THE RELATIONSHIP BETWEEN OBESITY AND DEPRESSIVE SYMPTOMS AMONG YOUNG GHANAIANS

BY

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THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MPhil PSYCHOLOGY DEGREE

JUNE, 2014

DECLARATION

This is to certify that this thesis is as a result of research conducted by Salma Yusuf Adusei under supervision towards the award of the Master of Philosophy Psychology Degree in the Department of Psychology, University of Ghana, Legon.

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Abstract

Considerable research has been documented showing obesity to lead to poor mental health outcomes including a higher risk for depression. However, in Ghana, obesity is an issue that raises mixed interpretations and attitudes. Although the traditional model is favourable towards overweight figures, obese people are still subjected to considerable weight stigmatization. Such stigmatization and its consequent psychological effects may be even better felt in settings, such as the school, where individuals may feel a sense of evaluation. The study aimed to establish a relationship between obesity and depressive symptoms among adolescent and young adult Ghanaians. It also aimed to examine whether self-esteem, some personality dimensions, and cultural identity served to moderate the relationship between obesity and depressive symptoms. Additionally, the study hoped to examine whether body dissatisfaction, perceived discrimination, and dieting mediate the relationship between obesity and depressive symptoms. Two hundred (200) individuals comprising one hundred (100) students from senior high schools and one hundred (100) university students were used as participants for the study. The study took the form of a cross-sectional survey. Questionnaires eliciting information on depressive symptoms, self-esteem, cultural identity, personality dimensions, perceived discrimination as well as background information were filled by participants. The body mass indexes of participants were also calculated and participants were categorized according to the World Health Organizations criteria. The study results indicated obesity to predict depressive symptoms. Cultural identity and self-esteem also moderated the relationship between obesity and depressive symptoms among adolescents. The relationship between obesity and depressive symptoms was also found to be mediated by dieting.

ACKNOWLEDGEMENTS

All Praise belongs to Allah, Lord of all the worlds. The All Knowing, Bestower of Favours and Honour, Who has, through His Grace and Mercies been a Friend to me through all situations.

My most profound gratitude also goes to my entire family, who have been with me, and have stood by me without much complaints, and have given me the privilege of knowing that we are truly one family.

I would also like to acknowledge the help of my supervisors; Dr. Adote Anum and Prof. J. Y. Opoku. I am most appreciative and thank you for your time, support, understanding and your valued guidance through this research.

I would also thank the staff of all the Senior High Schools I visited for their cooperation.

Lastly, I would like to thank all my friends, course mates and everyone who in one way or the other, have been of help and an inspiration to me.

Wassalam.

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LIST OF ABBREVIATIONS

BDD	Body Dysmorphic Disorder
BFI	Big Five Inventory
BMI	Body Mass Index
CES-D	Center of Epidemiological Studies Depression Scale
MEIM	Multi-group Ethnic Identity Measure
SES	Socio-economic status
WHO	World Health Organization

Chapter One

Introduction

The Relationship Between Obesity and Depressive Symptoms Among Young Ghanaians

Background to the Study

Worldwide, the prevalence of obesity/overweight has almost doubled since only a few decades ago (World Health Organization, WHO, 2013). Similarly, overweight/obesity rates in Ghana have increased substantially. A recent survey suggests more than half of the women in the urban capital of Ghana are either overweight or obese (Benkeser, Biritwum, & Hill, 2012). The WHO (2013), in view of the worldwide increase as well as of the negative consequences of obesity has therefore named it a global epidemic and public health issue requiring concerted efforts from various stakeholders in its control.

In Ghana, however, overweight/obesity is an issue that raises mixed reactions and attitudes. Ghanaians are known traditionally to value as the ideal the 'round' shaped individual, a shape that approximates to the Western overweight (Benkeser et al., 2012). Yet, obese individuals are stigmatized by some sections of the society. Especially in school settings, obese individuals are known to experience a lot of weight-based teasing. Nicknames given to obese individuals (such as 'obolo', 'oboshie') are not uncommon. Such weight-based teasing clearly contradictory to the admiration of the 'full figure', is expected to negatively impact on the mental health of individuals.

Obesity: Definition and Measurement

The WHO (2014) defines obesity/overweight as an excessive fat accumulation that becomes a risk to health. Obesity is also often defined in adults using the Body Mass Index (BMI), which is a measure of the weight in kilograms over the height in meter square. While overweight and obesity percentiles using the BMI for adults are fixed, those for children and

adolescents are specified according to age and sex-specific growth expectations (Flegal, Tabak, & Ogden, 2006).

The BMI or use of growth reference charts (as in the case of adolescents) represents the measurement of actual weight. However, there is also the concept of self-perceived weight. That is, how an individual considers and categorizes his/her own weight regardless of BMI. Inconsistencies in self-perceived weight as opposed to actual weight have been reported, leading researchers to conclude that self-perceived weight may be more related to psychological functioning than actual weight (Tang et al., 2010). An examination of obesity and its effects must therefore invariably involve an investigation of these two definitions or perspectives.

Obesity and Mental Health

Obesity has consistently been suggested to affect various areas of psychological functioning. This is due to the pervasive stigmatization of obese individuals. Obesity stigma is particularly enduring as it is considered justifiable because weight is perceived as controllable (Puhl & Heuer, 2010) and often dependent on individuals' character. Research on the subject has therefore generally found lower functioning of the obese in areas such as body image/satisfaction, self-esteem, among others. Notably, is its relationship to mood disorders (National Institute of Mental Health, 2006).

Obesity and Depression

There is known association between obesity and depression. Markowitz, Friedman, and Arent (2008) postulate two possible pathways, namely, health concern and appearance concern. The health concern pathway explains that obese individuals experience more functional

impairment and poor perceived health, both of which are independently related to depression (Markowitz et al., 2008).

In the appearance concern pathway, as a result of stigmatization, obese individuals are likely to be dissatisfied with their body, which is likely to lead to low self-esteem, and which, in turn, may lead to depression (Markowitz et al., 2008). Also, because of body dissatisfaction, obese individuals are likely to engage in repeated dieting (indicative of unsuccessful weight maintenance). This, the authours posit, is likely to lead to a feeling of failure which is itself depressing in nature (Markowitz et al., 2008). Indeed, research has found that weight-related depression can be caused by overweight perception and consequent dieting (Vaughan & Halpern, 2010).

It is worthy to note that, the appearance concerns in obesity that can lead to depressive symptoms are to be distinguished from Body Dysmorphic Disorder (BDD). BDD is defined as a preoccupation with an imagined or slight defect in appearance which leads to clinically significant distress and functional impairment (American Psychiatric Association, 1994, Phillips, 2004). Individuals who suffer from BDD perceive themselves as unattractive or deformed when in reality they have normal appearance (Phillips, 2004). Appearance concerns often focus on a particular body part such as the nose, hair, or skin but can involve the whole body (Phillips, 2004). BDD sufferers have also been reported to have higher depressive symptoms scores (Conroy et al, 2008; Dyl, Kittler, Phillips, & Hunt, 2006).

To differentiate BDD from normal appearance concerns, the preoccupation symptoms must reach clinical significance. Individuals with BDD are reported to think about the perceived deficit for an average of 3-8 hours a day (Phillips, 2004). BDD sufferers also often report impairment in social functioning such as with work or school (Phillips, 2004; Phillips, Quinn, & Stout, 2008).

Weight concerns have been shown to sometimes occur in BDD (for instance, Kittler, Menard, & Phillips, 2007). However, for a diagnosis to be made, some researchers consider that such weight concerns should not be accounted for by apparent obesity (Kittler et al., 2007).

Risk factors. The literature on psychological correlates of depression is copious and provides ample evidence that support a relationship between obesity and depressive symptoms. Research has also identified a number of factors that may predispose particular obese persons to depression. Among the risk factors, gender, socio-economic status (SES), as well as cultural group (Markowitz, et al., 2008; Wardle, Williamson, Johnson, & Edwards, 2006) are often considered. The risk factors listed here are not comprehensive but represent those that are being considered in this work.

First of all, the standard of thinness as the ideal form of beauty is observed to differ on the basis of culture. Members of cultural groups that adhere to this standard are therefore particularly at risk for obesity-related depression while other cultural groups with different appearance standards can remain unaffected. For instance, some studies have shown African Americans to generally hold much more flexible ideal weight perceptions compared to White Americans (Parker et al., 1995; Barroso, Peters, Johnson, Delder & Jefferson, 2010). White Americans have therefore often recorded greater associations between weight and depressive symptoms (Gavin, Rue, & Takeuchi, 2010).

Secondly, bodyweight standards and societal pressures on being physically attractive differ on the basis of gender as well as SES. In terms of gender, females have been found to be more pressured to achieve societal standards of beauty. Body dissatisfaction has therefore been observed to occur mostly in females than in males (Cachelin, Rebeck, Chung & Pelayo, 2002). Thus, mental health outcomes have also differed on the basis of gender with females commonly reporting lower mental wellbeing than males. Similarly, high SES has also been noted as a risk factor for obesity-related depression because a lower criterion for overweight

or obesity seems to exist in this stratum, leading to higher levels of depressive symptoms (Wardle & Griffith, 2001).

Protective factors. Thus far, to the best of the researcher's knowledge, no systematic examination of protective factors in the obesity/depression relationship has been reported in the literature. Research on obesity and depression, especially those in the adolescent literature has however been mixed despite studies that take into consideration the above mentioned effect modifiers.

It is clear that some obese individuals might show a number of resilient factors that protect them against psychological distress (Wardle et al., 2006). It becomes imperative, therefore, that such protective factors are studied in order to be able to help the obese. Self-esteem, some personality dimensions, and cultural identity are here considered as protective mechanisms that moderate this association. The justification for how the selected variables can moderate the obesity/depression association is given below.

Self-esteem, personality and cultural identity as moderating variables.

Self-esteem. Self-esteem refers to an individual's perception of his or her self-worth and arises out of the judgment people make about themselves (Rosenberg, 1979). But one has to recognize that the judgments individuals make about themselves is ultimately influenced by those made by others about them (Shrauger & Schoeneman, 1979). Self-esteem, for a long time, has therefore been evaluated in studies of obesity as an outcome. This view is valid considering that obesity is a stigmatized condition. Studies have therefore shown obese individuals to report lower self-esteem (Miller & Downey, 1999). Low self-esteem, on the other hand, can also lead to depression simply because individuals with low self-esteem have a greater probability to feel sad, isolated and miserable (Orth & Robins, 2013). Under this vulnerability model, low self-esteem therefore predisposes individuals to the experience of depression (Orth & Robins, 2013).

Although low self-esteem is associated with obesity, the obese population is heterogeneous (consisting of different degrees of obesity, as well as individuals of different backgrounds) and it cannot be assumed that the possible effect of obesity on self-esteem and self-esteem in turn on depression occurs in this population for every individual. Some obese individuals are likely to find ways of compensating for their perceived deficit by reducing the importance of appearance and compensating with other characteristics they have that are attractive (Wardle et al., 2006) thereby essentially maintaining their global self-esteem. In these circumstances, it is argued here that self-esteem is better conceptualized as a moderator such that obese individuals with low self-esteem will be at higher risk of depression while higher self-esteem will reduce the probability of depression among the obese.

Cultural Identity. Wide ethnic and cultural differences are also reported in weight perception and behaviour. These differences occur in several domains including the standard of thinness as the ideal and consequently, the cultural value placed on it (Miller & Downey, 1999).

The standard of thinness is most associated with western societies although the dynamics have been observed to change over time. Research has shown, for instance, that the average body sizes of Canadian and American female media images have moved from fuller to thinner body shapes over the years continuously widening the gap between media and population body sizes (Spettigue & Henderson, 2004; Spitzer, Henderson, & Zivian, 1999).

In Africa and some parts of Asia, the situation is different with reports of obesity or overweight rather as the ideal (for instance, Rguibi & Belahsen, 2006). Judging from these cultural differences, it becomes obvious that the consequences of obesity on mental health would differ from society to society. For instance, it seems that obesity is less stigmatized among some black ethnic groups (Padgett & Biro, 2003). In theory, therefore, obese individuals with high cultural identity in cultures that are comparatively more accepting of

weight will be less likely to experience depressive symptoms as societal pressures to be thin are reduced.

Personality. Personality is often defined as the set of attributes that make an individual unique and different from others. It is said to refer to individual differences that are present in patterns of thinking, feeling, and behaviour (American Psychological Association, 2013). This uniqueness that each individual brings to every situation has implications for various aspects of life including health.

Personality might influence the occurrence of depressive symptoms in a number of ways. First, the predisposition explanatory model postulates that some personality characteristics may play a causal role for the onset of depression (Klein, Kotov, & Bufferd, 2011). For instance, neuroticism, a personality factor that is associated with negative emotionality has consistently been found to increase the risk for depression as individuals high in neuroticism are more likely to experience negative emotional states (Klein et al., 2011).

In the reverse, other personality traits can serve as a buffer against the onset of depression/depressive symptoms. High conscientiousness, for example, has been consistently found to lower the risk for depression/depressive symptoms (Karsten et al., 2012) because conscientious individuals are better at impulse control as well as goal directed behaviour (John, Naumann, & Soto, 2008). It will therefore be expected that obese individuals who exhibit high conscientiousness will be at a lower risk for depression than obese individuals with low conscientiousness.

Secondly, certain personality traits may also play a protective role against the development of depression by decreasing stress exposure and reactivity. For instance, agreeableness, a personality dimension characterized by altruism, trust, modesty, and cooperativeness in interpersonal relations (Terracciano et al., 2009) have been found to play a protective role

from social stressors as individuals high in agreeableness give more positive evaluations of daily incidents (Komulainen et al., 2014). Consequently, it is posited, that agreeableness will be protective of obesity-related depression as it will decrease the subjective interpretations of stigma and stigma-related distress. It would therefore be expected that obese individuals high in agreeableness will be at a lower risk for depression than those low in agreeableness.

Problem Statement

Ghana is a country that presents varied reactions towards weight which is fueled by the existence of two opposing models of beauty. Traditionally, being buxom is considered attractive and therefore overweight figures are seen as ideal. This model is influential as research has shown, for instance, that majority of urban Ghanaian women chose overweight figures as their ideal body shape (Benkeser et al., 2012).

However, the traditional model is being gradually replaced by the western model which emphasizes the 'thin' ideal. This has come about mainly through the proliferation of western media. The western model is further becoming entrenched because of campaigns on health awareness which emphasize weight maintenance. Consequently, most Ghanaians are now becoming conscious of their weight.

This has created a high level of body dissatisfaction. Research has shown, for example, that although majority of urban Ghanaian women (64.9%) are either overweight or obese, about $3/4^{th}$ are still dissatisfied with their weight (Benkeser et al., 2012). Such high degree of body dissatisfaction suggests that weight will have a significant and negative impact on the mental health of Ghanaians.

Of even more concern is the pervasive stigmatization of the obese sub-population. Obese individuals now experience a lot of weight-based stigma which makes them particularly

prone to developing mental health problems such as increased depressive symptoms associated with weight concerns. It is therefore imperative to research into the mental health consequences of overweight/obesity.

Aim and Objectives of the Study

The present study aims to examine the relationship between obesity (both actual and perceived) and depressive symptoms.

The specific objectives are;

1. To establish a relationship between both actual and perceived obesity and depressive symptoms among young Ghanaians.
2. To examine whether perceived obesity will account for more variance in depressive symptoms than actual obesity.
3. To examine the moderating effects of self-esteem, some personality dimensions, and cultural identity on the relationship between obesity and depressive symptoms.
4. To examine the mediating roles of body dissatisfaction, perceived weight discrimination, and consequent dieting on the relationship between obesity and depressive symptoms.

Relevance of the Study

The importance of assessing the variables in this study cannot be overestimated. Clinical depression is known to be one of the most serious mental health conditions in the world. Undeniably, depression has been said to cause the most disability than all illnesses (Crabb & Razi, 2007). Delineating strategies that can help reduce the occurrence and progression of depression is therefore vital.

Self-esteem as well as personality is also known to affect a wide variety of domains in life. Similarly, a clear cultural identity has been suggested to promote health. Evaluation of these moderators in the obesity/depression relationship is thus of much significance as it will help improve screening strategies in mental health problems (Hillman, Dorn, & Huang, 2010). Findings of the study would therefore help in the development of screening or assessment strategies in schools. It will also aid in helping educationists better understand the individuals they deal with, both on a psychological as well as on a social level.

On the whole, the study will therefore help in planning for the prevention and psychological treatment of obesity-related depression as well as of low self-esteem in our society. When the interrelationships between the variables are well understood, a clearer and more achievable solution will be derived for the problem at hand. Hence, once the protective mechanisms are defined, work can begin on how to utilize them in clinical work.

The findings of the study can also be used to back advocacy on the avoidance of the stigmatization of overweight/obese individuals in order to create a society where each person is accepted and valued.

Chapter Two

Literature Review

The essence of this chapter is to give a general overview first, of the theories that inform this study and second, on what has already been done on the subject under study. It will hope to bring into perspective the broad conclusions that can be drawn through theory and current literature and to show their relationship to the present study.

The review will therefore consider the various variables under study and their relationship with each other in light of the important aspects that need to be outlined. It will thus aim to help situate the present topic in literature.

This review of related studies will therefore be organized around the following sub-headings;

Obesity and depression,

Obesity, self-esteem and depression,

Obesity, personality, and depression,

Cultural identity/values and psychological functioning,

Obesity stigma, body dissatisfaction, perceived discrimination and consequent dieting.

After the review of related studies, this chapter will also present a justification as well as the hypotheses and hypothesized model that guides the study.

Theoretical Framework

Bio-psychosocial approach. The larger, more general theory behind this study is the bio-psychosocial approach to illnesses. This theory was originally proposed by Dr. Engel (1977). In this model, a more comprehensive view of illnesses, encompassing the physical/medical, psychological, social and cultural is required in other to adequately provide health care (Engel, 1977). This model is also advocated to be used as a guideline for research (Engel, 1977).

It is quite important for research to look at illnesses from a more comprehensive point of view. The approach is certainly holistic and emphasizes that the biological, social, as well as psychological elements are basic to illnesses. As such, illnesses have corresponding correlates that inform its cause, maintenance, and progression. Thus, this research intends to look at both obesity and depression/depressive symptoms from this amalgamated perspective.

In terms of the biological, it is recognized, that the condition of obesity under study is itself perhaps or at least to some extent, a result of biological variation. For instance, some research on severe obesity has identified five genetic mutations that cause obesity (Farooqi & O'Rahilly, 2000). Similarly, biological models of depression explain the illness as due to substantial neurobiological mechanisms (Comer, 2010). Obesity is also linked with a high risk of the occurrence of co-morbidities such as diabetes and even some forms of cancer (WHO, 2014). Thus, it is important to control for the possibility of other biological variables (such as co-morbid illnesses) that can account for the association between obesity and depression. For instance, the presence of physical illness is known to increase the risk for depression (Nemade, Reiss, & Dombeck, 2007). With obesity having a number of other possible co-morbidities, it becomes important for research to control for the effect of chronic physical illness in order to isolate true relationships.

However, it must be noted that the question of obesity leading to depressive symptoms is treated here largely as a result of social and psychological variables. The research proceeds particularly from a socio-cultural perspective. To this effect, the body dissatisfaction explanation (Comer, 2010) is used. This states that western societies create gender differences in depression by creating unhealthy, often unachievable body shape goals for females (Comer, 2010). This theory is here extended to include not only western societies as many other non-western countries are gradually beginning to accept western beauty ideals. These standards of beauty also creates situations where out groups (individuals who fall below the beauty standards) are stigmatized by those who achieve this standard. With particular reference to obesity, attributions of controllability are used to explain the particularly enduring nature of weight stigma (Puhl & Brownell, 2003). The general perception being that obese people deserve to be degraded because weight is subject to individual control (Puhl & Brownell, 2003).

Still within the framework of the bio-psychosocial theory, the present research seeks to ascertain other factors that may moderate the obesity/depression relationship. In this regard, psychological variables, those that deal particularly with the self-concept and its interrelationships are studied. The research therefore considers the moderating effects of some personality dimensions, self-esteem and cultural identity on the obesity/depression relationship. Hence, other theories that inform the current study are presented below.

The five-factor model. The five- factor model of personality argues for a hierarchical organization of traits (McCrae & John, 1992). It is a version of trait theory that summarizes the central regularities in human behaviour (McCrae & John, 1992). The model conceptualizes five basic factors to represent the fundamental dimensions on which individuals differ. These five factors are neuroticism, conscientiousness, extraversion, openness and agreeableness and have been further divided into facets of each factor.

The labels of the five factors represent definitions and conceptualizations of each trait. Neuroticism is said to reflect individual differences in the tendency to experience distress (McCrae & John, 1992) and is sometimes conceptualized as negative emotionality (John et al., 2008). Conscientiousness is viewed as a trait that deals with being governed by conscience, being diligent, as well as thorough (McCrae & John, 1992). Conscientious individuals are therefore presented as having greater levels of impulse control as well as being better at thought driven and goal directed behavior (John et al., 2008). Extraversion is explained as implying an enthusiastic approach toward the social world and therefore is sometimes described as sociability, or positive emotionality (John et al., 2008). Openness is conceptualized as being open minded and often processing or appreciating originality (John et al., 2008). Agreeableness is also explained as a dimension characterized by altruism, trust, modesty, and cooperativeness in interpersonal relations (Terracciano et al., 2009). These factors are each considered separate and independent of the other.

The applicability of the five-factor model has been proven across different cultures (McCrae & John, 1992). It has also been argued to be applicable in populations of different educational levels (Rammstedt, Goldberg, & Borg, 2010). This assertion is of particular importance to this study as the sample will include individuals at the secondary as well as tertiary levels.

