ABSTRACT

Title of Document: THE RELATIONSHIP BETWEEN MENTAL HEALTH, PHYSICAL HEALTH, PHYSICAL APPEARANCE AND MARITAL DISSATISFACTION

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This study examines the relationship between mental health, physical health and physical appearance and marital dissatisfaction for women interviewed in the 1992 and 2002 rounds of the National Longitudinal Survey of Youth 1979. Ordered logistic regression analysis was applied to data from NLSY79's 1992 and 2002 rounds and the change from 1992 to 2002. This study found that health is an important factor in marital dissatisfaction. The results indicated that high levels of depression were related to high marital dissatisfaction, while high body weight and changes in physical health were related to low marital dissatisfaction. Social norms theory was found to be a consistent predictor of the relationship between poor mental health and marital dissatisfaction. Marital exchange theory's predictions were also supported by the data for the physical appearance and the physical health variables.

THE RELATIONSHIP BETWEEN MENTAL HEALTH, PHYSICAL HEALTH, PHYSICAL APPEARANCE AND MARITAL DISSATISFACTION.

By

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Dedication

This thesis is dedicated to my mother who motivates me to reach for every academic star on my horizon; to my father, who believes any star is attainable; and to Eshel, whose love I could not have done without.

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Chapter 1: Introduction

The increased divorce rate in American society during the late 1900s indicates that individuals became less likely than in the past to tolerate an unsatisfactory marriage. The divorce rate has since leveled. Studies now show that, a decade after marriage, only one in four couples is still married and at least moderately happy with their union (Glenn, 1998). Researchers in the last few decades have focused on this trend, and identified factors that contribute to marital dissatisfaction.

The deterioration of marital quality is a private and personal process, and a variety factors have been found to influence satisfaction levels within marriage. Individual factors, such as personality traits, each partner's family of origin, levels of commitment, appearance, physical health, and mental health; dyadic factors, such as each party's interaction with their partner, and the communication within a marriage; and environmental factors, such as employment, economic resources, gender role views, extramarital sex, children and the work environment of each spouse have all been found to influence marital satisfaction (Wolcott, 1999). Beyond these factors is the underlying issue of spousal expectations. Each person comes into the relationship with certain short term and long term expectations of what their marriage will be, and has expectations regarding their spouse's role in the marriage, and in their lives. What changes? What happens within the marriage to cause dissatisfaction?

Among the disappointments and unmet expectations that affect marital dissatisfaction are those related to health. Health and marital dissatisfaction have been found to have a direct effect on each other. The health of the individual seems to play a role with the satisfaction of an individual with his/her marriage – personal

relationships have the power to enhance the health of those within them (Kiecolt-Glasser & Newton, 2001) or be a principal source of mental and physical stress (Coyne & DeLongis, 1986). For the purposes of this study, health will be divided into three categories: physical appearance, mental health and physical health.

The shift over the last thirty years in the obesity of children and adults has been examined within health fields, but little attention has been paid to how obesity, or more moderate weight gain, affects the dissatisfaction of marriage partners. In American society, thinness is idealized and fatness is stigmatized (Sobal & Maurer, 1999), yet a majority of Americans is overweight. What strain does this dissonance place upon individuals and their relationships? How has this shift in weight and health influenced marriages, and marital dissatisfaction? What happens within a relationship when one partner's physical or mental health deteriorates? What happens to a marriage when a married individual becomes depressed, less healthy or gains weight?

This study is intended to fill a void in the literature by focusing on the impact of mental health (measured by level of depression), physical health (measured by physical health's effect on work) and physical appearance (measured by body mass index or BMI) on marital dissatisfaction. After reviewing the relevant literature and discussing appropriate theories, this paper sets forth a set of hypotheses that provide answers to some of the above questions. Using a national dataset (the National Longitudinal Survey of Youth), this study sheds significant light upon these issues.

Models for Examining Physical Health, Physical Appearance, Mental Health and Marital Dissatisfaction

Social Norms and Social Exchange theories provide perspectives for structuring this examination of the impact of mental health, physical health, and physical appearance on marital dissatisfaction. Each model provides a different viewpoint for examining the identified variables.

Social Norms Model

Social norm theory suggests that there is a high reward for conformity to family and societal expectations - thus deviance from family (or a partner's) expectations come at a high cost (White & Klein, 2002). Society and partners tend to accept those members who conform to society or the family's expectations, values and beliefs the most closely, and ostracize those who deviate. Even though the majority of American women are above "normal" weight, the social norm is for women to be thin. Therefore, if a woman is overweight or obese she is deviating from the norms of society. Research has shown that overweight women are stigmatized by society, their spouses and other members of their family (Allon, 1982; Millman, 1980).

