or individual-level factors such as cognition, amongst different populations. Psychological factors including perceived stress, depression, and anxiety are related to poorer eating behavior and diet quality.<sup>16</sup> Lower socioeconomic status may result in experiencing more stress as a result of engaging in environments characterized by chronic psychosocial stressors. Lower social position and its related higher stress levels may explain the social gradient in obesity.<sup>19-30</sup> Lower stress was found to be associated with healthier diets.<sup>16</sup> In contrast, higher levels of stress were associated with lower compliance with healthy dietary guidelines and lower diet quality such as lower FV intake and higher consumption of fatty foods as well as a higher prevalence of dieting.<sup>19</sup> A positive correlation has been shown between healthy dietary behaviors and psychological adjustments including lower depressive symptoms, higher self-esteem, and life satisfaction scores, while the lower quality of diet was accompanied by less positive psychological adjustments.<sup>14</sup> With respect to the factors explained above, dietary behaviors are too complex and a multi-component framework needs to be used to encompass an integration of salient determinants.<sup>17</sup>

#### *Psychosocial Factors Related to Adiposity Status*

Many individuals living with or without obesity chronically try to reduce their dietary intake to control their weight or prevent gaining extra weight. Although

the question is to what extent this control would be successful, restricting food intake deliberately or chronically may affect the capacity of the body energy regulation through some disturbing pathways.<sup>20</sup> In a study by Bellisle and colleagues,<sup>20</sup> eating inventory (EI) factors were studied with a broad range of BMI values from leanness to massive obesity in a population of over 2500 participants with a family history of obesity. The results of this study showed that the EI factors were generally modified in proportion to adiposity status, suggesting that there might be a causal link between restraint, disinhibition, hunger, and body adiposity. There was a relationship between disinhibition and hunger scores with BMI in a linear fashion in both genders, while there was a complex interaction among gender, weight fluctuations in the past, and adiposity status in variations for restraint scores. Restrained scores were associated significantly with the variance of BMI in men, but not in women, maybe due to less variation in restraint scores across the BMI scale or presence of obesity during childhood and/or adolescence in women. Moreover, there was a high correlation between disinhibition and hunger scores. The authors suggested that these two constructs might have interactions casually as severe hunger perceptions boost disinhibition which in turn increases weight gain. Consistent with these results in a study on Swedish women,<sup>21</sup> disinhibition was determined as the strongest EI factor independently differentiating obese and non-obese participants (with higher and lower disinhibition scores, respectively). In addition, a strong positive association between disinhibition and hunger scores and energy intake, and a weak negative association between energy intake and restrained eating were found within the obese group with no such associations in the non-obese control group. Women in the obese group had a higher intake of fat and sweet and a lower intake of fruit in the proportion of total energy intake compared to non-obese women. There was a significant negative correlation between restrained eating and disinhibition within the obese group, while there was only a weak positive correlation in the non-obese group. In agreement with the above-mentioned studies, in a retrospective, cross-sectional investigation of 638 healthy women, higher current disinhibition was strongly associated with higher current BMI and more weight gain during adulthood. However, the current dietary restraint did attenuate this correlation. The findings of this study suggested that such eating behaviors like dietary restraint might play an important role in moderating adulthood obesity.<sup>22</sup> These findings are consistent with the data from a large population-based sample of Finnish men and women presented by Kontinen et al.,<sup>23</sup> in which higher restrained eating was related to lower adiposity, uncontrolled and emotional eating, and higher self-control and dieting history (current or past) in obese individuals, whereas opposite correlations were found

among normal weight and participants who never went on a diet. In contrast, in a previous longitudinal study on the French general population, the associations of cognitively restrained eating were strongly positive with adiposity indicators only in normal-weight participants, but not in overweight ones. Moreover, in this study higher initial BMI predicted a larger increase in the restraint scores over a 2-year period, while the converse correlation did not exist.<sup>24</sup>