The self-protective properties of stigma. In their 1989 article on social stigma and self-esteem, Crocker and Major proposed some reasons why stigma may not necessarily affect self-esteem (Crocker & Major, 1989). Of interest to the present study is the proposition that stigmatized groups may devalue the dimension on which their group falls below the average and value other dimensions that they fare well on. Devaluing these dimensions means a lowering of its importance to the individual (Crocker & Major, 1989). The present

study therefore suggests the possibility that obese individuals are likely to devalue their appearance self-esteem while fundamentally maintaining other domains of self-esteem.

Ethnic identity theory. Phinney (2004) explains ethnic identity simply as a part of developing a secure identity or self-concept. According to Phinney (2004), ethnic identity is a multifaceted construct. Broadly, this model explains ethnic identity as based on a commitment to a partcular ethnicity as well as an exploration or search for ethnic identity. Relevant to this study is the assertion that age and context interact to produce effects on ethnic identity (Phinney, 2004). For instance, Phinney (2004) posits that high school settings create situations that elicits an adolescent's need to associate with a particular ethnicity.

Such situations of identity crisis can occur regarding all aspects of human interactions. In this study, individuals with a secure sense of ethnic identity are expected to to be buffered to some extent against weight stigmatization in school settings as traditional models of beauty are more favourable to weight gain

Review of Related Studies

Obesity and depression. Research in the area of obesity and depression has been considerably high as a good number of studies have been reported in the literature. Interest in this area has been especially present in the last three decades. Majority of reported studies especially those in the last two decades have demonstrated a marked adequacy in research design and methodology. Firstly, the greater numbers of the studies in this area have been largely epidemiological studies. Onyike, Crum, Lee, Lyketsos and Eaton (2003) for instance, investigated the relationship between obesity and depression with a population-based sample from the Third National Health and Nutrition Examination Survey numbering over eight thousand (8000). Similarly, Wardle et al., (2006) conducted their investigations with a sample of over five thousand (5000) adolescents. Such large sample sizes have been reported in

various other studies (for instance, De Wit, Van Straten, Herton, Pennix & Cuijpers, 2009 ; Goodman & Whitaker, 2002; Zhong et al., 2010).

Secondly, studies in this area have generally used well established and validated measures of depression. A number of studies have utilized diagnostic interview schedules that make use of the Diagnostic and Statistical Manual for Mental Disorders (DSM) criteria for depression. For instance, Onyike et al., (2003) utilized a Diagnostic Interview Schedule that took into consideration the criteria for a depressive episode in DSM III. Rofey et al., (2009) also utilized Structured Diagnostic interviews that use DSM III R and the DSM IV criteria. Other studies have used well validated self-report measures. In this regard, it is noteworthy that there has been quite some general consensus on measures used in studies of the obesity-depression relationship. The present literature indicates, for example, the unique acceptance and use of the Center of Epidemiological Studies Depression Scale (CES-D). Various authours (Goodman & Must, 2011; Zhong et al., 2010) have used the CES-D in their studies. Such prolific use of a particular measure is significant as it promotes comparability of studies across settings.

In relation to obesity measurement, majority of studies have used the BMI as their indicator of obesity and some have included the BMI along with other measures. Among those using the BMI, a few of the studies (Goodman & Must, 2011; Goodman & Whitaker, 2002; Sunwoo et al., 2011) have used self-reported BMI. Rickard, Kent, and Jerzy, (2005), for example, in their study allowed over 4000 adolescents to report their own weight and height arguing that previous research in that population had recorded high reliability between self-reported BMI and actual or measured BMI. Nonetheless, the use of self-reported BMI is expected to invariably reduce the validity of the data as inconsistencies have been reported in a number of studies evaluating the validity of self-reported height and weight. For example, in a rescent study of over three thousand 3000 individuals, the authours (Brettschneider,

Rosario, & Ellert, 2011) aimed to acsertain the validity of self-reported BMI when compared to actual BMI using a sample from the German Health Interview and Examination Survey for Children and Adolescents. Results showed that participants tended to underestimate their actual BMI, reducing the prevalence of overweight from 17.7% to 15.1%.

Rasmussen, Holstein, Melkevik, and Damsgaard (2013) presents a way of explaining the discrepancies in self-reported weight and height with their concept of percieved response capability characterised by time of previous measurements as well as recall ability as self-reported by the participant. In this study of a school-based sample in Denmark, they found one third of the sample had low response capability which was associated with an inability to accurately report their own measurement. For instance, among females, significant underestimations of weight was observed for students who had not been weighed recently. This demonstrates that self-reported weight and height measures may be reliable in some but not all populations. A majority of Ghanaians, for example, have not been weighed in their adolescent and adult years and thus using self-reported data in this population will be, to put simply, misleading.

Another concept that has received considerable attention in recent literature is the concept of percieved weight status defined as the individual's own perception of his/her weight status. Often in studies, respondents are asked to report whether they think of themselves as underweight, normal, overweight, or obese with the aim of evaluating whether the psychological perception of being overweight/obese or the actual reported obesity will be differentially associated with psychological functioning. One such study, conducted among Chinese adolescents was by Tang et al. (2010). Using a sample of school-aged adolescents between 10 – 17 years, they sought to ascertain relationships between actual or perceived obesity and depressive symptoms. They found that perceived weight category, not actual measured BMI category, was linked with depressive symptoms. Kurth and Ellert (2008) went

further to compare the effects of actual and perceived obesity on quality of life. They found actual body mass index to lead to better quality of life than perceived obesity. In this study (Kurth & Ellert, 2008), obese adolescents who considered themselves as normal in weight therefore had better psychological functioning than those adolescents who were actually of normal weight but considered themselves obese. Research seems to have reached a consensus that the relationship between obesity and depression is stronger when obesity is defined by self-perception.

Much like self-reported weight, inconsistencies in perceived weight has been recorded in the literature. Kurth and Ellert's (2008) study among German children and adolescents also testified to these inconsistencies. Just fewer than 40% of obese girls and fewer than 70% of obese boys were able to correctly evaluate themselves as overweight. Equally, in the study by Tang et al. (2010), the authours reported that as much as 48.1% of their participants misclassified their weight.

It must be noted that although percieved obesity is self-reported, it refers solely to the psychological evaluative processes in individuals and is invariably based on individual perception of self in relation to societal perceptions of appearance standards. Despite inconsistencis in both self-reported and percieved weight, neither one equates to the other. Although not researched, it is logical to presume that individuals who are unable to self-report their measured weight and height would still be able to perceive their own weight status and place themselves in a weight category. It is even possible to accept that even individuals who correctly self-report actual measures might still mispercieve their own weight category. Thus, reported rates of misperception of weight status are usually higher than erroneous reports of actual measures. Yet, in terms of percieved weight, the discrepancies are mostly what researchers want to study. Consequently, self-perception of weight category can be considered an independent and valid measure in all populations.

Majority of the studies have however, used actual or measured BMI (for instance, Onyike et al., 2003 ; Rofey et al., 2009; Wardle et al., 2006). Where percieved weight status has been used, it is often in comparison to actual measured weight category. The studies using measured BMI have utilized well established reference data either locally or internationally. A number of studies have used, for instance, the WHO reference data (Tang et al., 2010; Sunwoo et al., 2011) while others have used the Centre for Disease Control and Prevention Growth Charts (Goodman & Whitaker, 2002; Boutelle, Hannan, Fulkerson, Crow & Stice, 2010) as well as specific local reference data (Kurth & Ellert, 2008). These well established reference points give more reliability as well as validity to the data.

On the whole, there is a general agreement and usage of validated measures which increases the validity of the results making it possible to draw wide conclusions from existing data. The extensive use of specific measures also gives researchers the important ability to compare studies across populations and settings.

Despite the overall suitability in methodology, however, observed relationships have been noticeably diverse especially among community samples. Some studies of the obesity-depression relationship have arrived at positive relationships while others have found no relationship, and still, others report mixed results. The strengths of observed relationships have also been markedly diverse for different age groups as well as within particular age groups or sub-populations.

Among adult populations, although associations have been mixed, majority of studies have found a positive relationship between obesity and depression. Positive associations for middle to late adulthood have been especially strong. Roberts, Kaplan, Shema, and Strawbridge (2000) conducted a prospective study with data from two assessment points using a community based sample from the Alameda County Study. Their sample consisted of

individuals aged between 46 and 102. Cross-sectional analysis revealed that about 15.5% of the sample met the diagnostic criteria for major depression at baseline. The study reported greater risk for depression with obesity even after adjustments for co-variates including age, sex, education and chronic medical conditions. When the results were taken longitudinally, obesity prospectively predicted depression one year later. Also, Everson-Rose et al. (2009), in their study of 409 middle-aged women found each score point on the CES-D to be associated with as much as 1.03cm^2 increase in visceral adipose tissue. A score ≥16 on the CES-D suggested to be indicative of clinically relevant symptoms, was linked with 24.5% more fat. These results remained strong even in adjusted analysis. Correspondingly, Vogelzangs et al. (2008) in their 5-year longitudinal study of 2088 community sample of older adults found baseline depression to be related to a 5-year increase in visceral fat.

Of the few that do not report a positive association is a longitudinal study conducted by Wong, Leung, Leung, and Woo (2011) with a 4-year follow-up among a community sample of Chinese elderly. The authours aimed specifically to find out whether depressive symptoms at baseline was related to later abdominal obesity and vice versa. Participants were examined on depressive symptoms and measures of obesity on two year intervals. In this study only clinically significant depressive symptoms (defined as a score of 8 or above on the Geriatric Depression Scale) were considered. Unlike general findings, this study reported depression to be associated with a subsequent decrease in abdominal obesity among women even after adjusting for baseline obesity and other variables, leading the authours to conclude that although their substantial attrition level of 21% could have affected the results, cultural or ethnic differences may also be responsible (Wong et al., 2011).

Majority of studies have however not distinguished between sub-groups of the adult population. Among them, some have reported much greater associations. The Beaver Dam

Offspring Study by Zhong et al. (2010) was conducted using a sample of 2641 participants aged between 21 and 84. It is one of the first to have examined not only the simple relationship between obesity and depressive symptoms but also considered specific domains of depression. The study found a significant positive relationship between obesity and possible depression even after control of confounding variables such as age and gender. Continuous BMI also produced similar findings. Of even much significance, the study found obesity to be significantly associated with all subscales on the measurement tool for depression (CES-D). Similarly, the National Health and Nutrition Examination Survey, 2005-2006 (Zhao et al., 2011) also found obesity to be significantly associated with depressive symptoms.

Among children and adolescents, however, the relationships have been less robust than in adult populations. One study reporting a positive association was by Rofey et al. (2009). The authours conducted a 3-year longitudinal study with the aim of finding the relationship between childhood psychopathology and supsequent weight gain. They used a clincal sample of 189 children and adolescents aged between 8 and18 either diagnosed of depression or anxiety and compared them to 99 healthy controls. They found BMI to be related to depression even in this non-obese sample. Participants in the depressed group expressed higher average BMI than those in the control group. This finding is consistent with those that have usually been reported among clinical samples.

However, other studies have reported contrary results. Tanofsky-Kraff et al. (2006) investigated the relationship between body fat and psychological measures among children at high risk for adult obesity – that is, children who were overweight at the time of measurement or had one overweight parent. Participants were measured anually for an average of 4.2 years. They found that depressive symptoms did not serve as a significant

predictor of body fat. However, this study only utilized a convenience sample of 146 children which restricts generalizability of findings.

The results from majority of child and adolescent studies are fairly mixed. A study by Goodman and Must (2011) which followed a school-based cohort for three years also found no association between obesity and high depression as measured by the CES-D. However, obesity was associated with higher levels of depression when depression was taken as a continuous variable.

In another study, Goodman and Whitaker (2002) tried to find out the direction of the relationship between child/adolescent obesity and depression among a sample of 9374 participants of the National Longitudinal Study of Adolescent Health. They were unable to detect any significant relationship between obesity and depression cross-sectionally. However, depressed mood at baseline significantly predicted obesity after 1 year even when the effect of other variables such as self-esteem had been controlled. The reverse relationship -obesity leading to depression- was not significant. It can therefore be seen from the literature reviewed above that relationships are mixed and not conclusive.

One cannot but agree with Wardle et al. (2006) that the observed variability in research findings is unlikely to be due to methodological flaws, inadequacies or differences. To this effect, some research has focused on specific sub-populations. These studies utilizing risk factor models try to assess whether differences in results can be observed for highly at-risk groups. Research has generally considered gender, SES, and chronic physical illness as effect modifiers.

Gender. One risk factor that is consistently explored is gender. Gender differences have been observed in almost all facets of the obesity/depression association. Majority of

studies have found females to be at greater risk with only a few reporting gender to show only a trend.

Onyike et al. (2003) in a study reporting results for the Third National Health and Nutrition Examination Survey also included gender stratified analysis. In their study, they reported the obesity-depression relationship to be significant only for females. Equally, Beydoun and Wang (2010) found positive associations between morbid obesity and major depressive disorder for females but recorded negative association for males. Wardle et al. (2006) also found females to have higher rates of obesity and higher emotional symptom scores.

Some research has also been done specifically among females. Hillman et al. (2010) investigated the relationship between different measures of adiposity and depressive as well as anxious symptoms among 198 female adolescents with a mean age of 14.6 years. They found depressive symptoms to be associated positively with BMI and percent body fat even after controlling for age, race, SES, among other variables. Yet even in female only samples, some mixed results are present. Boutelle et al. (2010), for instance, using a structured diagnostic interview, evaluated the relationship between depression and obesity both in cross-sectional analysis and in longitudinal analysis with 1-year assessments for four years. They found no relationship between obesity and major depression but obesity was associated significantly when depressive symptoms were taken on a continuum.

The question is: To what extent are these gender differences independent of those already recorded in general or prevalence studies in depression? Even in studies that include gender as a covariate (for instance Roberts et al., 2000; Zhong et al., 2010), some associations between obesity and depressive symptoms/ depression are found. Certainly, these results indicate that obesity does account for differences in depressive symptom scores that are independent of those of sex.

Gender differences recorded in misperception of overweight may drive these associations. Girls are generally more likely to perceive themselves as overweight. For instance, Tang et al. (2010) found girls to be more likely than boys to perceive themselves as 'relatively heavy' while boys were more likely to misperceive themselves as 'too thin' or 'relatively thin'. Consequently, body dissatisfaction has generally been reported to be greater in females than in males. A study among adolescents, for instance, reported girls to be almost twice more likely than boys to be dissatisfied with their weight (Wang, Liang, & Chen, 2009).

Socio-economic status. SES has also been linked to both obesity and depression. These socio-economic differences have been robust. In relation to obesity, low SES has often been implicated. Baum and Ruhm (2007) used data from the 1979 cohort National Longitudinal Survey of Youth to investigate the relationship between age, SES and obesity. The authours found SES to be inversely associated with obesity (Baum & Ruhm, 2007). Further, longitudinally, BMI and obesity prevalence increased faster among those with low SES. For instance, obesity prevalence increased by 29.2% in the low SES group as opposed to 18.7% for the high SES group (Baum & Ruhm, 2007).

However, such results are reportedly more characteristic of developed nations. McLaren (2007) conducted a review in an attempt to update knowledge on the relationship between obesity and SES. The authour reviewed 333 studies published between 1988 and 2004. Observed patterns were different for countries with differing levels of human development (McLaren, 2007). On the whole, highly developed countries had a majority of studies reporting negative associations with individuals in the low socio-economic category having high prevalence of obesity. However, an increasing number of positive associations were recorded as one moved down the ladder of development (McLaren, 2007). Developing countries therefore reported obesity to increase along with higher socio-economic position. This overall pattern was also profoundly observed for females than for males. Among women

of highly developed countries, observed proportion of positive associations was 3 %. This proportion increased to 43% among medium developed countries and further increased to a remarkable 94% among low developed countries (McLaren, 2007).

This pattern of gender differences was also observed in an earlier review specifically among developing populations. Monteiro, Moura, Conde, and Popkin (2004) found that about half the number of studies among men that they reviewed reported no associations between obesity and SES leading them to conclude that it might be erroneous to consider obesity as a disease of the rich in developing countries. The authours also reported that similar to the findings of McLaren (2007), as countries increased in development (signified by Gross National Product) a shift from positive to negative associations especially among women is detected. This change among women is espected once the Gross Domestic Product reaches the midpoint of lower middle income countries (Monteiro et al., 2004). The authours (Monteiro et al., 2004) explained that these results may be accounted for by a general decrease in food insecurity and cost after a certain stage of economic development even in the lowest socio-economic stratum.

In relation to depression, studies have also found low SES to be a risk factor. Lorant et al. (2003) in their meta-analytic review on the relationship between socio-economic differences and depression found that overall, significant higher odds of depression is observed for individuals with low SES not only in relation to a new episode, but also in relation to the persistence of depression.

The interaction between SES and obesity on depression is however not straight forward. It seems that other factors interact to produce more positive associations between SES and depression among the obese sub-population. Wardle and Griffith (2001) tried to find out why SES is inversely associated with weight and thus investigated weight control practices using a

sample of 1894 individuals with data taken as part of the monthly Survey of the Office of National Statistics. The authours recorded higher levels of pecieved overweight associated with higher SES. They also reported significant positive relationships between SES and weight monitoring practices in both men (high SES, 41%; low SES, 30%) and women (high SES, 51%; low SES, 44%). The authours suggested that an explanation for this occurrence might be that appearance or weight standards might differ according to socio-economic classes (Wardle & Griffith, 2001) with a lower criterion for overweight among the high SES class.

At least one study in Ghana has also confirmed high SES to be linked with an increased risk of obesity (Benkeser et al., 2012). It also appears that individuals with high SES desire weight loss more than their low SES counterparts while those in the lowest SES desired weight gain (Benkeser et al., 2012) suggesting that high and low SES individuals may be more prone to depression as opposed to their medium SES counterparts.

Chronic Physical Illness. The influence of medical illness on depression or depressive symptoms has also been reported. Tanaka, Sasazawa, Suzuki, Nakazawa, and Koyama (2011) conducted a 7-year longitudinal study on health status and lifestyle factors as prdictors of depression in middle-aged and elderly Japanese. The study reported that aside from increased risk for depression with higher BMI, depression risk was also elevated for individuals with chronic diseases as well as those with poor percieved health in both sexes.

In view of the fact that obesity is a clinical condition that has a number of co-morbid disorders, it's influence on depressive symptoms might be over-estimated because of the influence of other diseases. For instance, diabetes, the most common co-morbid disorder in obesity has been associated with depression in various studies (Eaton, Haroutune, Gallo,

Pratt, & Ford, 1996; Shomaker et al., 2011) with the general pattern being that diabetes increases risk of depresion both cross-sectionally and prospectively.

Consequently, a number of studies in obesity have included a measure of chronic diseases and results have been similar to those in the general population. In a study on elderly Chinese men and women (Wong et al., 2011), both sexes recorded highly significant differences in number of chronic diseases observed between those with and without clinically relevant depression (females- MD 0.49, p-value <.001; males MD 0.57 p-value <.001). The inclusion of chronic illness as a control variable is therefore vital in order to isolate true effects.

Gender, SES, and chronic illness present one of the most robust variable associations used generally as covariates or moderators of the obesity/depression relationship. Nevertheless, variability in results even after control of these variables has been recorded.

Obesity might therefore not stand alone as a possible cause of depression (Wardle et al., 2006). It is rather more likely that the psychological impact of obesity on depression is more dependent on other characteristics that are inherent in the individual.

Obesity, self-esteem, and depression. Obesity has been linked with self-esteem and self-esteem in turn with depression. The association between self-esteem and depression has been one of the most robust found in the literature. Most of the studies in this area have reported a significant negative relationship between the two variables. Gayman, Lloyd, and Ueno (2011) in one of the most recent studies conducted on self-esteem and depression examined, among other things, whether having a history of major depression was related to young adulthood self-esteem. Using a large sample of community young adults in Florida, they found a history of major depression to be linked to negative self-esteem changes in that critical period of late adolescence, a time characterizing the gradual shift into adulthood.

However, the most significant finding of this study is the fact that negative self-esteem and depression are related even when stressful life events are controlled for.

Various studies have also examined the possible role of weight status in determining self-esteem. Such studies are among the earliest in the obesity literature. Among them, majority report negative relationships between self-esteem and obesity. An early meta-analysis of self-esteem and overweight (Miller & Downey, 1999) found an overall negative mean effect size (r = -.18, d = -.36). Some more recent studies have also confirmed these findings. McClure, Tanski, Kingsbury, Gerrard, and Sargent (2010) in a large population-based correlational study, considered a number of variables such as socio-demographics, child personality, weight status, parenting style, among others, in relation to self-esteem. Results of the study were that among other variables, overweight and obesity were independently associated with lower self-esteem. Generally, the evidence for lower self-esteem as a consequence of obesity is strong.

The perception of being 'fat' and not necessarily actual measured obesity, as earlier on noted, has been suggested to be what might account for the negative psychological consequences found in obese individuals (Tang et al., 2010). Indeed, percieved obesity has been linked with lower self-esteem. Perrin, Boone-Heinonen, Field, Coyne-Beasley, and Gordon-Larson (2010) studied over 10 000 adolescents enrolled in the National Longitudinal Study of Adolescent Health in the United States and found higher self-esteem to be associated with misperceived normal weight among females. Also, misperceived overweight among females was predicted by low self-esteem. Similarly, Miller and Downey (1999) reported higher effect sizes for perceived weight (d = -.72) than actual weight (d = -.24).

Gender differences in the obesity/self-esteem association have also been observed. Females are generally found to be more affected than males. Miller and Downey (1999) observed

higher effect sizes for females than for males. Similarly, the results of McClure et al. (2010) showed females to be a particularly at risk group.