Social norms theory explains that society expects different behaviors from women than from men, such as a heightened attention to personal appearance. Thus, according to the social norms model, women who have gained weight during their marriage have higher marital dissatisfaction because their weight gain is stigmatized

by their spouses who adhere to society's views of what a normative, attractive weight is for females (Sobal, Rauschenbach & Frongillo, 1995).

Social norms theory also explains that the wife would know if she is not fulfilling society's expectations for her appearance, and thus *her* marital satisfaction would be negatively impacted – because fatness is stigmatized in society, women who become fat feel they are viewed and judged negatively by their husbands (whether from actual feedback or inferences) and are, therefore, more dissatisfied in their marriages (Sobal, Rauschenbach & Frongillo, 1995).

Marital Exchange Model

Marital exchange theory argues that people are ultimately rational actors, but that their realities are made up of their individual assessments of the benefits and costs associated with specific actions, relationships and interactions. Therefore, every transaction into which a person enters has a cost and a reward (White & Klein, 2002). Over time, marriages may offer fewer rewards and greater costs. Ingoldsby, Smith and Miller (2004) write that as

> time goes by in a marriage, many couples reduce the number of rewarding exchanges that were typical during courtship…Should the level of satisfaction get low enough, a decision to separate or divorce could be made. However, many very unhappy couples stay together, especially as the length of the marriage increases. This would be explained by the many costs that are related to divorce: alimony, child support, social disapproval, role loss, loss of custody, religious concerns, and so on (p.59) (White & Booth, 1991 in Ingoldsby, Smith, & Miller, 2004).

Therefore, though rewards may decrease, the perceived costs are still too high to exit the relationship – thus couples stay together, but the level of their dissatisfaction with their marriages increases. Marital dissatisfaction is directly related to this premise of costs and rewards: dissatisfaction is lowest when the rewards outweigh the costs, and highest when the costs outweigh the rewards.

In marital exchange theory, this phenomenon can be described using comparison level analysis – that is, by looking at how well an individual is doing in his/her marriage in relation to how others are doing within their marriages, and how well others are doing who are not married (White & Klein, 2002). For example, the first comparison level is that husbands and wives compare their partner's weight to that of their friends, acquaintances and the media's portrayal of desirable couples - are they as attractive? In regards to their satisfaction with their spouses, and their spouses' bodies, this comparison level has the potential to wreak havoc in relationships. In other words, this theory reflects the old truism that the grass is always greener on the other side.

The second comparison level involves married couples looking at non-married individuals (i.e., divorced and single people). If they would divorce, what options for new relationships are there? Men may have different options than women, and the perceived costs and rewards could thus differ. Within this framework, marital exchange theory suggests that if a wife's depression level increased, her physical health declined, and/or her body weight increased, then her marital dissatisfaction would decrease due to comparing her increased costs and decreased options on the marriage market.

Application of this model to the variables in this study will be structured after Sobal, Rauschenbach and Frongillo's (1995) study of obesity and marital quality. A marital exchange model suggests that wives who report higher depression levels, lower levels of health and/or higher weight gain/BMIs would report lower marital dissatisfaction because they would "perceive and accept their limited options on the marriage market and therefore have lower standards for what constitutes a satisfactory marital relationship" (p.750) (Sobal, Rauschenbach & Frongillo, 1995). Since increased body weight is stigmatized by society, marital exchange theory suggests that overweight women adapt to the stigmatization by society and "recognize their lower value on the marriage market and lower their standards for getting and keeping a mate," which leads these women to "fear reentering the marriage market and, therefore, to be more satisfied with their marriage than people who are not subject to the stigma" (p.750) (Sobal, Rauschenbach & Frongillo, 1995).

This study examined how increasing the costs in a relationship affects marital dissatisfaction. Social norms theory explains the social significance of each variable, marital exchange theory explains the negative and positive attributes of each variable.

Applying Social Norms and Marital Exchange Models

These two models highlight different effects that the interplay of mental health, physical health and physical appearance have upon marital dissatisfaction, and lead to different hypotheses concerning the direction of the relationship among the variables. The social norms model emphasizes societal roles (optimal roles of good health, low depression, and normal body weight) and predicts that those who deviate from them will experience a higher level of marital dissatisfaction. The marital

exchange model predicts that women with higher depression levels, lower physical health and higher body weight will be less dissatisfied in their marriages because they will evaluate their lowered health as decreasing their options in the marriage market and thus be happier with their current relationship. An intensifying effect is added to the already proposed hypotheses through the concept of interdependence of factors - if the mental health, physical health and physical appearance of the wife all decline, then her marital dissatisfaction will increase even more. Therefore, the social norms and marital exchange theories predict opposite effects – social norms theory predicts a negative effect, and marital exchange theory predicts a positive effect on marital happiness.