In an observational study consisting of community-residing male and female adults, obese participants, in comparison to non-obese ones, showed higher levels of distress, especially depression, lower self-esteem, lower eating self-efficacy, less ability to attend social activities despite having equivalent social support, and in general poorer mental health. In addition, obese individuals had less control over eating during emotional or social challenges and less capacity for self-regulation over their food consumption in home environments with more available foods. Although self-reported food intake indicated no different intake of calories, carbohydrates, and fats among the groups, dietary intake of normal weight individuals was more compatible with a heart-healthy diet than the intake of obese participants. The overall findings of this study indicated that home food environment and psychosocial factors were meaningfully varied in obese individuals compared to normal-weight adults.<sup>25,30</sup> Investigating the psychosocial determinants of food intake in an Australian population indicated that obese women had less self-efficacy and confidence in the ability to effectively overcome food cravings in environments encountering food cues and eating compared to non-obese women. These findings suggested that cognitive behavioral pathways might perform weaker in eating regulation of the obese Australian population.<sup>26</sup>

In a recently published prospective study by Leske and colleagues,<sup>13</sup> the predictors of dieting and non-dieting approaches among Australian adults were investigated. Subgroup analyses based on BMI categories indicated subjective norms as a significant predictor of dieting intentions, while dieting failure attribution almost predicted non-dieting intention in normal-weight adults. In addition, self-efficacy and intention were shown as predictors of non-dieting behavior. In the overweight and obese subgroup of participants, beliefs for a healthy lifestyle and accepting the resulting weight were related to the prediction of non-dieting intentions, and planning was the only predictor of non-dieting behavior. In a cross-sectional study, comparison of psychosocial predictors between weight loss maintainers (WLM) with current normal weight from diverse populations and treatment-seeking obese (TSO) individuals from two different populations, higher dietary restraint, lower dietary disinhibition, and hunger and less depressive symptoms were indicated as the factors differentiating

WLM from the TSO group. WLM group had also fewer intakes of high-fat foods. Meanwhile, between the two TSO populations, African-Americans showed lower socio-economic status, higher hunger and restraint scores, and lower score on disinhibition compared to Caucasians which suggested specific behavioral targets in diverse subgroups of the obese population.<sup>27</sup> Some other studies also have shown the relationship between specific psychosocial factors, especially higher self-efficacy, more social support, and using strategies for behavioral change and more healthful dietary component values among overweight and obese men.<sup>28</sup> The results of the above-mentioned studies in general support how psychosocial determinants of dietary behavior differ significantly in obese individuals compared to normal-weight ones in different populations. These findings provide evidence for different cognitive-behavioral mechanisms in obese versus non-obese adults.

#### *Brain Functions Developmental Changes and Behavioral Responses*

Neurobiological evidence has shown that during adolescent maturation some age-related changes over cerebral functioning cause a shift from lower-order, more emotionally-based, sensory processing towards higher-order, more cognitive and rational processing of the stimuli in relation to present and future reward states. These changes possibly inhibit or activate motivational and behavioral systems within the prefrontal cortex in order to cross the immediate satisfaction of psychological needs and short-term rewards in favor of longer-term beneficial goals.<sup>7</sup> Thus psychosocial constructs influencing eating behavior in the youth may differ from those that predict dietary behavior in adult populations.<sup>7</sup> The following paragraphs represent a review of psychosocial factors related to eating behaviors among the youth and adults.

## Discussion

Understanding the psychosocial predictors of eating behavior in adults would help implement effective interventions. Self-efficacy is one of the main constructs which contributes to the social-cognitive theory and is considered as a strong correlate of health behavior change and maintenance.<sup>4</sup> Individuals who have more confidence in executing a performance, in turn, expect positive outcomes. In a study of the Japanese population by Wang et al.,<sup>4</sup> the likelihood of consuming higher amounts of FV was shown a 2- to 4-fold increase in participants who had moderate to high perceived self-efficacy for more consumption of FV. This study emphasized the importance of promoting the self-efficacy of the population for behavioral changes for performing effective interventional programs. In an interventional study, promoting self-efficacy following