Although relationships between low self-esteem and depressive symptoms or depression seem strong, other aspects are yet to receive much attention in the literature. The often reported associations are over generalized because definitions of self-esteem as a construct in research are often over simplistic. Self-esteem is a multi-faceted construct, yet evaluations are usually done with scales that consider only global self-esteem. Some studies, even when assessing global self-esteem, utilize over abridged scales. As an example, McClure et al. (2010) used just three items in their assessment of self-esteem raising questions about the validity of this instrument and its ability to provide a detailed understanding of how low self-esteem is related to the other variables.

To the effect that problems in self-esteem assessment exist, Phillips and Hill, as far back as 1998 conducted a detailed analysis of self-esteem in adolescence. With a sample size of 313, they made important contributions. Overweight and obese girls scored significantly lower than their normal weight counterparrts only on two domains: physical appearance and athletic competence. Other areas of self-esteem were fundamentally the same. Yet, studies still continue to measure essentially global self-esteem, clouding very significant differences or associations.

Consistent with the theory of self-protective effects of stigma (Crocker & Major, 1989), Phillips and Hill (1998) also found a devaluation of the social acceptance, athletic competence, and physical appearance domains. These were rated by participants as less important when compared to academic competence and behavioural conduct. This suggest that, even if obese individuals report low self-esteem on certain domains, they are unlikely to be affected because of devaluation of these domains. It is only in valued fields that lower

functioning can affect their overall self-concept and can further lead to other mental health issues. Undoubtedly, studies have already shown low levels of academic achievement to be associated with depression. Park, Heo, Subramanian, Kawachi, and Juhman (2012) reported decreases in depression experience with increases in academic achievement. McClure et al. (2010) also reported that students who had high school performance were less likely to report low self-esteem. It is therefore suggested that in school settings, performance self-esteem will be the highest determining factor for depression. In these instances, self-esteem is better conceptualized as a moderator and not an outcome. This underscores the importance of the proper conceptualizations of constructs.

The concept of self-esteem as a moderator of mental health outcomes- although not explored in relation to weight- has been researched in other related areas. Self-esteem has, for example, been found to significantly moderate the relationship between perceived discrimination and depression among women such that high self-esteem serves as a buffer that protects individuals from depression even in the face of perceived discrimination (Corning, 2002). This is particularly important to this study as obese individuals are also exposed to stigma and its resulting discrimination, underscoring the potential utility of self-esteem as a moderator of the obesity/depression relationship.

Even more illuminating is the fact that some recent research suggests that self-esteem does not only moderate psychological responses to rejection but moderates physiological responses as well (Ford & Collins, 2010). In a study examining self-esteem as a moderator of neuroendocrine and psychological responses to interpersonal rejection, individuals with low self-esteem exhibited greater cortisol reactivity to rejection when compared with individuals with high self-esteem.

Obesity, personality, and depression. Interest in personality has been identified in obesity research. Studies have investigated whether certain personality traits or dimensions predispose individuals to weight gain. In these studies, diverse personality measures, both quantitative and qualitative, have been used. For instance, Macías and Vaz Leal (2002) used the Millon Clinical Multiaxial Inventory-II (MCMI-II) for assessing personality in their study of morbidly obese individuals following bariatric surgery, while Valenti, Omizo, and Mehl-Madrona (2011) assessed participants with the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) in an equally clinical sample of obese bariatric surgery candidates. Also, Elfhag (2003) utilized the Rorschach while others such as Terracciano et al. (2009) have used the Revised Neo Personality Inventory and other measures of the Big Five Model. Such variability in personality measures and the somewhat variable outcomes have led some authours to question the validity of various instruments in determining relationships. López-Pantoja et al. (2012) in assessing the utility of five personality measures in a comparative study of obese individuals and controls found that some of the measures were not even useful in determining differences. Also, with different underlying theoretical perspectives, comparisons across studies are impaired although the general conclusion is that obese participants, especially clinical samples of morbidly obese individuals, show some personality disturbances such as a greater level of impulsivity that predisposes them to weight gain.

This relationship is especially present in the subset of studies that use the Big Five Factor model. One of the landmark studies in this area is a longitudinal study by Sutin, Ferrucci, Zonderman, and Terracciano (2011). Using data from a sample of almost 2000 participants in the Baltimore Longitudinal Study of Aging lasting for over fifty (50) years, the authours examined the assumption that personality may influence health through obesity. The authours

reported that cross-sectional analysis showed low conscientiousness or high neuroticism, or extraversion was associated with increasing BMI. This association was especially true for the impulsivity domain as the top 10th percentile of individuals in this domain were reported by the authours to weigh as much as 11kg more than the bottom 10th percentile. Longitudinal analysis also showed low conscientiousness as well as high neuroticism to be related to weight instability. Similarly, Terracciano et al. (2009) in their 3-year study found almost the same associations with high neuroticism, especially in the impulsivity domain, as well as low conscientiousness to be related to being overweight or obese. This relationship remained robust even after controlling for genetic influence.

These relationships have also been partially confirmed in a meta-analysis (Jokela et al., 2012). As in earlier studies, the authours found high conscientiousness to be associated with a lower risk for developing obesity (Jokela et al., 2012). Even more important, conscientiousness was also related to the persistence of obesity to the extent that, among the obese, higher constienciousness was associated with a greater likelihood of reversion to a normal weight.

Personality characteristics have also been consistently associated with depression. In this regard, a number of traits including neuroticism and conscientiousness have been implicated (Klein et al., 2011).

Of these traits, neuroticism is considered a risk factor. Oddone, Hybels, McQuoid, and Steffens (2011) found differences in traits of depressed and not depressed participants. The depressed group had higher neuroticism when compared to the non-depressed group.

Conscientiousness, on the other hand, has been suggested to reduce the risk for depression. In the same study by Oddone et al. (2011), the depressed group scored lower on conscientiousness when compared to the non-depressed group. In another study by Weiss et

al. (2009), the authours found increases in conscientiousness to correspond with decreases in the likelihood for both a minor and major depression. The authours also concluded that there are interactions between personality factors such that people high in neuroticism but who have average to high conscientiousness might be protected from depression (Weiss et al., 2009). It is suggested therefore, that although neuroticism has been found to be predictive of obesity, conscientiousness can moderate the progression from obesity to depression. Instances where personality traits interact to serve as a buffer against health/behvioural consequences are recorded elsewhere in the literature. Turiano, Whiteman, Hampson, Roberts, and Mroczek (2012) found higher levels of conscientiousness to moderate high neuroticism such that individuals who expressed both higher neuroticism and higher conscientiousness were buffered against the use of illegal drugs. Also, across three independent samples, and with the use of both cross-sectional and multiwave data, Bowling, Burns, Stewart and Gruys (2011) found consistent support for conscientiousness and agreeableness as moderators of the relationship between neuroticism and counter productive work behavious such that higher levels of conscientiousness and agreeableness buffered against the use of counter productive work behaviours.

It is also argued here, that much like the relationships between SES, obesity, and depression, it certainly cannot be assumed that depression in the obese sub-population will be related to the same personality traits found in general populations. To put it in context, obesity is a stigmatized condition and as such, the effects are greatly felt in interpersonal relationships. The greater likeability of individuals high in agreeableness may be protective as their perceived stigma will be reduced. At least one recent research supports the assertion that agreeableness can moderate the perception of events and mental health consequences by increasing more positive interpretations of daily incidents thereby reducing stress reactivity. In a study by Komulainen et al. (2014), agreeableness was related to higher positive and

lower negative affect as well as a lower variability of sadness. Also, agreeableness was associated with more positive evaluation of social situations and was found to be specifically protective against social stressors (Komulainen et al., 2014).

It is therefore argued that agreeableness will also interact with obesity to reduce the risk for depression. This is also in line with research that shows the most significant resilience factor in adolescent depression is good interpersonal relationships (Thapar, Collishaw, Pine, & Thapar, 2012). Since agreeableness is linked with such facets as compliance, and modesty, among others, which relates to social desirability/acceptability, agreeableness may actually reduce the stigma that obese individuals may experience.

Examining such interactions between personality, weight and depressive symptoms is important as it will be among the first attempts to examine an area that has potential utility for clinical practice but has been virtually non-existent in the literature.

Cultural identity/values and psychological functioning. The literature base for obesity shows ethnic/racial differences in terms of prevalence, perception, and effect. Generally, prevalence of obesity have been reported to be lower among white populations when compared to other ethnic groups in studies in the United States. The low prevalence has been suggested to be a result of a lower criterion for excessive weight gain in black and hispanic populations when compared to whites.

These differences in criterion for excessive weight has led to racial differences in perception of overweight. Studies have found blacks to be more likely to mispercieve their weight as normal when in fact, they are overweight. This finding can be extended to the Ghanaian population as overweight figures are considered the norm.

The effect of obesity on depression have also differed by race. In research that aimed to find ethnic or racial differences in the obesity/depression relationship, majority of studies have reported non-Hispanic whites to be the highest at risk group. Wardle et al (2006), for instance, found white females to have the strongest association between depressive scores and weight group despite the fact that they reported the lowest prevalence rates. Such relationships have been recorded in various other studies (Gavin et al., 2010; Simon et al., 2006).

Studies in the western world, in this regard, have also been markedly different from those in other parts especially those of Asian origin. Apart from the study by Wong et al. (2011), other works, such as that by Sunwoo et al. (2011) have also recorded results that suggest different ethnic or racial associations. In their study (Sunwoo et al., 2011), considered to be the first nationally representative sample in an Asian population, they investigated the relationship between weight and mental disorder. No significant relationship was found between obesity and depressive disorder. Rather, they found underweight status to be associated with depresssive disorder and the association remained significant even after adjustments for other variables. These results suggest that racial and cultural differences can alter the obesity/depression relationship. Some authours explain that collectivism, as well as favourable attitudes for the obese figure prevalent in Asian populations might be serving as a buffer (Wong et al., 2011).

Such favourable cultural perceptions have also been recorded among Africans. Rguibi and Belahsen (2006) reports of a preference for overweight/obesity among Moroccan Saharawi women. In this study, the authours reported that out of 249 women aged between 15 and 70, 199 thought their weight was appropriate although 30% were overweight and 49% obese. Majority of the sample had also reported trying to gain weight at some point in time and the

authours reported of a period (usually 40 days) of intentional fattening practices before marriage, comprising of reduced physical activity and deliberate overeating.

In other general research, high cultural identity has been associated with generally better outcomes. High cultural identity, for example, has been found to negatively correlate with depression among African Americans (Williams, Chapman, Wong, & Turkheimer, 2012). Cultural identity has also been suggested to influence positively various other outcomes including both young adult and adolescent drug use (Brook & Pahl, 2005; Gazis, Connor, & Ho, 2010).

Some studies conducted from africentric perspectives have also found africentric values to be associated with better outcomes. Constantine, Alleyne, Wallace, and Franklin-Jackson (2006) found significant positive associations between africentric values and self-esteem. African self- consciousness have also been found to contribute to health promoting behaviours among African American students (Thompson & Chambers, 2000).

In the light of these studies, some authours have concluded that cultural identity might increase resilience by moderating the effect of discriminatory experiences on psychological wellbeing for particular racial minorities (Williams et al., 2012). For instance, Deng, Kim, and Vaughan (2010) examined cutural orientation as a moderator of the relationship between discrimination experience and delinquent behaviour among Chinese American adolescents. The authours found that a high Chinese cultural orientation increased the negative impact of discimination experience while a high Western cultural orientation protected individuals against the negative impact.

This same process can be argued to occur for other stigmatized groups such as the obese as a high cultural identity is expected to moderate the relationship between obesity and depressive

symptoms in cultures that do not adhere to the standard of the "thin ideal" as has been used to explain the altered relationship among Asian populations (Wong et al., 2011).

Also, a clear cultural identity leads generally to better psychological wellbeing. Usborne and Taylor (2010) presented results which showed positive associations between cultural identity clarity, self-concept clarity, and self-esteem. Further, cultural identity clarity significantly predicted self-concept clarity and self-esteem. Also, self-concept clarity significantly mediated the relationship between cultural identity clarity and self-esteem. With the great importance of cultural identity, as these results suggest, it will serve as an important buffer for almoost all stigmatized groups.

Obesity stigma, body dissatisfaction, perceived discrimination, and consequent dieting. Obesity stigmatization has been long recorded in the literature. Various studies have shown negative perceptions of obese individuals. Obesity stigma has been recorded to occur in very young children. Musher-Eizenman, Holub, Miller, Goldstein, and Edwards-Leper (2004) in a study of 42 preschool children with a mean age of 5.2 years found that obese figures received more negative descriptions than other weight figures. Similarly, in a study by Zeller, Reiter-Purtill, and Ramey (2008), children described obese figures as less physically attractive and less athletic. Likewise, young children have been found to rate overweight figures as mean more often than nice (Su & Santo, 2011).

Such stigmatization has been explained as due to controllability beliefs (Puhl & Brownell, 2003). The controllability beliefs are also documented to emerge as early as in pre-school (Musher-Eizenman et al., 2004).

The pervasive stigmatization of obesity also leads to greater perceived discrimination by obese individuals. Carr and Friedman (2005) conducted a study specifically aimed to find out if obesity stigma translated into perceived discrimination. The authors found that moderately

or severely obese individuals had a greater likelihood of reporting everyday discrimination as well as major forms of discrimination. The perceived discriminations were recorded in settings such as the work place or health care facilities. Similarly, Hansson (2010) reported severely obese women to report more work and health care related discriminations as well as discrimination in interpersonal areas. In a study by Xie et al., (2003), perceived overweight adolescents experienced more peer isolation. Such peer isolation also occurs in young children as it has been demonstrated that pre-school children are less likely to choose obese figures for play mates (Musher-Eizenman et al., 2004).

The perceived discrimination often leads to adverse psychological effects. In a study of older adolescents (15-17), Rickard et al. (2005) found obese adolescents to have significantly more depressive symptoms as well as shame experiences than their normal weight counterparts. Similarly, Xie et al., (2003) reported higher levels of distress for perceived overweight adolescents.

The pervasive stigmatization also leads to a higher occurrence of body dissatisfaction among obese individuals. A large number of studies have reported such associations and these relationships tend to be robust (for instance, Goldfield et al., 2010). The occurrence of body dissatisfaction has also been linked to dietary restraint. For instance, Body image dissatisfation has been found to mediate the relationship between self-esteem and dieting (Gianini & Smith, 2008).

On the whole, positive relationships have been observed between obesity, body dissatisfaction, restrained eating or dieting and depressive symptoms. Goldfield et al. (2010) in a study of 1490 adolescents found obese individuals to report higher body dissatisfaction and at the same time greater adiposity was found to be associated with a higher likelihood for dieting. In the same study, higher depressive symptoms were also recorded for obese

individuals when compared to other weight groups. Vaughan and Halpern (2010) in their study of adolescents also found that the relationship between obesity and depressive symptoms was mediated by dieting. Thus, studies suggest the relationship between obesity and depressive symptoms passes through a complex pathway involving overweight perception, perceived discrimination, body dissatifaction, and consequent dieting.

Summary of literature review

Although mixed results exist in the literature, especially for adolescent populations, studies suggest a positive relationship between obesity and depressive symptoms. Research also suggests that chronic physical illness, high socio-economic status and being female puts individuals at a greater risk for obesity-related depression/depressive symptoms. Despite studies that include these risk factors, mixed results still exist. Other variables such as self-esteem, some personality dimensions, and cultural identity that have been found to influence both obesity and depression in separate analysis are considered in this study as moderators. This is because it has been argued that self-esteem has been found to moderate discriminatory experiences on psychological wellbeing and this is also theorized to occur among the obese as obese individuals may not neccesarily develop low self-esteem because of a devaluation of the appearance domains of self-esteem. The moderating role of conscientiousness is also investigated because it reduces the risk of depression and have been found to moderate other health behaviours such as illegal drug use. The potential utility of agreeableness is also considered because it has been shown to create more positive perceptions of daily events and thus have the potential of reducing discriminatory experiences through more positive appraisals. Cultural identity is also posited to moderate the obesity/depression relationship because cultural identity have been found to generally improve mental health outcomes and is especially expected to protect against obesity related depression in cultures that are more accepting of weight.

In this regard, this research proceed from a protective model as opposed to the risk factor models of earlier studies. The study hopes to delineate these relationships while controlling for the already identified risk factors. The study also aims to identify whether perceived discrimination, body dissatisfaction, and dietary restraint can account for the observed relationship between obesity and depressive symptoms.

Justification

The present study is justified because it is the first study that aims to explore the relationship between obesity and depression in a sample that expresses mixed reactions towards obesity. In Ghana, the available research on obesity has generally come from the physiological perspective and so its relationship to mental health has been generally ignored.

The research is also justified as it is among the initial attempts to consider protective factors in the obesity/depression association. Often, research has used demographic variables such as gender and SES as moderators. These studies proceed from risk factor models and can help in screening strategies. However, such demographics are often unpreventable and not amendable in clinical settings. This research will therefore investigate factors that are modifiable and can become the focus for change in therapy.

Statement of Hypotheses

From the theoretical framework and related studies, the following hypotheses were stated;

1: Actual obesity will significantly predict depressive symptoms while controlling for covariates (age, sex, socio-economic status, and chronic illness).

2: Perceived obesity will significantly predict depressive symptoms while controlling for covariates (age, sex, socio-economic status, and chronic illness).

3: Perceived obesity will significantly account for more variance in depressive symptoms than actual obesity.

4: Performance Self-esteem will significantly account for the highest variance in depressive symptoms among the measured domains of self-esteem.

5a: Self-esteem will significantly moderate the relationship between actual obesity and depressive symptoms.

5b: Conscientiousness will significantly moderate the relationship between actual obesity and depressive symptoms.

5c: Agreeableness will significantly moderate the relationship between actual obesity and depressive symptoms.

5d: Cultural identity will significantly moderate the relationship between actual obesity and depressive symptoms.

6: Body dissatisfaction, perceived discrimination, and dieting will significantly mediate the relationship between actual obesity and depressive symptoms.

7a: Self-esteem will significantly moderate the relationship between perceived obesity and depressive symptoms.

7b: Conscientiousness will significantly moderate the relationship between perceived obesity and depressive symptoms.

7c: Agreeableness will significantly moderate the relationship between perceived obesity and depressive symptoms.

7d: Cultural identity will significantly moderate the relationship between perceived obesity and depressive symptoms.

8: Body dissatisfaction, perceived discrimination, and dieting will significantly mediate the relationship between actual obesity and depressive symptoms.

Figure 1 below is a representation of the relationships hypothesized to exist between the variables under study. Actual and Perceived obesity are the hypothesized predictors of depressive symptoms. Sex, SES and chronic illness are variables whose effects on the obesity/depression relationship are being controlled. Also, the relationship between actual as well as perceived obesity and depressive symptoms is hypothesized to occur through body dissatisfaction, perceived discrimination and dieting. Some personality dimensions, self-esteem, and cultural identity are also hypothesized to affect the strength of the relationship between both actual/perceived obesity and depressive symptoms.

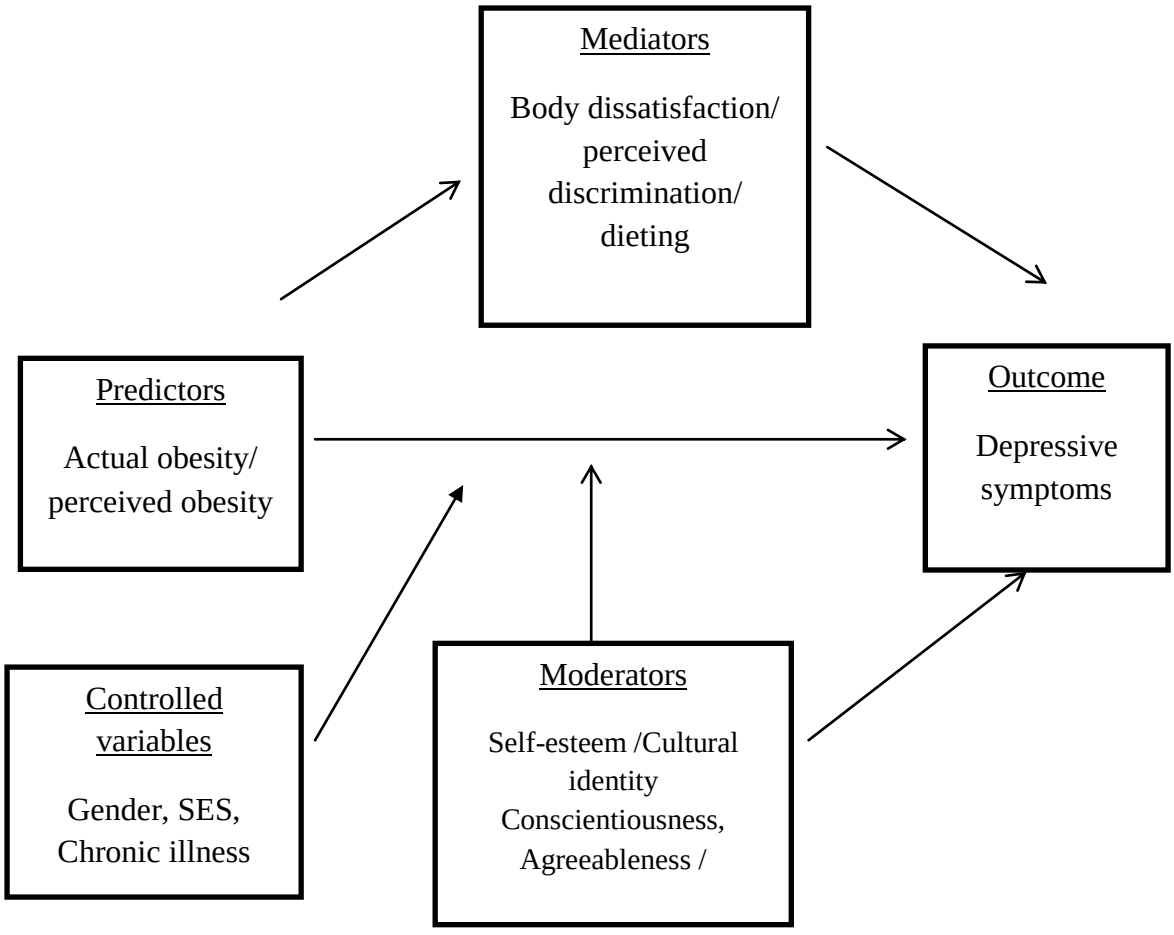

Figure 1: Model of Hypothesized Relationships

Operational Definitions of Terms

Depressive symptoms: Continuous scores on the depression measurement tool (Centre of Epidemiological Studies Depression Scale, CES-D)

Self-Esteem: Individuals' own perceptions of self-worth as measured by continuous scores on the State Self-Esteem Scale.