The next section reviews the relevant literature on the relationship between physical appearance, physical health, mental health and marital dissatisfaction.

Chapter 2: Literature Review

Appearance: Attractiveness

When looking at changes in mate selection preferences over time (in 1939, 1977, and 1996), men and women were found to place greater importance on their mates' physical attractiveness in 1996 compared with 1939, associating a desirable mate with good financial prospects (particularly men), mutual attraction and love, with the importance of domestic skills plummeting (particularly for men). Gender preferences in regard to mate qualities were the most similar in 1996 (Buss,

Shackelford, Kirkpatrick, & Larsen, 2001). The authors attributed these similarities to social changes such as the widespread use of birth control, fear of AIDS, the increase of women in the workforce, and the media's bombardment of physically attractive images of men and women (Buss, Shackelford, Kirkpatrick, & Larsen, 2001).

Thus physical attractiveness in a mate is important to both sexes; however, another study indicates that it may be more important to men. In the mid 1980s and generally also in 1996, distinct gender differences were found in defining characteristics that were desirable in a mate: men found good looks (Buss, Shackelford, Kirkpatrick, & Larsen, 2001), youth (Sprecher, Sullivan, & Hatfield, 1994), good health and good housekeeping skills (Amador, Charles, Tait, & Helm, 2005) more important then. On the other hand, women found good financial prospects, ambition and industriousness as more important than physical attractiveness (Buss, Shackelford, Kirkpatrick, & Larsen, 2001), and placed a higher value on similar educational backgrounds (Amador, Charles, Tait, & Helm, 2005). Despite these differences, men and women both rated mutual attraction and love as the most important characteristic in selecting a partner in marriage (Buss, Shackelford, Kirkpatrick, & Larsen, 2001), and looked for a dependable character, a pleasing disposition, emotional stability and maturity in their mates (Amador, Charles, Tait, & Helm, 2005).

Physical Appearance & Marital Dissatisfaction

Physical appearance is a key component in the initial attraction between

relationship partners and an important reason for beginning relationships. Since body weight is a central aspect of appearance (Hayes & Ross, 1987) it also assumes importance in attracting a desirable partner (Kallen & Doughty, 1984; Sobal, Nicolopoulos, & Lee, 1995). Men have been found to place a great deal of importance on a woman's body size and shape when they initiate romantic relationships (Singh, 1995). Yet what happens once the partner is attracted and a relationship is cemented through marriage? Once married, people often no longer feel the need to attract a partner, especially in the face of marital role obligations that shift their eating and exercising patterns (Sobal, 1984). Does the ensuing downshift in physical appearance affect the attraction within the couple and consequently their marital satisfaction? Especially if physical appearance was an important factor in one partner's attraction to the other, married couples may find the answer to this question to be "yes."

Once married, what happens if the partner's physical appearance changes over the course of the marriage – if the physical attributes that initially attracted the partner change? The emphasis on physical appearance does not stop after marriage; couples in America today operate in a consumer-dominated society, where appearance and strictly regulated weight are predominant criteria of social value both in women's evaluation by men and women's evaluation of themselves (Hesse-Biber, 1997). What happens if a woman's body does not fit into society's mold? Society has been shown to regard women who refuse to undergo dietary and exercise regimes as unfeminine (Baker, 1984), not valuable, low in social status, and lacking in self-control (Benjamen, Kamin-Shaaltiel, 2004). But what do their husbands think? Do they

subscribe to society's views? Do wives internalize society's viewpoints? Women have been found to be more susceptible than men to body image and eating disturbances, and are more vulnerable to unhealthy media representations of women (which have been found to contribute to women's dissatisfaction with their bodies (Forbes et al, 2005). Does this greater dissatisfaction with their own bodies cause women to be more or less dissatisfied with their marriages?

Previous research has shown that women who are overweight had fewer marital conflicts (Sobal et al, 1995), but had more difficulty expressing anger (Boskind-White & White, 1983; Weiss, Katzman & Wolchik, 1985) and accepted inappropriate behavior from their male partners because they felt that they had no alternatives (Millman, 1980). Research has shown that body weight is an important factor for mate selection – as individuals who are obese are less likely to marry than their healthier counterparts (Fu & Goldman, 1996), have lower socioeconomic status, are more likely to have unstable employment later in marriage (Averett & Korenman, 1994; Booth & Johnson, 1994) and earn lower wages. Research has also shown that the present sociocultural context encourages women's feelings of inadequacy in failing to obtain the unrealistic, if not impossible, emaciated body ideal currently endorsed (Markey, Markey & Birch, 2004). Society's ability to enhance women's feelings of inadequacy demonstrates how women internalize the perceptions of the social environment in which they live. Women also have been found to be more likely to adjust their own eating behaviors and feelings about their bodies in accordance with their significant others' preferences (Tantleff-Dunn & Thompson, 1995), report being more bothered by their partner's criticisms about their weight

(Murray, Touyz & Beaumont, 1995) and are more likely to be satisfied with their own bodies if they perceive their significant other to be (Miller, 2001; Tantleff-Dunn & Thompson, 1995). Furthermore, women's perceptions of their partner's "ideal female figure" was found to be critical in determining their susceptibility to maladaptive eating behaviors and their general psychological health (greater discrepancy leads to higher rates of depression and lower levels of self-esteem) (Tantleff-Dunn & Thompson, 1995). Thus, a husband's views have been found to impact how a woman views herself, but can they also influence how satisfied she is with her marriage?