behavioral and nutrition education counseling sessions could predict FV consumption over 12 months.<sup>31</sup> However, in the study of Wang and colleagues, a gap was found between the attitudes towards vegetable intake and daily consumption of vegetables. Individuals with higher scores on attitude for FV intake did not show necessarily more vegetable intake, while they showed a higher intake of fruits. On the other hand, high perceived barriers were related to less likelihood of consuming fruits. Further, more responsibility for planning meals was less likely to increase the amounts of vegetable intake.<sup>4</sup> This latter finding was in contrast with the results of some other population-based studies.<sup>32, 33, 29</sup> The possible explanations for the lower vegetable consumption despite higher planning skills in the above-mentioned study might be due to the family and self-preference, the cost of vegetables, and low level of knowledge about the health benefits of vegetables.<sup>4</sup> However, in the study of the South Korean population, the association between planning and higher FV intake was reported only in women.<sup>32</sup> In addition, in the study of the German population, planning was involved in translating intention into dietary behavior, but individuals with very low self-efficacy could not benefit from planning.<sup>33</sup> Besides the previously mentioned findings, higher scores on social support were more likely to increase the fruit consumption.<sup>4</sup> Also, in the study carried out by McSpadden et al.,<sup>14</sup> data of over 2900 adults in the United States showed a positive association between perceived social support and autonomous motivation and FV intake, while there was a negative correlation between controlled motivation and FV intake. However, higher scores on perceived social support were involved in attenuating this negative correlation between controlled motivation and FV intake. In a self-help interventional study on over 1200 adults, intrinsic motivation (such as self-image and personal health) and extrinsic motivation (such as social pressure) were linked to a reduction of fat intake, while those motivation scales were not associated with changes in fruit and vegetable intake at the end of the 12 months post-intervention.<sup>34</sup>

Some of the psychosocial factors are considered as the pre-motivational factors including knowledge and awareness of engaging in the risk behavior.<sup>1</sup> In a review study, a strong association was found between knowledge and FV intake.<sup>11</sup> Also, awareness has been found as an important factor involved in complex health behaviors like dietary intake.<sup>1</sup> Similarly, in a Dutch longitudinal study, lower average daily energy intake was seen in participants with the aware perception of their dietary behavior compared to participants with unaware perception. Risk perception, attitude, social influence, and intention among the aware participants, and risk perception and self-efficacy among the unaware participants were the variables for the prediction of eating in moderation. However, in both groups of aware and unaware of dietary intake, participants with a high BMI had significantly higher

levels of eating in moderation.<sup>35</sup>

Along with the mentioned correlates of eating, some more relationships have been found between several additional psychosocial constructs and FV intake. Also, higher levels of acculturation among Mexican immigrants who were living in America was associated with lower FV intake.<sup>11</sup> In a European study, the psychosocial constructs assessed in young adults were predictive of FV intake in 8-year-old subjects later. Education and previous behavior were significant predictors of whole-grain intake. In men, intention to eat a healthier diet was negatively associated with fat intake, while in women, perceived behavioral control was a significant predictor of fat intake at the follow-up. The findings of this study highlighted the importance of psychosocial factors for predicting future dietary behaviors and designing interventions targeting such factors.<sup>18</sup> The findings from adult studies support the strong predictive roles of psychosocial constructs like self-efficacy, social support, and knowledge with FV intake. In addition, evidence supports the predictive role of intentions, attitude, motivation, and barriers for FV intake; however, there is a lack of sufficient evidence on the association between these psychological constructs and consumption of other food groups. Thus, further research is still needed to confirm these associations.

## Conclusion

Evidence has shown some differences in eating inventory scores of dietary restraint, disinhibition, and hunger in participants with different adiposity statuses. Thus, psychosocial correlates of eating seem to be different in obese and non-obese individuals in meaningful ways. On the other hand, the psychosocial constructs predicting dietary behaviors in the youth population seem to be different from those in adults because, in the youth population, it seems that immediate gratification of psychological demands and youth preferences has priority for health-related behaviors. Therefore, it is suggested that there is a need to investigate psychosocial correlates of youth separately from those of adults. Overall, the findings emphasize the need for future comprehensive research with a strong experimental design to compare the psychosocial determinants of all groups of foods, in obese vs. non-obese individuals and youth vs. adults; this confirms the strength of the potential discussed correlators.

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