Personality: Unique individual characteristics as measured by the Big Five Inventory

Perceived Discrimination: Frequency of weight discriminations perceived by participants as measured by the Everyday Discrimination Scale

Cultural Identity: Individual affiliation to their cultural/or ethnic group as measured by the Multi Group Ethnic Identity Measure

Dieting: History of dietary restraint as reported by the participant

Perceived obesity: Participants own perception of being obese

Actual obesity: Obesity as measured by the Body Mass Index. The operational definitions for categories are:

Adults (WHO, 2015)

Underweight = <18.50 kg/m^2

Normal weight = 18.50 kg/m^2 - 24.99 kg/m^2

Overweight= 25.00 kg/m^2- 29.99 kg/m^2

Obese= ≥30.00 kg/m^2

Severely/Morbidly obese= ≥ 40.00 kg/m^2

Adolescents' cutoffs (WHO, 2009)

Underweight / thinness = <-2 SD

Normal weight = $-2 \leq z \leq 1$

Overweight= > +1SD

Obese= > + 2SD

Severely obese= > +3SD

Chapter Three

Methodology

This chapter gives information on the methods employed in this study. The chapter will detail information on the population used, the research design employed, the sample and sampling technique used as well as the procedure employed in order to attain the aim and objectives of the study.

Population

The target population for the research project comprised senior high school and university students in the Greater Accra Region of Ghana. A student population was considered appropriate, firstly, because of the negativity recorded to be demonstrated to individuals because of weight beliefs and concerns in a school setting (Margulies, Floyd, & Hojnoski, 2008; Zeller et al., 2008). Secondly, a student population was deemed appropriate because of the age range selected for the study, that is, individuals who are either young adults or in their adolescent years. Furthermore, in Ghana, the young and educated populations are those most influenced by foreign conceptions of beauty which makes them a population of interest.

The Greater Accra region was also deemed appropriate because Accra is made up of people of diverse ethnicities and orientations. The researcher believed this will help bring variability to the study thus contributing to the generalizability of the study results. Moreover, research has shown the Greater Accra region to have the highest prevalence of obesity in Ghana (Biritwum, Gyapong, & Mensah, 2005). It was therefore expected to reduce problems with sampling.

Sampling Technique

The study involved a convenient sample of adolescents and young adults. For the adolescent sample, there was first a convenience sample of three schools. That is, schools that agreed to

participate were included in the study. After the initial convenience sample of schools, individuals who agreed to participate in the study (through assent and parental consent procedures) were included. For the young adult sample, participants were a convenient sample of students from three residential halls in the University of Ghana. Individuals who agreed to participate in the study by signing a consent form were included.

Sample Size Determination

Effect sizes of the various variable relationships (for example between obesity and depression or between self-esteem and depression) have been recorded in the literature and there have been wide differences across studies. Also, some studies while reporting overall odd ratios that translate into low Cohen's *d* effect sizes report larger effects for subgroups. Miller and Downey (1999), for instance reported a high degree of variability when relationships between self-esteem and obesity were stratified by other variables. For instance, for self-perceived weight, a high effect size of $d = -.72$ was observed as opposed to a low effect size of $d = .24$ for actual weight.

Because of such variability, it was appropriate to estimate an overall moderate effect size when all the variables were considered together. This was important in order to prevent over or under estimations.

According to Field (2009), to perform multiple regressions- as was done in this study- a sample of 200 participants is adequate to achieve a medium effect size for a study of up to twenty (20) predictors. The sample size of 200 participants was therefore deemed appropriate.

Sample

A total of two hundred (200) participants from a healthy population were selected for the study. One hundred of the participants were selected from three senior high schools in the Greater Accra Region who agreed to participate in the study. These schools were the Accra Senior High School (situated at Accra Central), The Preset Pacesetters Senior High School (situated at Madina), and the Presbyterian Boys Senior High School (situated at Legon). These schools were selected because they are well situated in the urban parts of Accra which was comparable to the university population. The other one hundred participants were selected from the University of Ghana also situated at Legon. The sample had equal representations of males and females. The mean age for the entire sample was 18.5 years with a minimum age of 14 years and a maximum age of 26 years. When stratified by educational level, the mean age for the sample from the senior high schools was 15.95 with a minimum age of 14 and a maximum age of 17. For the university students sample, the recorded mean age was 21.1 years with a minimum age of 18 years and a maximum age of 26 years. Of the total sample, only 3% (6 individuals) reported dealing with a chronic physical illness.

Out of the two hundred (200) participants in the study, only 117 reported their ethnic group. The high number of missing data might be due to the fact that the research question did not give the option of mixed ethnicities thus resulting in only one (1) participant reporting a mixed ethnicity. As much as seventeen (17) ethnic groups were represented. Majority of the participants were Akan. This was predictable as the Akans are the largest ethnic group in the Greater Accra Region (Government of Ghana, 2015). The Ga-Dagme are the second largest group followed by the Ewe (Government of Ghana, 2015). However, in this sample, the Ewe ethnic group had a higher representation than the Ga-Dagme. Also, majority of the other ethnicities were represented by only two (2) participants or less. It should also be noted that the Akans are not entirely homogeneous as there are sub-enthnic groupings separated

traditionally even by geographic location. In this study, only seventeen out of the fifty nine Akans reported which particular sub-ethnic grouping they belonged to. The complete breakdown of the ethnic groupings are presented below in Table 1.

Table 1

Ethnic Group Representation in the Study

Ethnic Group	**Number of participants**	**Ethnic Group**	**Number of participants**
1. Akan	42	10. Grushi	1
Akan (Asante)	5		
Akan (Fante)	6		
Akan (Akuapen)	4		
Akan (Akyim)	2		
2. Ewe	21	11. Kusasi	1
3. Ga	13	12. Bimoba	1
4. Ga-Dangme	5	13. Guan	1
5. Dangme	2	14. Kotokoli	1
6. Nzema	2	15. Dandawa	1
7. Frafra	2	16. Chamba	1
8. Krobo	2	17. Adaa	1
9. Bribri (Hausa)	2	18. Akan and Ga	1

The table above shows that majority of the other ethnic groups were underrepresented precluding the possibility of any analysis on the basis of ethnic grouping. The insufficient

represeantation of various ethnic group members have generally been the trend in obesity studies often resulting in pooled analysis (Gavin et al., 2010).

In terms of actual weight/ BMI, the sample was divided into categories based on the WHO criteria for adults and the WHO reference data for adolescents. Out of the 200 participants used in the study 30 participants, representing 15% met the criteria for obesity while 41 participants, representing 20.5% met the criteria for overweight. The majority of participants (117, representing 58.5%) met the criteria for normal weight while 12 participants (6%) met the criteria to be considered as underweight.

However, in this study, 22 % (44) of participants perceived themselves as underweight, 59% (118) perceived themselves as of normal weight, 16% (32) considered themselves overweight, and 3% (6) considered themselves as obese. Therefore, only 54% (108 participants) correctly perceived their weight group.

Again, in the present sample, 51% (118) of participants reported body dissatisfaction. Out of the 200 participants, 31% (62 individuals) had tried to lose weight before and 13% of participants had also tried to gain weight before. Of those who had tried to lose weight, 93.5% (58 participants) reported the use of dietary restraint as a method of losing weight.

Inclusion and Exclusion Criteria

To be included in the adolescent sample, individuals had to be students of a Senior high school in Accra. Participants also had to be below the age of 18.

To be included in the young adult sample, individuals had to be tertiary student residing in Accra at the time of the study. Also, participants had to be below the age of 30.

Participants were to be excluded from the study if they reported a history of depressive illness because it would be impossible to determine if the present depressive symptoms expressed were due to the depressive disorder.

Measures

This section provides details on the data collection instruments used in the present study

The body mass index (BMI). The BMI, as explained earlier, is a measure of an individual's weight in kilograms over the height in meter squared. In children and adolescents, cut-off points are dependent on the use of reference data that interprets BMI on the basis of age and sex.

Indeed, the utility of various measures of adiposity have been suggested including waist-to-hip ratio, waist circumference as well as neck circumference (Hingorjo, Qureshi, & Mehdi, 2012; WHO, 2011). Various concerns have been raised regarding the relative utility of the BMI in relation to some other measures of adiposity. Research suggests that the BMI seems to be a less potent risk marker of some physical illnesses including overall cardio vascular risk than waist circumference and waist-hip ratio (WHO, 2011).

This is because risk of various diseases is affected not only by the presence of fat but also by body fat distribution. Therefore risk of physical health ailments may be greater or lower at a given BMI based on the location of fat (WHO, 2011). For instance, Asians, Chinese, and Aboriginal populations have been found to have a greater risk for physical ailments at lower BMI levels for which reason discussions have long begun on whether cut-off points should be redefined according to population/ethnic differences (Razak et al., 2007; WHO expert consultation, 2004).

Also, the BMI may lead to inaccurate classifications in research since population/ethnic differences in body build/composition may exist (Andersen et al., 2013; Razak et al., 2007). For instance, research has found that using the WHO BMI cut-offs may overestimate the number of individuals with higher BMI levels among the Inuit in Greenland as the average body structure among this population gives more weight per centimeter independent of body fat (Andersen et al., 2013).

However, in countries such as Ghana where minimal research on the subject have been conducted, the BMI was deemed appropriate because of the availability of international reference data especially with regards to adolescents who are still experiencing substantial physical changes.

A standard digital scale and height measure was used to measure the weight and height of participants. Participants had their weight and height measures taken with their feet bare or in light socks. Participants were weighed in kilograms and had their height taken in centimetres.

For adolescents, the BMI was calculated with the World Health Organization software, Anthroplus (WHO, 2009). Anthroplus is designed for use with children and adolescents and follows the WHO child standards and the WHO 2007 reference (WHO, 2009). This software gives the participants BMI based on age and sex appropriate BMI percentile charts as well as an approximated z-score. For adults, the BMI was calculated and referred to the WHO (2015) recommended cut-off points.

The center for epidemiological studies depression scale (CES-D). The CES-D was originally designed to measure depressive symptoms in an adult population, and was later validated among children and adolescents in order to get a comparative measure for different age populations.

The questionnaire/scale is organized around the major depressive symptomatology (that is, depressed mood, loss of appetite, feelings of guilt and worthlessness, psychomotor retardation, feelings of helplessness and hopelessness, and sleep disturbance). The original items were selected from previously validated scales (Radloff, 1977).

The adult form has been reported to have a high internal consistency of about .85 to .90 depending on the study (Radloff, 1977). Likewise, the child and adolescent form has been reported to show a high coefficient alpha of .84 (.44, Faulstich, Carey, Ruggiero, Enyart, & Gresham, 1986). It has also shown moderate correlation with the Children's Depression Inventory (Faulstich et al., 1986) signifying that the scale has adequate construct validity.

The child and adolescent form is a 20 item scale. It measures depressive symptoms on a four (4) point likert scale ranging from 'not at all' to 'a lot'. Sample items include: "I felt down and unhappy", and "I felt I couldn't pay attention to what I was doing". Possible scores range from 0-60 with higher scores indicating higher levels of depressive symptoms. Developers of the scale used a score of 16 and above as signifying the presence of significant depressive symptoms (Weissman, Orvaschel, & Padian, 1980).

The CES-D is considered suitable because of its high reliability across different populations. It has therefore been used consistently in various studies (for instance Zhong et al., 2010; Vaughan & Halpern, 2010). Also, the researcher finds it useful as the scale is organized around the Diagnostic and Statistical Manual criteria for depression. It is also one of the few good scales that have been validated among college students.

The child form was used in the study because an adolescent sample was included in the study. This was considered appropriate because differences between the original adult form and the child form are solely based on language. The measured domains remain the same. Parts of the child form which read "kids" were modified to read "kids/colleagues".

For the full scale, see appendix A.

The state self-esteem scale (Heatherton & Polivy, 1991). The state self-esteem scale was developed by Heatherton and Polivy in 1991. Unlike other self-esteem scales designed to measure trait self-esteem, this instrument was designed to measure state self-esteem making it more sensitive to situational changes in self-esteem.

The scale was modified from the Janis-Field Feeling of Inadequacy Scale (Janis & Field, 1959). Not unlike the original measure, the resulting measure is also multidimensional containing three correlated factors; the performance self-esteem, the social self-esteem, and the appearance self-esteem.

In their 1991 article on the development of the scale, Heatherton and Polivy present four (4) studies justifying the psychometric value of the scale. They reported a high internal consistency of $\alpha = 0.92$. Also, as part of the demonstration of the scales' construct validity, the scale correlated significantly with a number of other state and trait measures including the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and the State Anxiety subscale of the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1972). Furthermore, the scale correlated positively with global self-esteem (as measured by the Rosenberg self-esteem scale, 1965) meaning that although it was developed to be more sensitive to situational changes, it still measures the same construct.

The scale has twenty (20) items scored on a five-point likert scale ranging from 'not at all' to 'extremely'. The scale contains both positively and negatively phrased items and so some items are reverse scored. Possible scores on the scale range between 20 and 100 and scores can be summed for the various dimensions. High scores reflect high self-esteem. Sample items on the scale include 'I feel confident about my abilities', and 'I feel frustrated or rattled about my performance'.

The scale is preferred first because of the high reported validity and reliability. Also, the multidimensional nature of the scale makes it fit perfectly into the purpose of this study. Again, the scale was originally developed and validated among individuals who were mostly undergraduates from late adolescents to adulthood and it has also been reported to be one of the most commonly used scales among adolescents (Butler & Gasson 2005).

For the full scale, see appendix B.

The big five inventory (BFI, John & Srivastava, 1999). The BFI child version is a 46-item scale developed to measure personality. The scale utilizes short phrases and asks participants to choose options on a 5-point likert scale ranging from 'disagree strongly' to 'agree strongly'. It contains sub-scales for conscientiousness (9 items), agreeableness (9 items), extraversion (8 items), openness (10 items), and neuroticism (8 items), as well as an optional liking subscale (2 items). The child version was modified from an original version published in 1991. Sample items on the scale includes "…… is sometimes rude to others" and "……. does things carefully and completely"

The BFI has been demonstrated to have good reliability and validity. Reliability coefficients for the five factors range from 0.79 to 0.88 with a mean coefficient of 0.83 (John & Srivastava, 1999). Its' validity has also been proven as it has demonstrated good convergent validity with other recognized personality scales such as the NEO Five Factor Inventory. It has been reported to have a standardized validity coefficient of 0.92 from confirmatory factor analysis (John & Srivastava, 1999).

The child version was used in this study to provide a uniform measure for both the adolescent and adult populations. This was possible because the differences between the adult and child version is in relation to wording and not construct measurement. This child version was also preferred because the adult version had certain phrases that may have required greater proficiency in English from the adolescent population. For instance, question 15 reads " Is

ingenious, a deep thinker" for the adult version but reads " is clever, thinks a lot" for the child version. The optional liking subscale was also omitted.

For the full scale, see appendix C.

The everyday discrimination scale (Williams, Yu, Jackson, & Anderson, 1997). The Everyday Discrimination Scale is a nine (9) item self-report measure designed to measure perceived discriminatory practices as a result of person characteristics such as race, weight and other variables. Items ask respondents whether they have experienced certain discriminatory experiences and which of the person characteristics they think is the reason for that experience. The scale generates a summed score (Williams et al., 1997) from a 6-point likert scale ranging from 'Almost Every Day' to 'Never'. The scale has been proven to be one-dimensional (Lewis, Yang, Jacobs, & Fitchett, 2012) and therefore amounts to a single scale score.

The scale was used in the study because it has been reported to have good psychometric properties. The scale has also been found reliable across different settings and populations. For example, the scale was adapted for use in medical settings and produced a correlation coefficient of 0.89 (Peek, Nunez-Smith, Drum, & Lewis, 2011).

Sample items on the scale include "you are treated with less courtesy than other people are" and "people act as if they're better than you". For the present study, the scale was modified to specifically ask participants about perceived weight discrimination.

For the full scale, see appendix D.

The multi-group ethnic identity measure (MEIM, Phinney, 1992). The MEIM was originally developed by Phinney (1992) with the aim of constructing a measure of ethnic identity that can be reliable across diverse samples. The MEIM, since construction, has come

to be known as the most extensively used scale in this domain (Umaña-Taylor, 2003) and has been used among adolescents as young as 14 years (Grills & Longshore, 1996).

The high reliability and validity of the scale makes it useful and appropriate for the study. The scale has been shown to have alphas at or above .80 across studies. The measure has been reported to show a reliability of .81 with high school students and an even higher reliability of .90 among college students (Roberts et al., 1999).

In their 1999 article, Roberts et al. reported reliability values ranging from .81 to .89 across ethnic groups. This attested to the utility of the scale among diverse ethnic groups.

Construct validity of the scale was ascertained when it correlated positively with self-esteem, and coping measures linking cultural identity to good mental health (Roberts et al., 1999). Construct validity was further established through negative correlations with depression and loneliness (Roberts et al., 1999).

The scale has an introductory section which asks individuals to identify their ethnicity as well as 12 questions measured on a 4-point likert scale. Confirmatory factor analysis brought out two factors; the ethnic identity search, and the affirmation, belonging and commitment factors (Roberts et al., 1999). The scale uses 5 items to measure ethnic identity search and 7 items to measure the affirmation, belonging and commitment factor. An average of the scores on either one of the two subscales or the full scale is computed and used as a participant's score.

The introductory portion of the scale that asks people to identify their ethnicity was modified to suit the present study.

For the full scale, see appendix E.

Background information questionnaire. A section of background information was added to the questionnaires. This section appeared last on the questionnaire in order not to influence participants' answers. This background section required participants to give information on their sex, date of birth and age, presence of chronic physical illness, SES, as well as information about their self-perceived weight, ideal weight perceptions and attempts at weight change.

SES under this section was evaluated using the 2001/2002 modified version of the Family Affluence Scale (Currie, Elton, Todd & Platt, 1997; Currie et al., 2008) as well as other traditional indicators of SES. The 2001/2002 version of the Family Affluence Scale uses car ownership, occupancy in a bedroom, number of family holidays and computer ownership as indicators of family affluence (Currie et al., 2008). The validity of the Family Affluence Scale lies in the fact that it has been compared to other traditional indicators of SES and shown similar patterns of associations with majority of health measures (Currie et al., 1997). The Family Affluence Scale was particularly suitable for this study as the researcher anticipated missing values for some of the traditional measures of SES especially for the adolescent sample.

The other indicators of SES used in this study included parental educational level, parental employment, estimated average monthly income of household, as well as ownership of a savings account. An additive score on the scale was computed with high scores reflecting high SES.

Self-perceived weight was measured in this section with the question "Which body shape do you think you have?" Possible responses to the question were 'too thin', 'relatively thin', 'all right', 'relatively heavy', and 'too heavy' (Tang et al., 2010). The option "too thin" and "relatively thin"- reflecting severe thinness and thinness- were coded as perceived

underweight. The third option "all right" was coded as perceived normal weight. "Relatively heavy" was coded as perceived overweight and "too heavy" was coded as perceived obesity (Tang et al., 2010).

Ideal weight preference was measured in this section with the question "which body shape would you prefer to have?" Possible responses to the question were 'much thinner', 'relatively thinner', 'same as now', 'relatively heavier', and 'much heavier'.

A categorical score on body dissatisfaction was derived by comparing differences on the answering patterns for the perceived and ideal weight questions. Participants who chose the option "same as now" for ideal weight preference were coded as being satisfied with their body shape while those who chose any of the other options – 'much thinner', 'relatively thinner', 'relatively heavier', 'and much heavier'- were coded as experiencing body dissatisfaction.

Also, questions on attempts at weight change were included in this section. This included a question to measure dieting, that is, whether a participant had ever made an attempt to lose weight through dietary restraint.

For the full scale, see appendix F.

Research Design

The study took the form of a cross-sectional survey. The study utilized a cross section of the population and assessed them on the variables under study using self-report measures. Participants also had their weight and height measures taken. Also, data was collected from participants at only one point in time.

It is also worthy to note that the present study was considered exploratory in nature. This study sought to gain exploratory knowledge on the variables under study and their interrelationships.

Procedure

Ethical Approval was sought and obtained from the Institutional Review Board of the Institute of Statistical, Social, and Economic Research at the University of Ghana, Legon. Institutional access was then sought from the Selected Senior High Schools. After approval had been given to conduct the study, the researcher first conducted a pilot study with 20 individuals made up of 10 adolescents and 10 young adults selected from a school population. The sample for the pilot study all agreed to participate by signing either an assent and parental consent form or an adult consent form. The aim of the pilot study was to find out the applicability and reliability of the questionnaires to be used in the study. It was also to find out an approximate time needed for each participant to fill the questionnaire.

The pilot study. For the pilot study, participants who agreed to participate were approached twice. Participants completed all the questionnaires the first time and after 5 weeks. Test-retest reliability coefficients were then computed from the two scores as well as Cronbach's alphas. The test-retest coefficients and the Cronbach's alphas obtained from the pilot study are presented in Table 2.