Married people have been found to be healthier than non-married people, yet married people are more likely to gain weight after they marry (Rauschenbach, Sobal & Frongillo, 1995) – how does this affect their marital dissatisfaction? Is there a limit – moderate weight gain does not affect their marital dissatisfaction, but extreme weight (i.e., obesity) does?

Body Weight and Marital Dissatisfaction

Given the impact that an individual's health has on marital dissatisfaction, what of the impact of physical appearance on marital dissatisfaction? And what if an individual does not fit the "norms" of society regarding their weight? Our society subjects women to a "tyranny of slenderness" (Bartky, 1990, Bordo, 1993; Benjamin & Kamin-Shaaltiel, 2004) such that it has been argued that the normative obsession with slenderness contributes to an individual's maintenance of self-control, social status, and femininity (Baker, 1984). Women who refuse to undergo dietary and exercise regimens are perceived as not feminine, not valuable, low in social status,

and lacking in self-control (Benjamin & Kamin-Shaaltiel, 2004).

The body weight of wives has been shown to be associated with educational levels of husbands. Women who married men who had attained a high level of educational achievement (the author termed this marrying "up") were found to be consistently leaner than women who married men who had never passed beyond the level of basic vocational school (the author termed this "marrying down"). Additionally, women who married down were found to have more abdominal body fat than women who married up (Lipowicz, 2002).

Married and previously married men and women weigh more than those who have never married (Sobal, Rauschenbach, & Frongillo, 1992), and married men are more likely to be obese (Sobal et al., 1992). Sobal, Rauschenbach and Frongillo (2002) looked at how marital changes influence weight loss and weight gain. They found that in a baseline assessment and in a 10 year follow-up study, unmarried women who married gained weight; and men who remained divorced or who had become widowed lost more weight than men married at the baseline and the follow up (Sobal, Rauschenbach, & Frongillo, 2002). Changes in marital status do not only alter the physical body weight of individuals - they also affect the mental health of individuals. Women tend to be more concerned about weight than men do, but weight plays an important role in both men's and women's chronic health problems (Ross & Bird, 1994; Ross & Mirowsky, 1983). Additionally, the majority of adults have attempted to become thinner during their lives at some point (Williamson, Serdula, Anda, Levy, & Byers, 1992) - thus indicating a dissatisfaction with their physical appearance and/or their health (Cockerham, Kunz, & Lueschen, 1988;

Ferraro & Yu, 1995).

Physical Health and Marital Dissatisfaction

The physical health of individuals has been found to be linked to marriage – indeed, health and marriage seem to be inextricably linked as mortality rates in the US are higher for non-married people than married people (Verbrugge, 1979). In the realm of health, divorced and separated people have the worst health status, followed by widowed people, then single people, with married people having the highest health status of all the groups (Verbrugge, 1979). Physical health and marital dissatisfaction have been found to have a direct effect on each other. The satisfaction of an individual with his/her marriage seem to play a role in the health of the individual – personal relationships have the power to enhance the health of those within them (Kiecolt-Glasser & Newton, 2001) or be a principal source of mental and physical stress (Coyne & DeLongis, 1986). Men who reported low marital dissatisfaction had fewer health complaints and higher health ratings and women who reported having more positive feelings towards their husbands had fewer health complaints (Ganong & Coleman, 1991) – simply that happily married women reported better health than unhappily married women (Roth-Roemer & Kurpius, 1996). The physical health of an individual has also been found to be linked to marital distress. For example, even thinking of conflicts within their marriages made women's blood pressure increase (Carels, Sherwood & Blumenthal, 1998) and these increases were more pronounced with women who reported high marital dissatisfaction (Baker et al, 1999). Marital dissatisfaction has even been found to affect men's sperm count and women's premenstrual symptoms – the lower the marital distress the higher the sperm count in

men (Tuschen-Caffier et al, 1999), and the lower the marital dissatisfaction of women, the fewer premenstrual symptoms (Coughlin, 1990). Thus, marital dissatisfaction can even influence men and women's biological health. Indeed, individuals satisfied with their marriages reported better sleep, fewer depressive symptoms, and fewer physician visits than those who were less satisfied (Prigerson, Maciejewski & Rosenheck, R. 1999) and positive marital interactions reduced the probability of poor eating habits, substance use and inadequate sleep (Wickrama, Conger & Lorenz, 1995).