Table 2

Test-retest Coefficients and Cronbach's Alphas Obtained for the Measures in the Pilot Study

Measure	Cronbach's Alpha	Test-retest coefficient
Centre for Epidemiological Studies Depression Scale	.89	.71
State Self-Esteem Scale	.87	.80
Performance self-esteem	.87	.62
Social self-esteem	.67	.51
Appearance self-esteem	.77	.72
The Big Five Inventory		
Extraversion	.61	.58
Agreeableness	.66	.67
Conscientiousness	.78	.76
Neuroticism	.57	.51
Openness	.80	.77
The Multi-group Ethnic Identity Measure	.87	.85
Ethnic Identity Search	.60	.76
Affirmation, Belongingness, and Commitment	.91	.89
Everyday Discrimination Scale	.81	.73
Socio-economic Index	.76	.82

Majority of the items on the measures were contributing well to the observed reliabilities with the exception of a few items on the BFI. These items were item number 6, 8, 27, 33, 34, and 35. These items were modified to include phrases in parenthesis aimed at further explaining the main words in the items. For instance, item 6 on the questionnaire was modified to read; "_____Reserved; keeps thoughts and feelings to self (slow to show others how you feel or what you think). Through the pilot study, it was determined that it took each participant between 25 and 40 minutes on the average to fill and complete the questionnaires.

For the full scale of this modified version, see Appendix G.

The main study. The main study was then conducted with the appropriate versions of the scales described above. For the adolescent population, the researcher explained the assent and consent forms to potential participants detailing the aims and objectives of the study as well as the possible benefits and discomforts from the study. The assent and consent forms were then given to the potential participants. Those who returned both forms signed were included in the study. Participants then sat and filled the questionnaires after which they had their weight and height measurements taken. The researcher was around to further explain the questionnaires to the participants. Both the filling of the questionnaires and the weight and height measurements were done as privately as possible such that confidentiality could be maintained. Participants were weighed in kilograms and had their height taken in centimetres. There was one research assistant who aided the researcher to write down the obtained figures. Response rate was low for the adolescent sample. Out of the 221 parental and child assent forms distributed, approximately 117 forms representing 52.9% were returned.

For the young adult sample, three (3) residential halls were taken as the sampling frame. Participants were approached and the aim and objectives of the study as well as the possible benefits and discomforts were explained to them. Thereafter, consent forms were given out. Individuals who signed the consent forms were included in the study. As with the adolescent sample, participants sat and answered the questionnaires with the researcher around to give any further explanation of the measures when necessary. Weight and height measures were also taken with the greatest care to ensure confidentiality. Response rate for the young adult sample was high. Only about 7 out of the 112 individuals approached refused to participate. The response rate was therefore 93.75%.

For the Ethics Approval Letter see appendix H

For the Assent Form see appendix I

For the Parental Consent Form see appendix J

For the Adult Consent Form see appendix K

Chapter Four

Results

This chapter presents the results of analysis of data obtained at the end of the study. The data collected was analysed using the Statistical Package for Social Sciences (SPSS version 16.0). The chapter will provide information on some observed descriptive statistics as well as the results of hypotheses testing.

Descriptive Statistics

Summary of results of means, standard deviations, internal consistency of measures and skewness and kurtosis values are presented in Table 3.

Table 3

Summaries of Means, Standard Deviations, Internal Consistencies and Normality Values of Measures

Measure	Mean	Standard Deviation	Skewness	Kurtosis	Cronbach's Alpha
Centre for Epidemiological Studies Depression Scale (20 items	19.23	10.48	5.55	2.94	.86
State Self-Esteem Scale (20 items)	75.34	13.23	-3.96	1.37	.87
Performance Self-Esteem (7 items)	26.43	5.21	-3.74	0.94	.75
Social Self-Esteem (7 items)	26.34	5.92	-4.12	-0.02	.78
Appearance Self-Esteem (6 items)	22.58	4.83	-3.91	0.62	.75
Big Five Inventory					
Extraversion (8 items)	3.23	0.63	1.40	-0.11	.61
Agreeableness (9 items)	3.94	0.61	-5.07	2.13	.69
Conscientiousness (9 items)	3.72	0.65	-1.68	-0.00	.72
Neuroticism (8 items)	2.72	0.65	-0.21	-0.61	.60
Openness (10 items	4.00	0.52	-2.83	2.46	.65
Openness (9 items)	4.07	0.56	-4.35	4.40	.71
Multi-Group Ethnic Identity Measure (12 items)	2.68	0.52	-0.62	-0.00	.82
Ethnic Identity Search (5 items)	2.36	0.61	0.1	-0.00	.65
Affirmation, Belonging, and Commitment (7 items)	2.91	0.56	-1.38	-0.07	.77
Everyday Discrimination Scale (9 items)	21.10	9.33	3.95	-0.34	.81
Socio-Economic Index (10 items)	11.27	3.41	-2.05	-.031	.67
Socio-Economic Index (8 items)	10.5	3.18	-2.51	-2.35	.74

It can be observed from the table that the dependent variable- depressive symptoms- measured by the CES-D had a mean score of 19.23 and a standard deviation of 10.48 with a

positively skewed distribution. The scale also showed a high reliability of .86. The positive skewness means that there are more people scoring low on the construct than there are people scoring high on the construct. This is to be expected as significant depressive symptoms are considerably uncommon in non-clinical samples such as the one in the present study. Indeed, a score of 16 and above out of a possible score of sixty (60) is suggested by the developers of the scale to be used as indicative of significant depressive symptoms (Weissman, et al., 1980). The measure is therefore expected to give more low scores than high scores in normal populations.

The mean score of the sample on the state self-esteem scale was 75.34 with a standard deviation of 13.23. The scale also showed a high internal consistency of .87. All the subscales showed adequate reliabilities with an alpha coefficient of .75 for the performance and appearance self-esteem sub-scales and .78 for the social self-esteem subscale. The measure showed a negatively skewed distribution meaning that there were more people scoring high on the construct than there were people scoring low. The positive skewness observed on the dependent variable can also be used to explain the negative skewness observed for the self-esteem construct. The inter-relationships between the dependent variable and self-esteem suggest that where one is low, the other is usually high.

The BFI showed alpha's that ranged between .60 for the neuroticism factor and .72 for the conscientiousness factor. The mean scores ranged from 3.23 for extraversion to 4.00 for openness with standard deviations between 0.52 for openness and 0.65 for conscientiousness and neuroticism.

The original 10 item version of the openness factor had a Cronbach's alpha of .65. Item number 35 on the BFI asks participants to rate if they consider themselves as someone who "Likes work that is same every time". This item was found not to correlate well with the

other items on the openness factor. Removal of the item improved the scale's reliability to .71. The item was therefore excluded from all analysis. The Openness scale as used in this study therefore contains 9 items instead of the 10 items on the original measure.

A high reliability value of .82 was observed for the MEIM. The sub-scales also showed good internal consistency with a Cronbach's alpha of .65 for the ethnic identity search sub-scale and .77 for the affirmation, belongingness and commitment sub-scale.

The everyday discrimination scale also had a good reliability of .81 with a mean of 21.1 and a standard deviation of 9.33.

The 10-item socio-economic index had a Cronbach's alpha of .67. However, item number 10 which asks participants to report monthly income or estimate average monthly income for household had a lot of missing values especially among the adolescent sample. Also, item number five on the socio-economic index which asks participants to report the number of times they had been on holiday with their family was also not contributing well to the internal consistency of the scale. When items 10 and 5 were omitted from the scale, the reliability improved to .74. The two items were therefore excluded from the analysis.

The summary of means and standard deviation of scores on the variables by actual weight group are presented in Table 4.

Table 4

Summary of Means and Standard Deviations of Scores by Actual Weight Groups

Variable	Underweight		Normal weight		Overweight		Obese	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Depressive symptoms	16.42	9.79	18.55	9.45	19.80	9.74	22.33	14.62
Self-Esteem	75.42	14.39	76.29	13.06	73.05	11.69	74.73	15.49
Performance Self-Esteem	26.92	6.46	26.32	5.05	26.32	4.83	26.77	5.97
Social Self-Esteem	26.50	5.98	26.74	6.24	25.12	4.99	26.33	5.84
Appearance Self-Esteem	22.00	4.88	23.22	4.43	21.61	5.19	22.58	4.83
Personality								
Extraversion	3.26	.57	3.20	.62	3.25	.64	3.40	.69
Agreeableness	3.98	.65	3.96	.62	3.95	.53	3.86	.66
Conscientiousness	3.71	.65	3.73	.63	3.79	.60	3.56	.76
Neuroticism	2.56	.63	2.66	.66	2.83	.59	2.84	.70
Openness	3.39	.46	4.03	.58	4.09	.53	4.28	.54
Cultural Identity	2.79	.36	2.67	.54	2.76	.49	2.54	.53
Ethnic Identity Search	2.40	.51	2.37	.60	2.46	.61	2.16	.69
Affirmation, Belonging, and Commitment	3.07	.37	2.89	.60	2.97	.54	2.81	.53
Perceived Weight Discrimination	20.00	10.88	21.04	9.71	21.10	7.57	21.10	9.75
Socio-Economic Status	10.50	3.73	10.35	3.13	10.05	2.91	11.70	3.39

From Table 4, compared to the other groups, the obese group had the highest mean score on depressive symptoms (M = 22.33, SD =14.62). However, the overweight group had the highest mean score for self-esteem (M = 73.05, SD =11.69).

On the personality factors, the obese group had the highest mean score on the extraversion (M = 3.40, SD =.69) and the openness (M = 4.28, SD =.54) factors.

The obese group also obtained the lowest mean score on cultural identity (M = 2.16, SD = .69).

Also, both the overweight and the obese group had the highest mean scores on perceived discrimination (M = 21.10, SD =7.57; M = 21.10, SD = 9.75).

The summary of results of means and standard deviation of scores on the measures by perceived weight group are presented in Table 5.

Table 5

Summary of Means and Standard Deviations of Scores by Perceived Weight Groups

Variable	Perceived Underweight		Perceived Normal weight		Perceived Overweight		Perceived Obesity	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Depressive symptoms	18.86	10.91	18.17	9.61	21.22	10.14	32.67	16.68
Self-Esteem	76.25	12.69	77.42	12.34	69.81	11.87	57.17	20.92
Performance Self-Esteem	26.59	5.13	26.69	5.01	26.19	4.81	21.33	9.42
Social Self-Esteem	27.89	5.52	26.68	5.91	24.22	5.04	19.50	6.95
Appearance Self-Esteem	21.77	4.52	24.06	3.95	19.41	8.55	16.33	5.16
Personality								
Extraversion	3.10	.56	3.32	.65	3.25	.64	2.81	.61
Agreeableness	3.81	.62	4.05	.59	3.85	.50	3.31	.76
Conscientiousness	3.77	.62	3.77	.62	3.52	.72	3.35	.76
Neuroticism	2.72	.63	2.58	.64	3.08	.51	3.51	.55
Openness	3.94	.69	4.09	.52	4.18	.50	4.04	.60
Cultural Identity	2.58	.52	2.73	.51	2.67	.53	2.56	.66
Ethnic Identity Search	2.25	.57	2.29	.66	2.43	.98	2.36	.61
Affirmation, Belonging, and Commitment	2.80	.61	2.95	.56	2.93	.52	2.64	.59
Perceived Discrimination	22.16	9.58	20.44	9.53	21.03	6.88	26.50	14.22
Socio-Economic Status	9.80	3.32	10.78	3.10	10.69	3.15	9.17	3.84

In relation to perceived weight groups, perceived obesity was associated with the highest mean score on depressive symptoms (M = 32.67, SD = 16.68). The perceived obesity group also had the lowest mean score for self-esteem (M = 57.17, SD = 20.92).

Also, in relation to the personality domains, the perceived obesity group obtained the lowest mean score on extraversion (M = 2.81, SD =.61), agreeableness (M = 3.31, SD =.76), and conscientiousness (M = 3.35, SD =.79) and had the highest mean score for neuroticism (M = 3.51, SD =.55).

The perceived obesity group also had the highest mean score for perceived discrimination (M = 26.50, SD = 14.22).

Hypotheses Testing

Hypothesis 1: *Actual obesity will significantly predict depressive symptoms while controlling for covariates (age, sex, socio-economic status, chronic illness).*

To test for the significance of this hypothesis, a hierarchical multiple regression analysis was performed. Age and chronic illness did not significantly correlate with depressive symptoms hence they were excluded from the analysis. A summary of the results of the correlation of variables in this study are presented in Table 6. Results of the hierarchical regression analysis for the hypothesis are presented in Table 7.

The summary of results of the correlations of the variables in this study are presented below in Table 6

Table 6: ***Correlation Matrix of variables***

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
WG	-																		
PWG	.56**	-																	
DS	.10	.11	-																
SE	-.07	-.17*	-.54**	-		.													
Pse	.01	-.06	-.53**	.79**	-														
Sse	-.10	-.26**	-.43**	.86**	.52**	-	.												
Ase	-.11	-.13	-.39**	.80**	.48**	.55**	-												
EXT	.08	.04	-.18*	.31**	.32**	.23**	.27**	-											
AGR	-.07	-.02	-.32**	.37**	.29**	.32**	.33**	.27**	-										
CON	-.05	-.14**	-.11	.41**	.41**	.37**	.29**	.18*	.33**	-									
NEU	.12	.18**	.49**	-.55**	-.43**	-.42**	-.51**	-.28**	-.34**	-.16*	-								
OPE	.16*	.09	-.25**	.28**	.37**	.14**	.19**	.35**	.29**	.28**	-.17*	-							
EI	-.06	.03	-.01	.03	.08	-.04	.08	.12	.15*	.21**	.02	.04	-						
PD	.06	.01	.34**	-.37**	-.37**	-.36**	-.23**	-.19**	-.27**	-.16*	.18*	-.05	.05	-					
SES	.09	.07	-.22*	.27**	.21**	.24**	.23**	.19**	.18*	.07	-.24**	.23**	.04	-.14*	-				
Sex	.18*	.14*	-.26**	-.13	-.13	-.06	-.11	.03	-.02	-.03	.31**	-.07	.05	-.03	-.21**	-			
Age	.11	.01	.08	.11	.10	.17*	.02	.09	.07	.19**	-.03	.02	-.14*	-.27**	.17*	-.04	-		
BD	.13	.06	.11	-.28**	-.06	-.24**	-.38**	-.07	-.13	-.12	.12	.04	.06	.18**	-.06	.01	.03	-	
D	.41**	.30**	.22**	-.27**	-.19**	-.22**	-.26**	-.03	-.08	-.03	.19**	.02	.02	.15*	-.04	.25**	-.04	.33**	-
CI	-.14	-.14	.03	-.07	-.08	.07	.04	-.14	-.21**	-.11	.05	-.12	-.09	.10	-.02	.06	-.06	-.01	.11

***=p <.05, **=p <.01**

Key: WG=Actual weight group; PWG=Perceived weight group; DS= Depressive symptoms; SE= Self-Esteem; PSE= Performance self-esteem; SSE= Social self-esteem; ASE= Appearance self-esteem; EXT= Extraversion; AGR= Agreeableness; CON=Conscientiousness; NEU= Neuroticism; OPE= Openness; EI= Ethnic identity; PD= Perceived discrimination; SES; Socio-economic Status; BD= Body dissatisfaction; D= Dieting; CI= Chronic illness

Table 7

Hierarchical Multiple Regression Analysis Of Actual Weight Groups On Depressive Symptoms Accounting For The Effects Of Socio-Economic Status, And Sex.

Variable	*B*	*SEB*	*B*	*t*	*p*
1 Constant	22.133	2.772		7.984	.000
Socio-economic status	-.509	.230	-.154	-2.214	.028
Sex	4.907	1.458	.235	3.366	.001
2 Constant	22.572	2.826		7.988	.000
Socio-economic status	-.594	.233	-.180	-2.552	.011
Sex	4.522	1.492	.216	3.031	.003
Underweight	-.669	3.059	-.015	-.219	.827
Overweight	.337	1.827	.013	.184	.854
Obese	4.152	2.077	.142	1.998	.047

R^2=.115, Adjusted R^2 = .093

From the analysis, both SES (β= -.180, t= -2.552, p = .011) and sex (β=.216t= 3.031, p = .003) were significant covariates that predicted depressive symptoms. Of the weight groups, a change to obesity was the only significant predictor of depressive symptoms (β= .142, t=1.998, p = .047) and it predicted about 14% of the variance in depressive symptoms. The hypothesis stated above was therefore supported.

Hypothesis 2: *Perceived obesity will significantly predict depressive symptoms while controlling for covariates (age, sex, socio-economic status, chronic illness).*

Hierarchical multiple regression analysis was used to test the hypothesis. From Table 6 (correlation matrix), age and chronic illness did not correlate with depressive symptoms

hence the two variables were excluded from the analysis. Results of the Hierarchical multiple regression analysis is presented in Table 8.

Table 8

Hierarchical Multiple Regression Analysis of Perceived Weight Groups on Depressive Symptoms Accounting for the Effects of Socio-Economic Status, and Sex

Variable	*B*	*SEB*	*B*	*t*	*P*
1 Constant	22.133	2.772		7.984	.000
Socio-economic status	-.509	.230	-.154	-2.214	.028
Sex	4.907	1.458	.235	3.366	.001
2 Constant	20.966	2.875		7.293	.000
Socio-economic status	-.468	.229	-.142	-2.046	.042
Sex	4.567	1.449	.218	3.151	.002
Perceived Underweight	-.610	1.758	.024	.347	.729
Perceived Overweight	2.397	1.967	.084	1.218	.225
Perceived Obesity	12.943	4.131	.211	3.3133	.002

R^2=.143, Adjusted R^2 = .121

From Table 8, Perceived Obesity significantly predicted depressive symptoms (β= .211, t=3.3133, p = .002). Further, perceived obesity accounted for 21 % of the variance in depressive symptoms. The hypothesis which states that perceived obesity will significantly predict depressive symptoms was therefore supported.

Hypothesis 3: *Perceived obesity will significantly account for more variance in depressive symptoms than actual obesity*

To test this hypothesis, hierarchical multiple regression analysis controlling for the effects of sex and SES was conducted. The results are presented in Table 9.

Table 9

Hierarchical Multiple Regression Analysis of Perceived and Actual Obesity on Depressive Symptoms Accounting for the Effects of Socio-Economic Status, and Sex

Variable	*B*	*SEB*	*B*	*t*	*p*
1 Constant	22.133	2.772		7.984	.000
Socio-economic status	-.509	.230	-.154	-2.214	.028
Sex	4.907	1.458	.235	3.366	.001
2 Constant	21.408	2.727		7.851	.000
Socio-economic status	-.466	.226	-.141	-2.067	.040
Sex	4.723	1.429	.226	3.304	.001
Perceived Obesity	12.384	4.082	.202	3.034	.003
3 Constant	21.692	2.750		7.889	.000
Socio-economic status	-.510	.232	-.155	-2.201	.029
Sex	4.617	1.436	.221	3.215	.002
Perceived Obesity	10.725	4.538	.175	2.363	.019
Actual Obesity	1.846	2.198	.063	.840	.402

R^2=.140, Adjusted R^2 = .122

From Table 9, perceived obesity significantly predicted depressive symptoms (β= .175, t=2.363, p = .019). Actual obesity, however, when included in the model with perceived obesity, was no longer a significant predictor of depressive symptoms (β= .063, t=.840, ρ = .402). In this model, perceived obesity accounted for approximately 17% of the variance in

depressive symptoms. The hypothesis that perceived obesity will significantly account for more variance in depressive symptoms than actual obesity was therefore supported.

Hypothesis 4: *Performance Self-esteem will significantly account for the highest variance in depressive symptoms among the measured domains of self-esteem.*

To test this hypothesis a hierarchical regression analysis was performed with the self-esteem subscales on depressive symptoms. The results are presented in Table 10.

Table 10

Hierarchical Multiple Regression Analysis of Self - Esteem Domains on Depressive Symptoms

Predictor	*B*	*SEB*	*B*	*t*	*p*
1 Constant	47.267	3.275		14.432	.000
Performance self-esteem	-1.060	.122	-.527	-8.720	.000
2 Constant	54.102	3.581		15.107	.000
Performance self-esteem	-.719	.143	-.357	-5.012	.000
Social self-esteem	-.319	.134	-.180	-2.377	.018
Appearance self-esteem	-.330	.159	-.152	-2.075	.039

R^2=.335 Adjusted R^2= .325

From Table 10, all the subscales of self-esteem significantly predicted depressive symptoms (PSE, β= -.357, t= -5.012, p = .000; SSE, β= -.180, t= -2.377, p = .018; ASE, β= -.152, t= -2.075, p = .039). Table 10 also shows that performance self-esteem certainly accounted for the highest variance (36 %) in depressive symptoms (β= -.357, p = .000). Social self-esteem accounted for only 18% of the variance while appearance self-esteem accounted for the

smallest variance of 15%. The hypothesis which stated that performance self-esteem will account for the most variance when compared to the other domains of self-esteem was therefore supported.

Hypothesis 5a: *Self-esteem will significantly moderate the relationship between actual obesity and depressive symptoms*

To test the hypothesis stated above, hierarchical multiple regression analysis controlling for the effects of SES and sex was conducted. Results are presented in Table 11.