Marital Dissatisfaction and Physical Health

An individual's satisfaction with their marriage can also determine how healthy they behave and how they cope. Supportive relationships have been shown to directly influence whether an individual engages in health-promoting behaviors and whether they use maladaptive coping behaviors (Lewis, Rook & Schwarzer, 1994). Good communication in marriages has even been shown to have a profound influence on recovery from physical ailments and death. Husbands who reported that they disclosed more to their wives were less likely to die and/or be rehospitalized within the next year following a myocardial infarction (Helgeson, 1991). As evidenced, marital dissatisfaction has a powerful influence on health – it has the power to enhance health or make it worse.

But within the group of married people, what kind of role does the physical health of the individuals within marriage have on their marital dissatisfaction? Research has found that health also affects marital dissatisfaction. The health of an

individual has been found to play a role in his/her marital dissatisfaction. For example, men and women who have periodontal disease and dental cavities (Marcenes & Sheiham, 1996); who report high levels of physical symptoms (Barnett, Davidson & Marshall, 1991) and rate their health poorly (Ganong & Coleman, 1991) are more likely to report low marital quality than those with better health. The development of ulcers has also been found to be associated with low levels of marital love for their spouses (Medalie, Stange, Zyanski & Goldbourt, 1992). Additionally, women in the upper quartile on health perceptions reported higher partner role quality and fewer marital concerns than women in the lower quartile (Roth-Roemer & Kurpius, 1996). Thus, the health status of individuals within marriage has been found to be strongly associated with their marital dissatisfaction.

Not only was the current rate of dissatisfaction with an individual's marriage related to physical health, but changes in marital quality were correlated with changes in physical health (Wickrama, Conger & Lorenz, 1995). Booth and Johnson (1988) found that respondents who experienced a decline in health reported small increases in marital dissatisfaction. They also found that the association between a decline in the individual's health and his/her risk of divorce was not statistically significant (Booth, A. & Johnson, D., 1988). But what happens when there is a decline in physical appearance, does it affect marital happiness, as do declines in physical health? Is the effect of a decline in physical health different from a decline in physical appearance? Does the marital satisfaction of the individual whose health or physical appearance declines decrease even more?

As described above, the size of the health gain from marriage has been found

to be remarkable – it may be as large as the benefit from giving up smoking (Wilson & Oswald, 2005). But does this health gain also come with an increase in body weight? Marital dissatisfaction has also been shown to affect body weight. In a study looking at women who had gastric restriction surgery for the treatment of morbid obesity, marital dissatisfaction was associated with weight gain a year later (Wickrama, Conger & Lorenz, 1995). Though BMI (the standard measure within the field of body weight) has not been found to predict the likelihood of marriage or divorce (Fu & Goldman, 2000), body weight has been found to be associated with marital status – marriage has been associated with significant weight gain and divorce with significant weight loss (Sobal & Rauschenbach, 2003). Does physical appearance (i.e., weight gain) follow the same trajectory as physical health mentioned above – in that, since marital satisfaction has been found to affect body weight, does body weight also affect marital dissatisfaction? Does increased body weight affect marital satisfaction? According to social exchange theory that would define increased body weight as a cost, marital satisfaction would increase as a result of increased body weight in the same way that decreased health leads to higher marital satisfaction – keeping in mind that a weight gain by a very skinny person (i.e., BMI < 20 = underweight) could have a positive impact on the way she is perceived. This study hypothesized that weight gain would become a liability above a BMI of 20. Few studies have looked at this, and even fewer have produced conclusive evidence. The closest one is Sobal, Rauschenbach and Frongillo's (1995) study looking at obesity and marital quality. Body weight, marital unhappiness, and marital problems were examined in a national telephone survey of 1,980 married adults. They found that

obese women reported less marital unhappiness, and that men and women who gained weight were happier with their marriage. Outside of these two findings, the authors found no other significant associations between weight and marital quality, but they argued that the topic required further study. Although their sample was large, they found only a small number of people for whom marital quality measures changed between the baseline and the follow-up assessments. The authors argued the need for contemporary data to be used, as their data were dated, being from 1979 and 1980, as well as needing a longer period than a one-year follow-up to assess the role of weight and marital satisfaction. The need for further study in this area that Sobal, Rauschenbach and Frongillo (1995) identified motivated the present study.

The only other study examined health related behaviors and risk of divorce in the U.S. Fu and Goldman's (2000) study looking at the association between health-related behaviors and the risk of divorce found that, while smoking and drug use were strongly related to risks of marital dissolution, obesity and short stature were not. However, they looked at premarital variables and used marital status, not marital satisfaction. Social exchange theory would explain their findings because if the lowered health existed prior to marriage the partner had already evaluated it within their cost/reward framework and had accepted it (if they got married). But what happens if their partner gains weight within marriage?

There is remarkably little information on the influence of body weight on marital dissatisfaction – and even less looking at the association of all three (mental health, physical health and physical appearance) on marital dissatisfaction. There is a single study measuring the effect (or lack thereof) of body weight on marital

dissatisfaction (Sobal, Rauschenbach & Frongillo, 1995), and the existing research has shown contradictory results that led Fu and Goldman (2000) to suggest that the association between health-related physical characteristics and marital stability and quality may be complicated and require further study. We do know, however, that a large amount of body fat (which generally equals a higher BMI) is unhealthy as it increases the risk for many major diseases (Bjorntorp, 1993; Rebuff & Scrive et al, 1999), that lower levels of health (i.e., lower health status) increase marital dissatisfaction (Booth & Johnson, 1994) and increase the probabilities of marital dissolution (Joung, 1996; Waldron, Hughes & Brooks, 1996); and that high levels of depression increase marital dissatisfaction. However, the combined influence of all three (body weight, health status, and depression) on marital dissatisfaction is not known.

Mental Health & Marital Dissatisfaction

Even though married, employed men and women have the lowest overall depressive affect scores and unmarried, unemployed men and women have the highest scores (Guarnaccia, Angel & Worobey, 1991), the level of depression of married individuals has been found to be influenced by a number of factors. Lower levels of health (Whitlatch, Feinberg & Sebesta, 1997), physical limitations (Whitboune, 2001) and both longer term and recent changes in perceived health (Turner, Killian & Cain, 2004) have been found to be related to higher rates of psychological distress and increased symptoms of depression, respectively. Furthermore, marital status, employment and cohabitation are all factors that have

been found to influence depression; marital losses increase levels of depression, whereas marital gains decrease depression levels (Simon & Marcussen, 1999). Employment and marital status have also been shown to affect depression rates, for the highest rates of depression are found in unemployed divorced women, and the lowest in employed married men (Gutierrex-Lobos, 2000).

Additionally, mental and physical health overlap as obesity and depression have both been found to be associated with hypertension, coronary heart disease, diabetes mellitus, and an increased mortality risk, and are associated with each other (obesity has been found to increase the risk for depression across race and genders, even after controlling for chronic physical disease, familial depression and demographic risk factors) (Dong, Sanchez & Price, 2004). Therefore, examination of both the separate and combined effects of mental health and physical appearance on marital dissatisfaction is needed.

Changes in Marriage and Marital Dissatisfaction

There is substantial research showing that marital dissatisfaction increases over time - a normal course in relationships. Divorce is more likely to occur once marital dissatisfaction has increased substantially (Gottman & Levenson, 2002). Research has found there to be two periods that are critical to marital dissolution and have the highest levels of marital dissatisfaction – divorces tend to occur within the first seven years of marriage (due to the first seven years as being a period characterized by volatile and high emotions) or around the fourteenth year (usually around midlife when most people have teenage children) (Gottman & Levenson,

2002).

Chapter 3: Hypotheses

The following are exploratory hypotheses that predict opposite directions. This study examined the relationships that each model predicts, to determine whether the results support one theoretical model rather than the other.

1. Marital exchange theory: argues that if a wife's worsening (diminishing) mental health, physical health and physical appearance are costs in the marriage (based on previous research describing decreases in physical appearance (Sobal, Rauschenbach & Frongillo, 1995; Bjorntorp, 1993; Benjamin & Kamin-Shaaltiel, 2003), mental health (Wolcott, 1999; Dong, Sanchez & Price, 2004), and physical health (Ganong & Coleman, 1991; Carels, Sherwood & Blumenthal, 1998) as costs in America), then the wife will perceive herself as less valued on the marriage market, with less to offer; thus she will be happier with her current relationship and her marital dissatisfaction will decrease accordingly.

    a) If the mental health of the wife decreases over time (becomes a cost) then her marital dissatisfaction will decrease.

        i) if the wife's level of depression increases, then her marital dissatisfaction will decrease.

    b) If the physical health of the wife decreases (becomes a cost) then her marital dissatisfaction will decrease.

i) if the wife's physical health decreases, then her marital dissatisfaction will decrease.

c) If the wife becomes less attractive (i.e., her physical appearance becomes a cost) then her marital dissatisfaction will decrease.

i) if the wife gains weight then her marital dissatisfaction will decrease.

d) If mental health, physical health and physical appearance of the wife all decline, then her marital dissatisfaction will decrease even more.