Table 11

Hierarchical Multiple Regression Analysis on the Moderating Effect of Self-esteem on the Relationship Between Actual Obesity and Depressive Symptoms

Predictors	*B*	*SEB*	*B*	*t*	*p*
1 Constant	22.133	2.772		7.984	.000
Socio-economic Status	-.509	.230	-.154	-2.214	.028
Sex	4.907	1.458	.235	3.366	.001
2 Constant	22.548	2.757		8.177	.000
Socio-economic Status	-.593	.232	-.180	-2.561	.011
Sex	4.616	1.453	.221	3.177	.002
Obesity	4.109	2.002	.140	2.052	.041
3 Constant	49.748	3.795		13.108	.000
Socio-economic status	-.111	.202	-.034	-.550	.583
Sex	4.125	1.223	.197	3.372	.001
Obesity	3.165	1.687	.108	1.875	.062
Self-esteem	-.423	.047	-.534	-9.055	.000
4 Constant	48.413	3.820		12.675	.000
Socio-economic status	-.064	.202	-.019	-.318	.751
Sex	4.390	1.220	.210	3.598	.000
Obesity	2.969	1.676	.101	1.771	.078
Self-esteem	-.414	.047	-.522	-8.880	.000
Obesity*Self-esteem	-1.093	.531	-.117	-2.057	.041

R^2=.392, Adjusted R^2=.375

The results presented in Table 11 show that self-esteem significantly predicted depressive symptoms (β= -.522, t= -2.057, p = .000). However, actual obesity lost significance as a predictor of depressive symptoms with the inclusion of self-esteem (β= .101, t= 1.771, p = .078). The interaction term between actual obesity and self-esteem was negative and significant (β= -.117, t= -2.057, p = .041). The negative interaction term means that high self-esteem reduces the probability of actual obesity leading to depression and vice versa. The

hypothesis that self-esteem will significantly moderate the relationship between actual obesity and depressive symptoms was therefore supported.

Hypothesis 5b: *Conscientiousness will significantly moderate the relationship between actual obesity and depressive symptoms*

To test for the moderating effect of conscientiousness on the relationship between actual obesity and depressive symptoms, hierarchical multiple regression analysis controlling for the effects of SES and sex were conducted. Results are presented in Table 12.

Table 12

Hierarchical Multiple Regression Analysis of the Moderating role of Conscientiousness on the Relationship Between Actual Obesity and Depressive Symptoms

Predictors	*B*	*SEB*	*B*	*t*	*p*
1 Constant	22.133	2.772		7.984	.000
Socio-economic Status	-.509	.230	-.154	-2.214	.028
Sex	4.907	1.458	.235	3.366	.001
2 Constant	22.548	2.757		8.177	.000
Socio-economic Status	-.593	.232	-.180	-2.561	.011
Sex	4.616	1.453	.221	3.177	.002
Obesity	4.109	2.002	.140	2.052	.041
3 Constant	28.066	4.731		5.933	.000
Socio-economic status	-.560	.232	-.170	-2.412	.017
Sex	4.664	1.449	.223	3.218	.002
Obesity	3.766	2.011	.129	1.873	.063
Conscientiousness	-1.571	1.096	-.097	-1.434	.153
4 Constant	28.438	4.769		5.963	.000
Socio-economic status	-.555	.233	-.168	-2.388	.018
Sex	4.615	1.453	.221	3.176	.002
Obesity	3.983	2.039	.136	1.953	.052
Conscientiousness	-1.674	1.108	-.103	-1.512	.132
Obesity*Conscientiousness	.426	.628	.047	.678	.498

R^2=.126, Adjusted R^2=.104

From Table 12, the interaction term between conscientiousness and actual obesity on depressive symptoms was not significant (β= .047, t= .678, p = .498). This means that the hypothesis which stated that conscientiousness will significantly moderate the relationship between actual obesity and depressive symptoms was not supported.

Hypothesis 5c: *Agreeableness will significantly moderate the relationship between actual obesity and depressive symptoms*

Hierarchical multiple regression analysis was conducted to test for the significance of agreeableness as a moderator of the relationship between obesity and depressive symptoms. The model controlled for the effects of SES and sex. The results of the analysis are presented in Table 13.

Table 13

Hierarchical Multiple Regression on the Moderating Effect of Agreeableness on the Relationship Between Actual Obesity and Depressive Symptoms

Predictors	*B*	*SEB*	*β*	*t*	*p*
1 Constant	22.133	2.772		7.984	.000
Socio-economic status	-.509	.230	-.154	-2.214	.028
Sex	4.907	1.458	.235	3.366	.001
2 Constant	22.548	2.757		8.177	.000
Socio-economic status	-.593	.232	-.180	-2.561	.011
Sex	4.616	1.453	.221	3.177	.002
Obesity	4.109	2.002	.140	2.052	.041
3 Constant	38.986	4.867		8.010	.000
Socio-economic status	-.439	.226	-.133	-1.941	.054
Sex	4.879	1.401	.233	3.482	.001
Obesity	3.434	1.936	.117	1.774	.078
Agreeableness	-4.585	1.138	-.265	-4.030	.000
4 Constant	39.026	4.895		7.973	.000
Socio-economic status	-.441	.227	-.134	-1.939	.054
Sex	4.883	1.405	.234	3.475	.001
Obesity	3.456	1.952	.118	1.770	.078
Agreeableness	-4.591	1.142	-.265	-4.020	.000
Obesity*Agreeableness	.066	.643	.007	.103	.918

R^2=.183, Adjusted R^2= .162

From table 13, although agreeableness significantly predicted depressive symptoms (β= -.265, t= -4.020, p = .000) it showed no interaction with obesity (β= .007, t= .103, p = .918).

Thus, the hypothesis which stated that agreeableness will significantly moderate the relationship between actual obesity and depressive symptoms was not supported.

Hypothesis 5d: *Cultural identity will significantly moderate the relationship between actual obesity and depressive symptoms*

To test the hypothesis, hierarchical multiple regression analysis was conducted controlling for the effects of sex and SES. Results are presented in Table 14.

Table 14

Hierarchical Multiple Regression on the Moderating Effect of Cultural Identity on the Relationship Between Actual Obesity and Depressive Symptoms

Predictors	*B*	*SEB*	*β*	*t*	*p*
1 Constant	22.133	2.772		7.984	.000
Socio-economic status	-.509	.230	-.154	-2.214	.028
Sex	4.907	1.458	.235	3.366	.001
2 Constant	22.548	2.757		8.177	.000
Socio-economic status	-.593	.232	-.180	-2.561	.011
Sex	4.616	1.453	.221	3.177	.002
Obesity	4.109	2.002	.140	2.052	.041
3 Constant	20.495	4.471		4.584	.000
Socio-economic status	-.602	.233	-.183	-2.589	.010
Sex	4.571	1.457	.219	3.136	.002
Obesity	4.256	2.021	.145	2.106	.037
Cultural identity	.801	1.373	.040	.584	.560
4 Constant	21.178	4.434		4.776	.000
Socio-economic status	-.645	.231	-.196	-2.793	.006
Sex	4.194	1.451	.201	2.890	.004
Obesity	5.338	2.055	.182	2.597	.010
Cultural identity	.791	1.358	.039	.582	.561
Obesity*Cultural identity	1.601	.701	.157	2.282	.024

R^2= .140, Adjusted R^2=.118

The results presented in Table 14 show that the main effect of cultural identity on depressive symptoms was not significant (β= .039, t= .582, p = .561). However, the interaction term between actual obesity and cultural identity on depressive symptoms was significant and positive (β= .157, t= 2.282, p = .024). The positive interaction term means that high cultural identity increases the strength of association between actual obesity and depressive symptoms. The hypothesis that cultural identity will significantly moderate the relationship between actual obesity and depressive symptoms was therefore supported.

Hypothesis 6: *Body dissatisfaction, perceived discrimination, and dieting will significantly mediate the relationship between actual obesity and depressive symptoms*

From the correlation matrix (Table 6) body dissatisfaction was not significantly related to depressive symptoms thus it was excluded from the analysis. Controlling for sex and SES, actual obesity did not significantly predict perceived discrimination (β=.062, t=.864, p= .388) hence it was also excluded from the analysis. A series of hierarchical multiple regressions were conducted to test the mediating effect of dieting. All the models controlled for the effects of sex and SES. Summary table of all the analysis for dieting as a mediator of the relationship between actual obesity and depressive symptoms is presented in Table 15.

Table 15

Summary Results of Mediation Effect of Dieting on the Relationship Between Actual Obesity and Depressive Symptoms

Variables	R^2	ΔR^2	*B*	*SEB*	β	*t*	ρ
Sex			3.823	1.474	.183	2.594	.010
Socio-economic status			-.494	.225	-.150	-2.193	.029
Dieting on depressive symptoms	.136	.122	1.974	.658	.206	2.997	.003
Sex			.489	.149	.224	3.272	.001
Socio-economic status			-.025	.024	-.072	-1.044	.298
Actual obesity on dieting	.141	.128	.852	.206	.279	4.138	.000
Step 2							
Sex			4.616	1.453	.221	3.177	.002
Socio-economic status			-.593	.232	-.180	-2.561	.011
Actual obesity	.115	.101	4.109	2.002	.140	2.052	.041
Step 3							
Sex			3.773	1.472	.180	2.563	.011
Socio-economic status			-.550	.229	-.167	-2.401	.017
Actual Obesity			2.640	2.060	.090	1.281	.202
Dieting	.143	.125	1.725	.686	.180	2.516	.013

From the analysis, dieting significantly predicted depressive symptoms (β= 206, t=2.997, p= .003) and accounted for 21% of the observed variance. Actual obesity also significantly predicted dieting (β= .279, t=4.138, p= .000) accounting for approximately 28% of the observed variance. When actual obesity alone was put in the model, it significantly accounted for 14% of the observed variance (β= .140, t=2.12, p= .041). In the next model containing both dieting and actual obesity, dieting significantly predicted depressive symptoms (β= .180,

t=2.516, p= .013). Obesity however, was no longer a significant predictor of depressive symptoms (β= .090, t=1.281, p= .202).

The Sobel test was then used to determine the significance of mediation. The observed Z value was statistically significant (Z= 2.43, p<.01). It can therefore be concluded that dieting significantly and fully mediated the relationship between actual obesity and depressive symptoms. The hypothesis which states that body dissatisfaction, perceived discrimination and dieting will significantly mediate the relationship between actual obesity and depressive symptoms was therefore supported in relation to dieting.

Hypothesis 7a: *Self-esteem will significantly moderate the relationship between perceived obesity and depressive symptoms*

To test the hypothesis stated above, hierarchical multiple regression analysis controlling for sex and SES was used. The results of the test are presented in Table 16.

Table 16

Hierarchical Multiple Regression Analysis on the Moderating Effect of Self-Esteem on the Relationship Between Perceived Obesity and Depressive Symptoms

Predictors	*B*	*SEB*	*β*	*T*	*p*
1 Constant	22.133	2.772		7.984	.000
Socio-economic Status	-.509	.230	-.154	-2.214	.028
Sex	4.907	1.458	.235	3.366	.001
2 Constant	21.408	2.727		7.851	.000
Socio-economic Status	-.466	.226	-.141	-2.067	.040
Sex	4.723	1.429	.226	3.304	.001
Perceived Obesity	12.384	4.082	.202	3.034	.003
3 Constant	48.407	3.918		12.355	.000
Socio-economic status	-.040	.199	-.012	-.200	.841
Sex	4.284	1.222	.205	3.504	.001
Perceived Obesity	5.326	3.584	.087	1.486	.139
Self-esteem	-.412	.048	-.520	-8.571	.000
4 Constant	47.383	3.935		12.042	.000
Socio-economic status	-.050	.198	-.015	-.252	.801
Sex	4.449	1.219	.213	3.651	.000
Perceived Obesity	-.407	4.750	-.007	-.086	.932
Self-esteem	-.398	.048	-.503	-8.234	.000
Perceived Obesity*Self-esteem	-.764	.419	-.143	-1.825	.070

R^2=.383, Adjusted R^2=.368

The results presented in Table 16 indicate that the interaction term between perceived obesity and self-esteem on depressive symptoms was not significant (β= -.143, t= -1.825, p= .070). Also, although the main effect of self-esteem in this model is significant and accounts for 50% of the observed variance (β= -.503, t= -8.234, p= .000), the main effect of perceived obesity had been rendered insignificant (β= -.007, t= -086, p= .932). The hypothesis which

states that self-esteem will significantly moderate the relationship between perceived obesity and depressive symptoms was therefore not supported.

Hypothesis 7b: *Conscientiousness will significantly moderate the relationship between perceived obesity and depressive symptoms*

In order to test for the significance of the hypothesis, hierarchical multiple regression analysis of the moderating effect of conscientiousness on the relationship between perceived obesity and depressive symptoms was performed. The model controlled for the effects of sex and SES. The summary of the results are presented in Table 17.

Table 17

Hierarchical Multiple Regression Analysis of the Moderating Role of Conscientiousness on the Relationship Between Perceived Obesity and Depressive Symptoms

Predictors	*B*	*SEB*	*β*	*t*	*p*
1 Constant	22.133	2.772		7.984	.000
Socio-economic Status	-.509	.230	-.154	-2.214	.028
Sex	4.907	1.458	.235	3.366	.001
2 Constant	21.408	2.727		7.851	.000
Socio-economic Status	-.466	.226	-.141	-2.067	.040
Sex	4.723	1.429	.226	3.304	.001
Perceived Obesity	12.384	4.082	.202	3.034	.003
3 Constant	26.808	4.705		5.697	.000
Socio-economic status	-.443	.226	-.134	-1.963	.051
Sex	4.754	1.426	.227	3.333	.001
Perceived Obesity	11.839	4.091	.193	2.894	.004
Conscientiousness	-1.518	1.080	-.094	-1.406	.161
4 Constant	26.663	4.698		5.676	.000
Socio-economic status	-.453	.225	-.138	-2.012	.046
Sex	4.935	1.430	.236	3.451	.001
Perceived Obesity	9.057	4.593	.148	1.972	.050
Conscientiousness	-1.475	1.078	-.091	-1.368	.173
Perceived Obesity*Conscientiousness	-.861	.651	-.099	-1.323	.187

R^2=.153, Adjusted R^2=.153

From Table 17, the interaction term between perceived obesity and conscientiousness on depressive symptoms was not significant (β= -.099, t= -1.323, p= .187). The hypothesis stating that conscientiousness will significantly moderate the relationship between perceived obesity and depressive symptoms was not supported.

Hypothesis 7c: *Agreeableness will significantly moderate the relationship between perceived obesity and depressive symptoms*

Hierarchical multiple regression analysis of the moderating effect of agreeableness on the relationship between perceived obesity and depressive symptoms was performed to ascertain the significance of the hypothesis stated above. The model controlled for the effects of sex and SES. The summary of results are presented in Table 18.

Table 18

Hierarchical Multiple Regression on the Moderating Effect of Agreeableness on the Relationship Between Perceived Obesity and Depressive Symptoms

Predictors	*B*	*SEB*	*β*	*t*	*p*
1 Constant	22.133	2.772		7.984	.000
Socio-economic status	-.509	.230	-.154	-2.214	.028
Sex	4.907	1.458	.235	3.366	.001
2 Constant	21.408	2.727		7.851	.000
Socio-economic status	-.466	.226	-.141	-2.067	.040
Sex	4.723	1.429	.226	3.304	.001
Perceived Obesity	12.384	4.082	.202	3.034	.003
3 Constant	36.938	4.926		7.499	.000
Socio-economic status	-.345	.221	-.105	-1.563	.120
Sex	4.962	1.386	.237	3.580	.000
Perceived Obesity	9.740	4.017	.159	2.425	.016
Agreeableness	-4.270	1.143	-.247	-3.735	.000
4 Constant	36.850	4.942		7.456	.000
Socio-economic status	-.347	.221	-.105	-1.567	.119
Sex	4.976	1.390	.238	3.581	.000
Perceived Obesity	8.407	5.314	.137	1.582	.115
Agreeableness	-4.246	1.148	-.245	-3.699	.000
Perceived Obesity*Agreeableness	-.229	.595	-.033	-.384	.701

R^2=.195, Adjusted R^2= .174

Table 18 indicates that although the main effect of agreeableness on depressive symptoms in the model was significant (β= -.245, t= -3.699, p= .000) the interaction term between agreeableness and perceived obesity on depressive symptoms was not significant (β= -.033, t= -.384, p= .701). The above stated hypothesis was therefore not supported.

Hypothesis 7d: *Cultural identity will significantly moderate the relationship between perceived obesity and depressive symptoms*

Hierarchical multiple regression analysis was conducted in order to test the hypothesis. The model included sex and SES as controlled variables. Summary of results are presented in Table 19.

Table 19

Hierarchical Multiple Regression on the Moderating Effect of Cultural Identity on the Relationship Between Perceived Obesity and Depressive Symptoms

Predictors	*B*	*SEB*	*β*	*t*	*p*
1 Constant	22.133	2.772		7.984	.000
Socio-economic status	-.509	.230	-.154	-2.214	.028
Sex	4.907	1.458	.235	3.366	.001
2 Constant	21.408	2.727		7.851	.000
Socio-economic status	-.466	.226	-.141	-2.067	.040
Sex	4.723	1.429	.226	3.304	.001
Perceived Obesity	12.384	4.082	.202	3.034	.003
3 Constant	19.836	4.428		4.479	.000
Socio-economic status	-.470	.226	-.143	-2.080	.039
Sex	4.695	1.434	.225	3.275	.001
Perceived Obesity	12.460	4.094	.203	3.044	.003
Cultural identity	.608	1.347	.030	.451	.652
4 Constant	20.376	4.422		4.608	.000
Socio-economic status	-.484	.225	-.147	-2.146	.033
Sex	4.500	1.433	.215	3.141	.002
Perceived Obesity	13.786	4.156	.225	3.317	.001
Cultural identity	.495	1.343	.025	.369	.713
Perceived Obesity*Cultural identity	.984	.602	.111	1.636	.104

R= .149, Adjusted R^2=.149

Table 19 shows that the interaction term between cultural identity and depressive symptoms was not significant (β= .111, t= -1.636, p= .104). The hypothesis that cultural identity will moderate the relationship between perceived obesity and depressive symptoms was therefore not supported.

Hypothesis 8: *Body dissatisfaction, perceived discrimination, and dieting will significantly mediate the relationship between perceived obesity and depressive symptoms*

From Table 6 (correlation matrix), body dissatisfaction was not significantly related to depressive symptoms hence it was excluded from the analysis. Controlling for sex and SES, perceived obesity did not significantly predict perceived discrimination (β=.094, t=1.333, p= .184) and it was also excluded from the analysis. Separate analysis was conducted for dieting as a predictor of depressive symptoms, then for perceived obesity as a predictor of dieting. Both perceived obesity and dieting were then regressed on depressive symptoms. All the analyses controlled for the effects of sex and SES. Summary of the series of hierarchical regression analyses for dieting as a mediator of the relationship between perceived obesity and depressive symptoms are presented in Table 20.

Table 20

Summary Results of Mediating Effect of Dieting on the Relationship Between Perceived Obesity and Depressive Symptoms

Variables	R^2	ΔR^2	*B*	*SEB*	β	*t*	*P*
Sex			3.823	1.474	.183	2.594	.010
Socio-economic status			-.494	.225	-.150	-2.193	.029
Dieting on depressive symptoms	.136	.122	1.974	.658	.206	2.997	.003
Sex			.530	.152	.243	3.491	.001
Socio-economic status			-.003	.024	-.008	-.121	.904
Perceived obesity on dieting	.108	.094	1.307	.433	.204	3.018	.003
Step 2			4.723	1.429	.226	3.304	.001
Sex							
Socio-economic status			-.466	.226	-.141	-2.067	.040
Perceived obesity	.137	.123	12.384	4.082	.202	3.034	.003
Step 3							
Sex			3.862	1.455	.185	2.655	.009
Socio-economic status			-.462	.223	-.140	-2.072	.040
Perceived Obesity			10.260	4.124	.167	2.488	.014
Dieting	.162	.145	1.625	.665	.170	2.444	.015

From the analysis, dieting significantly predicted depressive symptoms (β= 206, t=2.997, p= .003). Perceived obesity also significantly predicted dieting (β= .204, t=3.018, p= .003).

When the two variables were put in the model together, dieting significantly predicted depressive symptoms (β= .170, t=2.444, p= .015). Perceived obesity was still a significant

predictor of depressive symptoms (β= .167, t=2.488, p= .014) accounting for 17% of the variance in depressive symptoms.

The Sobel test was then used as a test of the significance of mediation. The observed Z value was statistically significant (Z= 2.13, p<.05). It can therefore be concluded that dieting partially mediated the relationship between perceived obesity and depressive symptoms. The hypothesis which states that body dissatisfaction, perceived discrimination and dieting will significantly mediate the relationship between perceived obesity and depressive symptoms was therefore supported in relation to dieting.

Additional Findings

To find out whether there were age-related differences in the moderation effects of self-esteem and cultural identity on the relationship between actual obesity and depressive symptoms, a stratified analysis of the hypothesis by age-group was performed.

The results showed that the adolescent population drove the association found between self-esteem on depressive symptoms. The interaction between self-esteem and obesity was significant (β= -.177, t= -2.360, p= .020) for the high school sample. The result for the young adult sample was no longer significant (β= -.042, t= -.444, p= .658).

Correspondingly, the moderating effect of cultural identity on the relationship between obesity and depressive symptoms was significant for the adolescent sample (β= .181, t=2.004, p= .048) but not for the young adult sample (β= .132, t= 1.235, p= .220).

Also, a significant interaction between obesity and neuroticism on depressive symptoms was observed for the senior high level (β= .263, t= 3.254, p= .002) in stratified analysis.

For the regression Tables see appendix L

Summary of Findings

1. Actual obesity was predictive of depressive symptoms independent of the effects of sex and socio-economic status.
2. Perceived obesity also significantly predicted depressive symptoms independent of the effects of sex and socio-economic status.
3. When both perceived and actual obesity were included in one model, actual obesity was no longer a significant predictor of depressive symptoms.
4. Among the self-esteem domains measured (that is, performance, social, and appearance) performance self-esteem accounted for the highest variance in depressive symptoms.
5. Dieting fully mediated the relationship between actual obesity and depressive symptoms but only partially mediated the relationship between perceived obesity and depressive symptoms. Body dissatisfaction and perceived discrimination did not significantly mediate the relationship between both actual or perceived obesity and depressive symptoms.
6. Self-esteem and cultural identity significantly moderated the relationship between actual obesity and depressive symptoms. However in age/educational level stratified analysis the observed moderating roles were significant only for the senior high school sample. Neuroticism also moderated the relationship between actual obesity and depressive symptoms in stratified analysis for the senior high school sample.