2. Social Norms theory suggests that there is a high reward for conformity to societal expectations - thus deviance from them comes at a high cost.

a) If the mental health of the wife decreases, then her marital dissatisfaction will increase.

i) if the wife's level of depression increases, then her marital dissatisfaction will increase.

b) If the physical health of the wife decreases, then her marital dissatisfaction will increase.

i) if the wife's physical health decreases, then her marital dissatisfaction will increase.

c) If the wife becomes less attractive then her marital dissatisfaction will increase.

i) if the wife gains weight then her marital dissatisfaction will increase.

d) If the mental health, physical health and physical appearance of the wife all decline, then her marital dissatisfaction will increase even more.

3. Previous research explains why other factors, like having children, or having been married for over 7 years (the average number of years for first divorce – Cherlin, 1981; Kurdek, 2000) affect marital dissatisfaction.

a) having children will be linked to increased marital dissatisfaction of the wife.

b) length of marriage: being married for 7 years or more has been linked to increased marital dissatisfaction of the wife.

4. Moderating variables: If a couple has children, or the marriage has lasted longer than 7 years, the wife's mental health, physical health, and physical appearance will have a weaker effect on marital dissatisfaction.

Independent variables:

The independent variables for this study are poor mental health, poor physical health and poor physical appearance. Mental health was defined as the wife's level of depression, physical health as wife's rating of her own health status, and physical appearance as an equation of body weight and height (BMI).

Dependent variable:

The dependent variable for this study is marital dissatisfaction - defined as the wife's rating of the dissatisfaction that she has with her marriage.

Control variables:

Other relevant socio-demographic factors are also included to control for their

possible impact on the dependent and independent variables. The control variables in this study are: length of marriage, number of children the wife has, race, and income - as they have been shown to have a direct impact on marital dissatisfaction.

Chapter 4: Methods

For this study, secondary data analyses were used to examine data from a large nationally representative sample of 12, 686 young men and women who were between the ages of 14 and 22 when they were first interviewed in 1979. The database is called the National Longitudinal Survey of Youth 1979 and was collected yearly from 1979-1994 and biennially from 1996 to the present and is currently ongoing (there have been 20 surveys since 1979). It is considered to be representative of all American men and women born in the late 1950s and early 1960s. For the proposed study only the sample of young women was used; 6,283 young women were interviewed in 1979 and by 2002, 3,955 young women remained in the study. The NLSY sample is a multi-stage, stratified random sample. The NLSY had very high retention rates – close to 90 percent from 1979 to 2002.

Ideally both the husband's and the wife's dissatisfaction ratings would be used, however, only the wife's marital satisfaction rating is available, thus each variable will only be tested based on the wife's self report data. Despite this limitation, there have been some studies that have shown that information from wives is a better predictor of marital satisfaction, or dissatisfaction, than information from husbands, therefore, the results from this study will still be beneficial for adding to the literature (Bentler & Newcomb, 1978; Floyd & Markman, 1983; Karney,

Bradbury, Fincham, & Sullivan, 1994).

The sample for this study includes an overrepresentation of minorities, therefore, appropriate weights were used. When the NLSY started in 1979, there were 2,819 white women, 901 poor white women, 1,561 Black women, and 1,002 Hispanic women interviewed. Percentage-wise, in 1979 the sample was 50.2% white, 30.1 percent Black, and 19.7% Hispanic. In 2002, the sample was 50.7 percent white, 30.6 percent black, and 18.6 percent Hispanic.

The National Longitudinal Surveys were primarily started with the purpose of collecting data on young Americans' labor force experiences and their investments in education and training. It is sponsored by the Bureau of Labor Statistics at the U.S. Department of Labor. However, the actual dataset contains a wide variety of questions and addresses much broader issues than just employment and education. The NLS was also funded by different agencies to ask specific sets of questions in their interest areas: for example, the U.S. Department of Health and Human Services and the National Institute on Aging added questions.

Questions

The NLSY dataset is composed of three survey instruments: questionnaires that are the main source of information for each respondent; questionnaire supplements that contain additional sets of questions; and documents such as the household interview form that have information on members of each respondent's household.

Sample

The following variables were tested at two different points in time: 1992 and 2002. The women were all married and aged 27-35 in 1992 (n=2,279). Due to the addition of an over-40 health module between 1992 and 2002, only women aged 40-45 answered all the relevant questions for this study. Due to this constraint, there is a reduced sample size for 2002 and for the change from 1992 to 2002 (n=1,831). This study looked at all women married in or before 1992, and the same respondents in 2002 who were 40 years old or older (to age 45). All of the following variables measuring the change from 1992 to 2002 were computed using the following formula:

Change from 1992 to 2002 = 2002 score – 1992 score

Therefore, the changes computed for the variables from 1992 to 2002 could be positive (indicating the characteristic worsened over time; i.e., the respondent became less happy with her marriage, more depressed, physically limited or gained weight), zero (indicating no change) or negative (indicating the characteristics improved over time; i.e., the respondent became happier with her marriage, less depressed, not physically limited or lost weight).