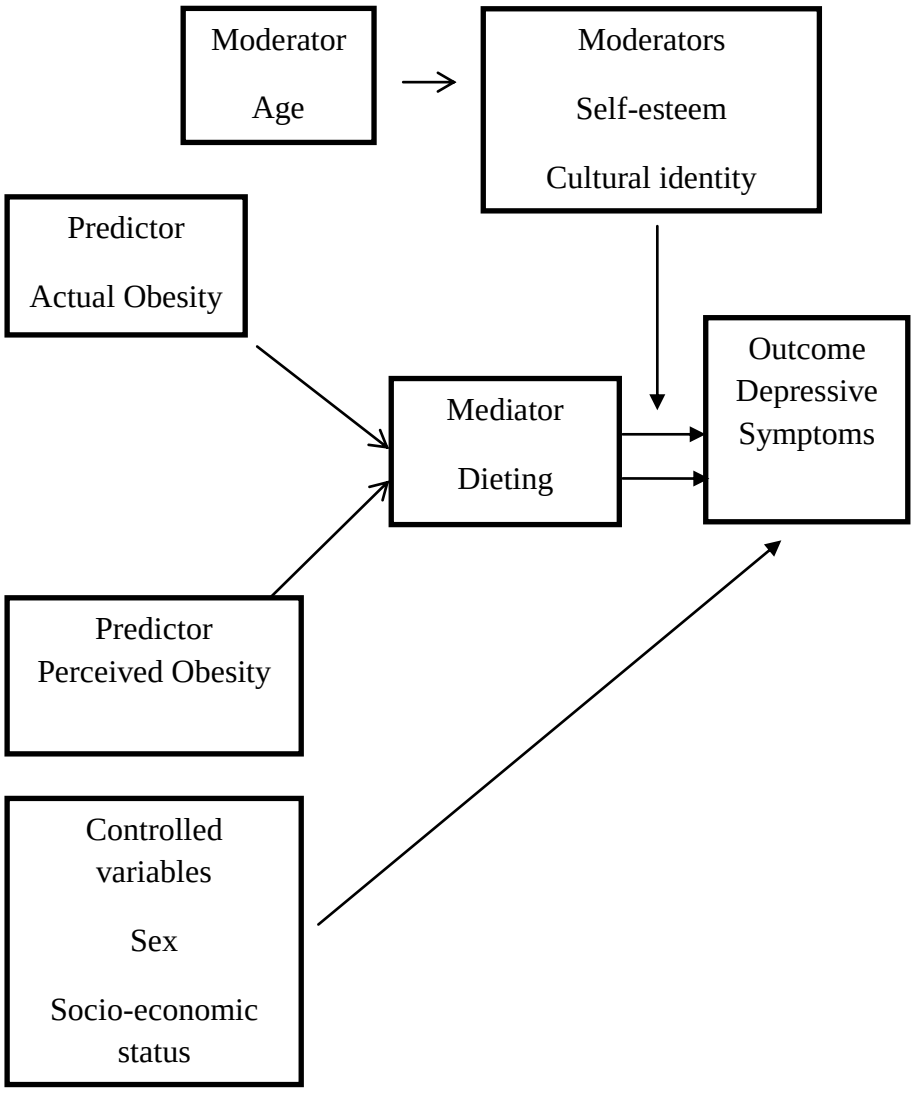

Figure 2: Observed Conceptual Model

Chapter Five

Discussion

The main aim of the study was to examine the relationship between obesity and depressive symptoms among young Ghanaians. The specific objectives were to establish a relationship between both actual and perceived obesity and depressive symptoms. It also examined whether body dissatisfaction, perceived discrimination, and dieting mediated the relationship between obesity and depressive symptoms. Additionally, it was to examine the moderating roles of self-esteem, some personality dimensions, and cultural identity on the relationship between obesity and depressive symptoms.

This chapter presents a discussion of findings, the limitations of the study as well as the recommendations for practice and future studies. This chapter will end with the conclusions from the study.

Discussion of Findings

Actual and perceived obesity as predictors of depressive symptoms. One of the objectives of this study was to establish a relationship between both actual and perceived obesity on depressive symptoms. This objective was fully realized. Hypothesis 1 and 2, testing whether actual and perceived obesity predicted depressive symptoms was significant. Actual obesity accounted for about 14 % of the observed variance while perceived obesity accounted for 21% of the observed variance.

In this study, therefore, although the underweight, normal weight and overweight groups (both actual and perceived) did not predict depressive symptoms, both actual and perceived obesity were found to be predictive of depressive symptoms. Moreover, the observed effect was robust as it was independent of the effects of sex and SES. This has been reported in various other studies (Everson-Rose et al., 2009; Roberts et al., 2000; Zhong et al., 2010).

This is also in contrast to studies (such as Goodman & Must, 2011; Wong et al., 2011) that found no relationship between obesity and depressive symptoms.

This finding is significant in the sense that majority of Ghanaians are unaware of the possible mental health consequences of obesity. This study is therefore the first relating obesity to depressive symptoms among young, urban-based, and educated Ghanaians.

This finding cannot be accounted for through the health concern pathway described by Markowitz et al. (2008). The health concern pathway explains that - as a result of the physical health risks associated with obesity- obese individuals may experience more functional impairment and poor perceived health which can both lead to depression. The sample under study was, however, largely a healthy population. Only 3% of participants reported dealing with a chronic physical illness. Also, chronic illness was not significantly related to depressive symptoms. The appearance concern pathway described by Markowitz et al. (2008) which explains obesity to be related to depressive symptoms through psychological factors offers the best explanation to the relationship in this sample. The appearance concern pathway explains, first of all, that obese individuals may experience body dissatisfaction which may lead to low self-esteem and which in turn may lead to depression. Secondly, obese individuals are also expected to engage in repeated dieting as a result of body dissatisfaction which can also lead to depression. In this study, although the first pathway model was not validated, dieting was found to mediate the relationship between both actual and perceived obesity on depressive symptoms.

The relative importance of perceived obesity as opposed to actual obesity. One other objective of the study was to find out if perceived obesity was a better predictor of depressive symptoms than actual obesity. In the first two hypotheses, when the effect of both actual and perceived obesity were observed individually, perceived obesity predicted more

variance in depressive symptoms than actual obesity, giving the first indication that perceived obesity is related more to depressive symptoms than actual obesity. In the third hypothesis, when both actual and perceived obesity were included in one model as a set of predictors of depressive symptoms, actual obesity completely lost significance as a predictor. Perceived obesity on the other hand significantly predicted depressive symptoms although it accounted for a reduced variance of 17%. This result suggests that actual obesity may be predicting depressive symptoms through the psychological perception of obesity. Undeniably, studies have consistently found the relationship between obesity and depressive symptoms to be stronger when obesity is defined by the individual's own perception of weight status (Tang et al., 2010).

As Tang et al., (2010) put it, weight, in and of itself is not of much relevance to young people. However, the perception of being 'fat' is what counts. As such, the relationship between obesity and depressive symptoms becomes one largely mediated by self-perception/body image. Therefore, mental health is largely affected by how individuals' perceive themselves.

The relationship between obesity and depressive symptoms, the role of dieting. Another aim of the study was to find out if body dissatisfaction, perceived discrimination, and dieting mediated the effects of both actual and perceived obesity on depressive symptoms. The tested hypotheses showed that dieting fully mediated the relationship between actual obesity and depressive symptoms but only partially mediated the relationship between perceived obesity and depressive symptoms. Neither body dissatisfaction nor perceived discrimination was a significant mediator of the relationship between both perceived and actual obesity on depressive symptoms. These results indicate that unlike actual obesity, perceived obesity contributes unique variance to depressive symptoms regardless of whether an individual engages in dietary restraint or not.

To explain this finding, the appearance concern pathway, postulated by Markowitz et al., (2008), is used. This model suggests that as a result of stigmatization, obese individuals are likely to experience body dissatisfaction which will lead to consequent dieting and then to depressive symptoms. In this study, although perceived discrimination was significantly related to depressive symptoms, it did not mediate the relationship between obesity and depressive symptoms. Similarly, although as much as 51% of the sample reported being dissatisfied with their weight, body dissatisfaction did not mediate the relationship between obesity and depressive symptoms. The pathway model was however partly supported by the study as dieting, among the possible mediators, significantly mediated the relationship between obesity and depressive symptoms. It seems that, although perceived discrimination might lead to body dissatisfaction, these conditions alone are not necessary to produce depressive symptoms. Engaging in dietary restraint is actually partly necessary for individuals to move along the pathway from obesity to depression.

Over concern with body image has been proposed to lead to restrictive dieting and unhealthy weight control methods (Croll, 2005) especially in adolescence, a period characterized by greater peer teasing and parental encouragement to control weight. These unhealthy weight control methods are likely to fail so individuals engage in repeated dieting. This in itself will create a feeling of failure which as Markowitz et al. (2008) posit, is 'depressogenic' in nature.

The moderating roles of self-esteem, cultural identity and neuroticism. The study was also aimed at finding some moderators of the obesity/depression relationship. Self-esteem was expected to moderate the obesity depression relationship because a high self-esteem may reduce vulnerability to depression and vice versa. The moderating roles of conscientiousness and agreeableness were also analyzed because research gives some indication that these factors can reduce the risk for depression (Oddone et al., 2011; Thapar et

al., 2012) by increasing the propensity towards positive as opposed to negative emotionality. Cultural identity was also investigated as a moderator because a clear cultural identity has been found to generally improve psychological outcomes. Further, with regards to obesity, cultures more accepting of weight may serve to protect individuals from psychological distress.

In relation to perceived obesity, none of the moderators were significant. This will seem to suggest that once individuals perceive themselves as obese, their psychological well-being is very likely to be affected regardless of the personality characteristics possessed by the individual or of his/her self-esteem as well as regardless of the level of cultural identity.

In terms of actual obesity, however, this study found self-esteem, and cultural identity to moderate the relationship between obesity and depressive symptoms. This finding was however driven by the high school sample as the relationships lost significance in the university sample when results were stratified by educational level. These finding suggest that the moderating factors are applicable to adolescents but not to young adults.

Finding these moderators at the adolescent level is highly important as concern with body image or with meeting appearance standards can become a fixation, especially in adolescence (Weinshenker, 2002).

However, the moderating role of self-esteem as established by this study is not solely in relation to appearance self-esteem. Indeed, hypothesis four showed appearance self-esteem to account for the lowest variance in depressive symptoms while performance self-esteem accounted for the highest variance. This suggests that if obese individuals devalue their appearance self-esteem (as suggested by the theory of the self-protective properties of stigma; Crocker & Major, 1989) and focus on other domains of self-esteem, then obese individuals with a high performance self-esteem are likely to have a reduced risk for depressive

symptoms. This will be in line with research that suggests that in school populations, performance self-esteem is likely to predict differences in mental health outcomes (McClure et al., 2010; Park et al., 2012).

This finding that self-esteem moderates the relationship between obesity and depressive symptoms is new as self-esteem has only been studied as an outcome of obesity or a predictor of depressive symptoms (for instance, McClure et al., 2010; Miller & Downey, 1999). This finding is very significant as body image is said to be more strongly linked to self-esteem than to external evaluations of others (Croll, 2005). Therefore, obese individuals who are able to maintain the other domains of self-esteem might protect themselves from depressive symptoms associated with weight concerns and perceived discrimination.

Also, cultural identity was found to moderate the obesity/depression relationship. However, the moderation term was positive, suggesting that obese individuals with a high cultural identity might function poorer in relation to mental health outcomes. This finding was not expected as the Ghanaian setting is generally encouraging towards weight gain. Also, cultural identity has generally been found to improve mental health outcomes (Thompson & Chambers, 2000; Usborne & Taylor, 2010).

This finding is explained in relation to the fact that the Ghanaian setting presents a unique conflict to the growing adolescent because of the apparent mixed reactions towards weight. Just as one believes in an overweight ideal, at the same time western models of beauty that portray overweight figures as unhealthy are abundant in the media. For a growing adolescent, who might only now be in the process of forming clear values and beliefs, such mixed interpretations might cause inner conflicts that can be overbearing and subsequently lead to depressive symptoms.

In additional findings, the study also found neuroticism to moderate the relationship between actual obesity and depressive symptoms among the adolescent sample. Indeed, numerous studies had already identified neuroticism as a robust predictor of depressive symptoms (Klein et al., 2011; Oddone et al., 2011; Terracciano et al., 2011). This is explained in relation to the big-five model of personality. This model describes individuals high in neuroticism as having a greater tendency to experience distress (McCrae & John, 1992). This suggests that obese individuals who are high in neuroticism are more likely to experience depressive symptoms because of their tendency towards negative emotionality.

It seems that, the reason why protective factors in the obesity/depression relationship have not been given enough attention is in part due to the stigmatization and controllability beliefs that are so imbedded in societies. This study shows that it is not enough to simply outline the risk factors of the obesity/depression relationship; it is also not enough to simply use research to inform on the outcomes of illnesses. Research must go further to inform on the possibilities of change when outcomes are undesirable.

Limitations

It is considered important to outline here some of the limitations of the present study. The cross-sectional nature of the study means that causative inferences cannot be made about the relationships observed. Again, the study was conducted in a young, urban, school-based population. This population is identified as an at risk group because weight-based stigmatization is greater among the young, urban, and educated population, who are essentially the most influenced by media perceptions on weight and the health importance of maintaining a relative normal body shape. Wide variations in the observed relationships might occur in other populations such as in rural populations where the traditional model of

beauty still has fundamental control. The findings of the study can therefore be generalized only to school populations in the urban centers of Ghana.

Also, the body dissatisfaction variable used in this study was inferred from inconsistencies between perceived weight and ideal body shape as reported by the participants. Explicit measures of body dissatisfaction are better at elucidating relationships. This might therefore account for the non-significance of body dissatisfaction as a mediator of the obesity/depressive symptoms relationship. Similarly, the scales used in this study had not been standardized in a Ghanaian population and therefore some of them may not have functioned well.

Recommendations

Among this relatively small sample of young and educated urban Ghanaians, the effects of obesity on mental health are indicated. This finding suggests that it is time for Ghanaians to consider the possible mental health consequences of obesity. More research should be conducted to ensure that a clearer picture of the issues is defined.

Strategies to reduce weight stigmatization should be instituted. During the data collection stage, because of the stigma associated with weight, it was difficult to get individuals to volunteer among the senior high school students. This suggests that, second cycle institutions should be the main focus of these campaigns.

The observed moderators can be further assessed to consider their utility in clinical settings. These variables can be of help in the treatment of depression in adolescence caused by weight concerns.

This study was conducted in order to explore relationships between obesity and depressive symptoms. Future studies should consider using nationally representative samples. This will help in the ability to generalize findings to a larger population and will also help in observing various group differences such as urban versus rural, or between ethnicities. In this study, apart from the problem of underreporting, most of the ethnic groups were also underrepresented making any analysis practically impossible. It will also be interesting to have studies into select sub-populations such as among older adults. Since this research was conducted only in the Greater Accra region of Ghana, it will be interesting to find out how these relationships occur in the other regions that have a lesser prevalence of obesity.

Longitudinal studies should also be conducted in order to examine how these relationships occur within individuals over the long term. Research can, for example, observe fluctuations in depressive symptoms as a consequence of weight instability.

Future studies should also consider standardizing the measures used in the study in the Ghanaian population to ensure that they are culturally sensitive enough. Future research should also consider controlling for the effects of BDD.

Conclusion

This study was conducted with a sample of 200 young adults and adolescents attending either a senior high or tertiary institution in the Greater Accra region of Ghana. The study shows obesity to be predictive of depressive symptoms. A test of mediation also found dieting/dietary restraint to partly account for the observed relationship between obesity and depressive symptoms. Self-esteem, cultural identity and neuroticism were found to moderate the relationship between actual obesity and depressive symptoms among the adolescent sample.

These findings are indicative that obesity (especially perceived obesity) is associated with the likelihood of depressive symptoms among young and educated urban Ghanaians. This suggests that intervention strategies to address weight stigmatization and concerns should be instituted in order to address this issue.

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Appendices

Appendix A

The Centre for Epidemiological Studies Depression Scale

Below is a list of the ways you might have felt or acted. Please tick how much you have felt this way during the past week. Please respond to the following statements as honestly as you can. Use the given scale ranging from not at all to a lot. Please tick your response

DURING THE PAST WEEK	**Not At All**	**A Little**	**Some**	**A Lot**
1. I was bothered by things that usually don't bother me.	_____	_____	_____	_____
2. I did not feel like eating, I wasn't very hungry.	_____	_____	_____	_____
3. I wasn't able to feel happy, even when my family or friends tried to help me feel better.	_____	_____	_____	_____
4. I felt like I was just as good as other kids/colleagues.	_____	_____	_____	_____
5. I felt like I couldn't pay attention to what I was doing.	_____	_____	_____	_____

DURING THE PAST WEEK	**Not At All**	**A Little**	**Some**	**A Lot**
6. I felt down and unhappy.	_____	_____	_____	____
7. I felt like I was too tired to do things.	_____	_____	_____	____
8. I felt like something good was going to happen.	_____	_____	_____	____
9. I felt like things I did before didn't work out right.	_____	_____	_____	____
10. I felt scared.	_____	_____	_____	_____

DURING THE PAST WEEK	Not At All	A Little	Some	A Lot
11. I didn't sleep as well as I usually sleep.	_____	_____	_____	____
12. I was happy.	_____	_____	_____	_____
13. I was more quiet than usual.	_____	_____	_____	_____
14. I felt lonely, like I didn't have any friends.	_____	_____	_____	_____
15. I felt like kids/colleagues I know were not friendly or they didn't want to be with me	_____	_____	_____	_____

DURING THE PAST WEEK	Not At All	A Little	Some	A Lot
16. I had a good time.	_____	_____	_____	_____
17. I felt like crying.	_____	_____	_____	_____
18. I felt sad.	_____	_____	_____	_____
19. I felt people didn't like me.	_____	_____	_____	_____
20. It was hard to get started doing things.	_____	_____	_____	_____

Appendix B

The State Self-Esteem Scale (Heatherton & Polivy, 1991)

Current Thoughts Scale

This is a questionnaire designed to measure what you are thinking at this moment. There is, of course, no right answer for any statement. The best answer is what you feel is true of yourself at this moment. Be sure to answer all of the items, even if you are not certain of the best answer. Again, answer these questions as they are true for you **RIGHT NOW**.

Using the following scale, place a number in the box to the right of the statement that indicates what is true for you at this moment:

1 = not at all

2 = a little bit

3 = somewhat

4 = very much

5= extremely

1. I feel confident about my abilities. ☐
2. I am worried about whether I am regarded as a success or failure. ☐
3. I feel satisfied with the way my body looks right now. ☐
4. I feel frustrated about my performance ☐
5. I feel that I am having trouble understanding things that I read. ☐
6. I feel that others respect and admire me. ☐
7. I am dissatisfied with my weight. ☐

8. I feel nervous because I am worried about what others think of me. ☐

9. I feel as smart as others. ☐

10. I feel displeased with myself. ☐

11. I feel good about myself. ☐

12. I am pleased with my appearance right now. ☐

13. I am worried about what other people think of me. ☐

14. I feel confident that I understand things. ☐

15. I feel inferior to others at this moment. ☐

16. I feel unattractive. ☐

17. I feel concerned or worried about the impression I am making. ☐

18. I feel that I have less scholastic ability right now than others. ☐

19. I feel like I'm not doing well. ☐

20. I am worried about looking foolish. ☐

Appendix C

Big Five Inventory -46-A

Here are some statements that may or may not describe what you are like. In the blank next to each statement, write the number that shows how much you agree or disagree that it describes you. For example, do you agree that you are someone who is bossy? Write a 5 if you agree strongly, a 4 if you agree a little, a 3 if you neither agree nor disagree, a 2 if you disagree a little, or a 1 if you disagree strongly. **Ask if you don't know what a word means!**

1	2	3	4	5
Disagree Strongly	**Disagree a little**	**Neither agree not disagree**	**Agree a little**	**Agree Strongly**

I see myself as someone who…

1. _____Is talkative
2. _____Tends to find fault with others
3. _____Does things carefully and completely
4. _____ Is depressed, blue
5. _____Is original, comes up with new ideas
6. _____Reserved; keeps thoughts and feelings to self
7. _____Is helpful and unselfish with others
8. _____Can sometimes be careless
9. _____Is relaxed, handles stress well.
10. _____Is curious about many different things
11. _____Is full of energy
12. _____Starts quarrels with others
13. _____Is a reliable worker
14. _____Can be tense

15. _____Is clever, thinks a lot

16. _____Generates a lot of enthusiasm

17. _____Has a forgiving nature

18. _____Tends to be disorganized

19. _____Worries a lot

20. _____Has an active imagination

21. _____Tends to be quiet

22. _____Is generally trusting

23. _____Tends to be lazy

24. _____Doesn't get easily upset, emotionally stable

25. _____Is creative and inventive

26. _____Takes charge, has an assertive personality

27. _____Can be cold and distant with others

28. _____Keeps working until things are done

29. _____Can be moody

30. _____Likes artistic and creative experiences

31. _____Is sometimes shy, inhibited

32. _____Is considerate and kind to almost everyone

33. _____Does things efficiently

34. _____Stays calm in tense situations

35._____ Likes work that is the same every time (routine, follows a regular procedure)

36. _____Is outgoing, sociable

37. _____Is sometimes rude to others

38. _____ Makes plans and sticks to them

39. _____Gets nervous easily

40. _____Likes to think and play with ideas

41. _____Doesn't like artistic things (plays, music)

42. _____Likes to cooperate; goes along with others

43. _____Is easily distracted; has trouble paying attention

44. _____Knows a lot about art, music, or books

Appendix D

Everyday Discrimination Scale

Using the scale provided **below**, place a number by the statement to indicate how much it applies to you.

6 - Almost everyday

5- At least once a week

4- A few times a month

3- A few times a year

2- Less than once a year

1 - Never

In your day-to-day life, how often do any of the following things happen to you because of your weight?

1. ---------You are treated with less courtesy than other people are.

2. ---------You are treated with less respect than other people are.

3. ---------You receive poorer service than other people at restaurants or stores.

4. ---------People act as if they think you are not smart.

5. ---------People act as if they are afraid of you.

6. ---------People act as if they think you are dishonest.

7. ---------People act as if they're better than you are.

8. ---------You are called names or insulted.

9. ---------You are threatened or harassed.

Appendix E:

The Multi-group Ethnic Identity Measure (MEIM, Phinney 1992)

In this country, people come from many different ethnic groups and cultures (**such as Akan, Ewe, Frafra etc**). These questions are about your ethnicity or your ethnic group and how you feel about it or react to it.

Please fill in: In terms of ethnic group, I consider myself to be _____

Use the numbers below to indicate how much you agree or disagree with each statement.

4 = Strongly agree

3 = Agree

2 = Disagree

1 = Strongly disagree

1. I have spent time trying to find out more about my ethnic group, such as its history, traditions, and customs. ☐
2. I am active in organizations or social groups that include mostly members of my own ethnic group. ☐
3. I have a clear sense of my ethnic background and what it means for me. ☐
4. I think a lot about how my life will be affected by my ethnic group membership. ☐
5. I am happy that I am a member of the group I belong to. ☐
6. I have a strong sense of belonging to my own ethnic group. ☐

7. I understand pretty well what my ethnic group membership means to me. ☐

8. In order to learn more about my ethnic background, I have often talked to other people about my ethnic group. ☐

9. I have a lot of pride in my ethnic group. ☐

10. I participate in cultural practices of my own group, such as special food, music, or customs. ☐

11. I feel a strong attachment towards my own ethnic group. ☐

12. I feel good about my cultural or ethnic background. ☐

Appendix F

Background Information Section

Below are some questions about you that we would like you to answer. Please answer these questions as honestly as possible. There is no right or wrong answer.

1. Respondent's Sex: M ☐ F ☐
2. Respondent's Age: ……
3. Date of birth: ……..
4. Do you have a preference for a particular body shape? Yes ☐ No ☐
5. Which body shape do you think you have?" Too thin ☐ Relatively thin ☐
   All right ☐ Relatively heavy ☐ Too heavy ☐
6. Which body shape would you prefer to have?
   Much thinner ☐ Relatively thinner ☐ Same as now ☐
   Relatively heavier ☐ Much Heavier ☐
7. Have you ever been ashamed or embarrassed about you size? Yes ☐ No ☐
8. **a**. Have you ever done anything to alter/change your weight? Yes ☐ No ☐

   If **'Yes'** please continue

   If **'No'** please skip to no 9

   b. Was this an attempt to lose or gain weight? Lose weight ☐ Gain weight ☐

   c. List at least three (3) things you had done……

   ……

   ……

d. If the three things listed above included an attempt at **dieting**, approximately how many times have you tried to lose weight through dieting?

Once ☐ Two or three times ☐ More than three times ☐

9. **a**. Please indicate if you have any known chronic physical illness? For example diabetes, hypertension etc Yes ☐ No ☐

   b. If '**Yes**', please specify ……

SES

Please continue to help us know more about yourself.

1. Where do you live?

   Separate house/flat apartment ☐ Compound house ☐

   Huts/ improvised homes such as tents or kiosks ☐

2. Do you have your own bedroom for yourself?

   No ☐ Yes ☐

3. Does your family own a car, van or truck?

   No ☐ Yes, one 1 ☐ Yes two or more ☐

4. How many computers do your family own?

   None ☐ One ☐ Two ☐ More than two ☐

5. During the past 12 months, how many times did you travel away on holiday with your family?

   Not at all ☐ Once ☐ Twice ☐ More than twice ☐

6. Do you have a savings account? No ☐ Yes ☐

7. What is your father's highest educational level?

   No education ☐ High school ☐ Tertiary ☐

8. What is your mother's highest educational level?

No education ☐ High school ☐ Tertiary ☐

9. Are both of your parents employed? Yes ☐ No ☐

10. Are you employed? Yes ☐ No ☐

a) If '**Yes**', in what range does your monthly income fall?

100-200 Ghana Cedis ☐ 200-300 Ghana Cedis ☐

300-400 Ghana Cedis ☐ 400-1000 Ghana Cedis ☐

1000 and above ☐

b) If **'No'**, please estimate average monthly income for household

100-200 Ghana Cedis ☐ 200-300 Ghana Cedis ☐

300-400 Ghana Cedis ☐ 400-1000 Ghana Cedis ☐

1000 and above ☐

Appendix G

Big Five Inventory -46-A (Modified)

Here are some statements that may or may not describe what you are like. In the blank next to each statement, write the number that shows how much you agree or disagree that it describes you. For example, do you agree that you are someone who is bossy? Write a 5 if you agree strongly, a 4 if you agree a little, a 3 if you neither agree nor disagree, a 2 if you disagree a little, or a 1 if you disagree strongly. **Ask if you don't know what a word means!**

1	2	3	4	5
Disagree Strongly	**Disagree a little**	**Neither agree not disagree**	**Agree a little**	**Agree Strongly**

I see myself as someone who…

1. _____Is talkative
2. _____Tends to find fault with others
3. _____Does things carefully and completely
4. _____ Is depressed, blue
5. _____Is original, comes up with new ideas
6. _____Reserved; keeps thoughts and feelings to self (slow to show others how you feel or what you think)
7. _____Is helpful and unselfish with others
8. _____Can sometimes be careless (unconcerned about avoiding harm or making mistakes)
9. _____Is relaxed, handles stress well.
10. _____Is curious about many different things
11. _____Is full of energy
12. _____Starts quarrels with others
13. _____Is a reliable worker

14. _____Can be tense

15. _____Is clever, thinks a lot

16. _____Generates a lot of enthusiasm

17. _____Has a forgiving nature

18. _____Tends to be disorganized

19. _____Worries a lot

20. _____Has an active imagination

21. _____Tends to be quiet

22. _____Is generally trusting

23. _____Tends to be lazy

24. _____Doesn't get easily upset, emotionally stable

25. _____Is creative and inventive

26. _____Takes charge, has an assertive personality

27. _____Can be cold and distant with others (unfeeling towards others)

28. _____Keeps working until things are done

29. _____Can be moody

30. _____Likes artistic and creative experiences

31. _____Is sometimes shy, inhibited

32. _____Is considerate and kind to almost everyone

33. _____Does things efficiently (quickly and correctly)

34. _____Stays calm in tense (anxious or nervous) situations

35._____ Likes work that is the same every time (routine, follows a regular procedure)

36. _____Is outgoing, sociable

37. _____Is sometimes rude to others

38. _____ Makes plans and sticks to them

39. _____Gets nervous easily

40. _____Likes to think and play with ideas

41. _____Doesn't like artistic things (plays, music)

42. _____Likes to cooperate; goes along with others

43. _____Is easily distracted; has trouble paying attention

44. _____Knows a lot about art, music, or books

Appendix H

Ethics Approval Letter

UNIVERSITY OF GHANA
ETHICS COMMITTEE FOR THE HUMANITIES (ECH)

P. O. Box LG 74, Legon, Accra, Ghana

My Ref. No.....

25th February, 2014

Salma Y. Adusei
Dept. of Psychology
University of Ghana
Legon

Ms. Adusei,

PROTOCOL ECH 009/13-14: THE RELATIONSHIP BETWEEN OBESITY AND DEPRESSIVE SYMPTOMS AMONG YOUNG GHANAIANS

This is to advise you that the above reference study has been presented to the Ethics Committee for the Humanities and the following actions taken subject to the conditions and explanation provided below:

Expiry Date: 11/01/15

On Agenda for: Initial Submission

Description: 25/10/13

ECH Action: Approved

UG/ISSER/ECH VALID UNTIL 11 JAN 2015 APPROVED DOCUMENT

Please accept my congratulations.

Yours Sincerely,

Rev Prof. J. O. Y Mante
ECH Chair

CC: Director, ISSER

Tel: +233-303933866 Email: ech@isser.edu.gh

Appendix I

Assent Form

My name is Salma Yusuf Adusei and I am from the Psychology Department at the University of Ghana. I am conducting a research study entitled "**The Relationship between Obesity and Depressive Symptoms among Young Ghanaians**". I am asking you to take part in this research project because I am trying to learn more about the relationship an individuals' weight, type of personality, self-esteem, cultural identity as well as some individual background information has with his or her level of depressive symptoms. This will take between fifty five (55) minutes to an hour five minutes (1:05) of your time.

If you agree to be in this study, you will be asked to fill some paper/pencil questionnaires. These questionnaires will ask for information on weight, depressive symptoms, personality, self-esteem, cultural identity, as well as socio-economic status, physical illness and gender. If you agree, you will also be asked to take body measurements of weight and height.

Your participation in this study will help us gain information about the link between weight and depressive symptoms, self-esteem, personality and cultural identity. This will help us in preventing and dealing with depression that is caused by weight concerns. At the end of your participation, you will also be entitled to a pen and a book. You will be told of your weight and height if you want to know. You will also be given counselling should you need it.

However, the risks associated are that of tiredness or boredom because of the time you will use to fill the questionnaire. Also, some of the questions asking you about how you have been

feeling may make you a little uncomfortable. Therefore, enough time will be sought so you can have a little rest.

You can stop participating at any time if you feel uncomfortable. No one will be angry with you if you do not want to participate.

Your information will be kept private. No one will be able to know how you answered the questions. We will **not** ask for your name on the questionnaire. No one except you will have access to your weight and height measurements.

You may ask me any questions about this study. You can call me at any time (0249158439) or talk to me the next time you see me.

Please talk about this study with your parents/guardians before you decide whether or not to participate. I will also ask permission from your parents/guardians before you participate in the study. Even if your parents/guardians say "yes" you can still decide not to participate.

By signing below, it means that you understand and know the issues concerning this research study. If you do not want to participate in this study, please do not sign this assent form. You and your parents will be given a copy of this form after you have signed it.

This assent form which describes the benefits, risks and procedures for the research titled "The Relationship between Obesity and Depressive Symptoms among Young Ghanaians" has been read and or explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate.

Child's Name:…… Researcher's Name:……

Child's Signature/ Thumbprint:…… Researcher's Signature……

Date: …… Date: ……

Appendix J

Parental/Guardian Consent Form

Title: The Relationship between Obesity and Depressive Symptoms among Young Ghanaians.

Principal Investigator: Salma Yusuf Adusei

Principal Supervisor: Dr. Adote Anum

Secondary Supervisor: Prof. J. Y. Opoku

Address: Department of Psychology, University of Ghana, Legon.

General Information about Research

Your ward is being asked to participate in a study on The Relationship between Obesity and Depressive Symptoms among Young Ghanaians. In this study we seek to find if weight, personality, self-esteem, cultural identity and other demographic variables predict depressive symptoms.

If you and your ward accept participation in the research, your ward will be required to fill questionnaires that bother on weight, depressive symptoms, personality, self-esteem, and cultural identity. The questionnaire will also include questions on perceived discrimination socio-economic situation, physical illness, and some demographic variables. These questionnaires are in the paper/pencil format. Answering of the questionnaires is expected to take approximately 45 minutes to an (1) hour. Your ward will also be required to allow

researchers take measurement of weight and height which will take about another 10 minutes. The entire research will therefore last about 55 minutes to an hour, five minutes (1:05).

Possible Risks and Discomforts

We do not foresee any serious short or long term risks involved for the participants in this study. We however anticipate the risk of tiredness or boredom. This is expected because of the time required to fill the items on the questionnaires. Therefore, sufficient time will be sought so as to give your ward enough room for recuperation. Also, we acknowledge that some questions we will ask your ward about current depressive symptoms, self-esteem and views on weight might be distressing and cause some feelings of discomfort. In such a situation your ward is free to stop responding to the questionnaire or any section of it. Also, your ward will be entitled to a free counselling session should he or she need one. Phone numbers (of the principal investigator and of the supervisor) will also be provided to help any respondent who will have problems after the free counselling session.

The rights of your ward as a participant will be respected. In addition, enough time will be given to address any questions you and your ward might have during the course of the study.

Possible Benefits

This research is not designed to benefit you or your ward directly but information gained in this study will go a long way to give up-to-date information on the relationship between weight and depressive symptoms as well as protective factors in this association. This is very important as it will help in the prevention and management of depression associated with weight concerns which is a growing problem in Ghana. It will also help in creating advocacy on the subject.

However, after the study, participants will be given information about their weight and height measures if desired. Any participant found to have clinically significant levels of depressive symptoms will be informed and given psychological help if so desired.

Confidentiality

All information obtained from you and your ward during this study will be treated as confidential. The privacy of your ward will be protected to the best of our ability at all times. You ward will not be identified individually or by any personal information in any way as a result of participation in this research. Participants will only be identified through randomly generated codes. There will be restricted access to any information obtained. The data collected however, may be used collectively or as part of publications and papers related to the topic under study.

Compensation

At the end of the study, participants will be given a pen and a book.

Voluntary Participation and Right to Leave the Research

You and your ward are free to withdraw or stop responding to the questionnaire or any section of it at any point in time without any penalty or loss of rights.

Contacts for Additional Information

The following numbers can be contacted in case of any discomfort, or need for further explanation or information. Student Researcher: Salma Yusuf Adusei: Tel: 0249158439

Supervisor: Dr. Adote Anum: Tel: 0249107770

Your rights as a Participant

This research has been reviewed and approved by the Ethics Committee for Humanities (ECH), University of Ghana. If you have any questions about your ward's rights as a research participant you can contact the ECH Office between the hours of 8am-5pm or through the email address:ech@isser.edu.gh

VOLUNTEER AGREEMENT

The above document describing the benefits, risks and procedures for the research titled "The Relationship between Obesity and Depressive Symptoms among Young Ghanaians" has been read and explained to me (Parent/Guardian) as well as my ward. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to have my ward participate as a volunteer

_____ _____

Date Name and signature or mark of Guardian/Parent

_____ _____

Date Name and signature or mark of researcher

Appendix K

Consent Form

Title: The Relationship between Obesity and Depressive Symptoms among Young Ghanaians.

Principal Investigator: Salma Yusuf Adusei

Principal Supervisor: Dr. Adote Anum

Secondary Supervisor: Prof. J. Y. Opoku

Address: Department of Psychology, University of Ghana, Legon.

General Information about Research

You are being asked to participate in a study on The Relationship between Obesity and Depressive Symptoms among Young Ghanaians. In this study we seek to find if weight, personality, self-esteem, cultural identity and other demographic variables predict depressive symptoms.

If you accept participation in the research, you will be required to fill questionnaires that bother on weight, depressive symptoms, perceived discrimination, personality, self-esteem, and cultural identity. The questionnaire will also include questions on physical illness, and some demographic variables. These questionnaires are in the paper/pencil format. Answering of the questionnaires is expected to take approximately 45 minutes to an (1) hour. You will also be required to allow researchers take measurement of your weight and height which will

take about another 10 minutes. The entire research will therefore last about 55 minutes to an hour, five minutes (1:05).

Possible Risks and Discomforts

We do not foresee any serious short or long term risks involved for the participants in this study. We however anticipate the risk of tiredness or boredom. This is expected because of the time required to fill the items on the questionnaires. Also, we acknowledge that some questions we will ask you about current depressive symptoms, self-esteem and views on weight might be distressing and cause some feelings of discomfort. In such a situation you are free to stop responding to the questionnaire or any section of it. Also, you will be entitled to a free counseling session should you need it. Phone numbers (of the principal investigator and of the supervisor) will also be provided to help any respondent who will have problems after the free counseling session.

Your rights as a participant will be respected. In addition, enough time will be given to address any questions you might have during the course of the study.

Possible benefits

This research is not designed to benefit you directly but information gained in this study will go a long way to give up-to-date information on the relationship between weight and depressive symptoms as well as protective factors in this association. This is very important as it will help in the prevention and management of depression associated with weight

concerns which is a growing problem in Ghana. It will also help in creating advocacy on the subject.

However, after the study, participants will be given information about their weight and height measures if desired. Any participant found to have clinically significant levels of depressive symptoms will be informed and given psychological help if so desired.

Confidentiality

All information obtained from you during this study will be treated as confidential. Your privacy will be protected to the best of our ability at all times. You will not be identified individually or by any personal information in any way as a result of participation in this research. Participants will only be identified through randomly generated codes. There will be restricted access to any information obtained. The data collected however, may be used collectively or as part of publications and papers related to the topic under study.

Compensation

At the end of the study, participants will be given a pen and a book

Voluntary Participation and Right to Leave the Research

Participation in this study is voluntary. You are free to withdraw or stop responding to the questionnaire or any section of it at any point in time without any penalty or loss of rights.

Contacts for Additional Information

The following numbers can be contacted in case of any discomfort, or need for further explanation or information. Student Researcher: Salma Yusuf Adusei: Tel: 0249158439,

Supervisor: Dr. Adote Anum: Tel: 0249107770

Your rights as a Participant

This research has been reviewed and approved by the Ethics Committee for Humanities (ECH), University of Ghana. If you have any questions about your rights as a research participant you can contact the ECH Office between the hours of 8am-5pm or through the email address: ech@isser.edu.gh

VOLUNTEER AGREEMENT

The above document describing the benefits, risks and procedures for the research titled "The Relationship between Obesity and Depressive Symptoms among Young Ghanaians" has been read and or explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction.

I agree participate as a volunteer

_____ _____

Date Name and signature of Volunteer

_____ _____

Date Name and signature of Researcher

Appendix L

Regression Table 1

Moderation Analysis for the Moderating Effect of Self-Esteem on the Relationship between Actual Obesity and Depressive Symptoms among High School Students

Predictors	*B*	*SEB*	*Beta*	*t*	*Sig.*
1 Constant	18.782	4.238		4.432	.000
Sex	8.137	2.336	.369	3.484	.001
Socio-economic status	-.352	.355	-.105	-.993	.323
2 Constant	18.326	4.177		4.388	.000
Sex	8.479	2.305	.384	3.679	.000
Socio-economic status	-.402	.350	-.120	-1.147	.254
Obesity	6.298	3.090	.186	2.038	.044
3 Constant	48.273	5.034		9.590	.000
Sex	6.514	1.823	.295	3.573	.001
Socio-economic status	-.178	.276	-.053	-.647	.519
Obesity	4.044	2.439	.119	1.658	.101
Self-esteem	-.424	.054	-.571	-7.831	.000
4 Constant	45.009	5.108		8.812	.000
Sex	7.193	1.804	.326	3.987	.000
Socio-economic status	-.037	.276	-.011	-.133	.895
Obesity	2.479	2.473	.073	1.002	.319
Self-esteem	-.401	.054	-.540	-7.462	.000
Obesity*Self-esteem	-1.399	.593	-.177	-2.360	.020

R^2= .552, Adjusted R^2=.529

Regression Table 2

Hierarchical Multiple Regression Analysis of the Moderating Effect of Cultural Identity on the Relationship between Actual Obesity and Depressive Symptoms among Senior High School Students

Predictors	*B*	*SEB*	*Beta*	*t*	*Sig*
Constant	18.782	4.238		4.432	.000
Socio-economic status	-.352	.355	-.105	-.993	.323
Sex	8.137	2.336	.369	3.484	.001
Constant	18.326	4.177		4.388	.000
Socio-economic status	-.402	.350	-.120	-1.147	.254
Sex	8.479	2.305	.384	3.679	.000
Obesity	6.298	3.090	.186	2.038	.044
Constant	17.287	6.992		2.473	.015
Socio-economic status	-.409	.354	-.122	-1.155	.251
Sex	8.502	2.320	.385	3.665	.000
Obesity	6.362	3.125	.187	2.036	.045
Cultural identity	.397	2.137	.017	.186	.853
Constant	17.127	6.884		2.488	.015
Socio-economic status	-.434	.349	-.129	-1.243	.217
Sex	7.999	2.297	.363	3.482	.001
Obesity	6.599	3.079	.194	2.143	.035
Cultural Identity	.694	2.109	.030	.329	.743
Obesity*Cultural Identity	2.359	1.177	.181	2.004	.048

R^2=.252, Adjusted R^2=.212

Regression Table 3

Moderation Analysis of Neuroticism on the Relationship between Actual Obesity and Depressive Symptoms among Senior High Students Using Hierarchical Multiple Regression

Predictors	*B*	*SEB*	*Beta*	*t*	*Sig.*
Constant	18.782	4.238		4.432	.000
Sex	8.137	2.336	.369	3.484	.001
Socio-economic status	-.352	.355	-.105	-.993	.323
Constant	18.326	4.177		4.388	.000
Sex	8.479	2.305	.384	3.679	.000
Socio-economic status	-.402	.350	-.120	-1.147	.254
Obesity	6.298	3.090	.186	2.038	.044
Constant	-3.558	6.064		-.587	.559
Sex	6.129	2.154	.278	2.846	.005
Socio-economic status	-.185	.321	-.055	-.577	.566
Obesity	6.083	2.807	.179	2.167	.033
Neuroticism	7.568	1.636	.407	4.625	.000
Constant	-6.230	5.837		-1.067	.289
Sex	7.453	2.093	.338	3.562	.001
Socio-economic status	.066	.316	.020	.208	.836
Obesity	5.881	2.676	.173	2.198	.030
Neuroticism	7.475	1.560	.402	4.793	.000
Obesity*Neuroticism	3.136	.964	.263	3.254	.002

R^2=.428, Adjusted R^2=.397