Variables

Marital dissatisfaction, the dependent variable, was measured by the question "Now, I have some additional questions about your current relationship. Would you say that your marriage is…" and respondents were asked to answer "1" very happy, "2" fairly happy, or "3" not too happy. A coding value of "4" was added to the marital dissatisfaction scoring for those respondents who had divorced from 1992 to 2002, because they were defined as being extremely unhappy. Marital

dissatisfaction was assessed in the NLSY in 1988 through 2002, every other year.

Change in Marital Dissatisfaction: Marital satisfaction was calculated at time 1 and again at time 2. The respondent's satisfaction level at time 1 was then subtracted from the level at time 2. If the resulting change score was positive, then the respondent's marital dissatisfaction had increased, and if it was negative, then the respondent's marital dissatisfaction had decreased. If it was zero, then there was no change.

Physical health, an independent variable, was measured by the question "Would you be limited in the kind or amount of work you could do on a job for pay because of your health?" and respondents were asked to answer "1" yes, or "0" no. This question was asked in every NLSY wave from 1979 to 2002.

Change in Physical health - physical health was calculated at time 1 and time 2. The respondent's health status at time 1 was then subtracted from time 2. If the recently changed score was positive, then the respondent's health had declined, if it was negative, then the respondent's health had improved, and if it was zero, then there was no change.

Mental health, an independent variable, was measured by the CES-Depression scale. The CESD scale asks nine questions, asking respondents "After each statement, please tell me how often you felt this way during the past week…I did not feel like eating, my appetite was poor; I had trouble keeping my mind on what I was doing; I felt depressed; I felt that everything I did was an effort; my sleep was restless; I felt that I could not shake off the blues, even with help from my family or friends; I felt lonely; I could not get "going"; and I felt sad. For each of the questions,

respondents were asked to answer: "0" rarely, none of the time, one day; "1" some, a little of the time, 1-2 days; "2" occasionally, moderate amount of the time, 3-4 days; or "3" most, all of the time, 5-7 days. The nine question responses were summed, with the index of depression being an individual's total score that can range from 0-27. Cronbach's alpha was calculated for internal consistency in 1992 and in 2002 – both with high reliability (around 80% in both years) (see Tables 1 & 2 below).

Table 1: Cronbach's Alpha for CESD Scale 1992:

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
0.796	0.810

Table 2: Cronbach's Alpha for CESD Scale 2002:

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
0.804	0.813

Change in mental health: The CES-Depression scale was first used in the NLSY in 1992, and then consistently through 2002. The mental health index was calculated at time 1 and again at time 2. The respondent's depression score at time 1 was subtracted from their score at time 2, creating the change score. If the change was positive, then the respondent's depression level would have increased, if it was negative, then their depression level had decreased, and if it was zero, then there was no change.

Physical appearance, an independent variable, was measured by the

respondent's self-reported height and weight measurements and were used to create a reported Body Mass Index (BMI) of weight/height^2 in pounds and inches (BMI = [weight in pounds/(height in inches) x (height in inches)] x 703) (Sobal, Rauschenbach & Frongillo, 2003). Several studies have shown that self-reported height and weight measurements are reasonably accurate (Steward, 1982; Stunkard & Albaum, 1981; Wing, Epstein, Ossip, & LaPorte, 1979). Height and weight were asked in every wave from 1979-2002.

Change in physical appearance: Each respondent's BMI at time 1 (1992) and again at time 2 (2002) were calculated. BMI at time 1 was subtracted from BMI at time 2, and the change in the physical appearance variable was created. This is the measure of change in physical appearance/weight over time. If the result was positive, then the respondent gained weight, if it was negative, then the respondent lost weight, and if it was zero, then the body weight of the respondent did not change.

Control variables – There were four control variables in this study: length of marriage, children, income and race.

Chapter 5: Empirical Evidence from NLSY79

Data: NLSY79

Using 1992 and 2002 rounds of interview from the NLSY79 dataset, the hypothesized relationships between marital dissatisfaction and mental health, physical health, and physical appearance are examined. In addition to the observations on

marital dissatisfaction, the 1992 round includes health items for all respondents who are between 27 and 35 years of age. After cleaning up the data, which included removing missing values not relevant for this study, the 1992 round yielded more than two thousand (2,279) observations. Similarly, the 2002 round, which only includes health items for women 40 - 45 years of age, yielded slightly less than two thousand (1,831) observations. Either round of observations, 1992 or 2002, allows for preliminary testing of the stated hypotheses about the relationship between marital dissatisfaction and other variables on a cross sectional basis. Nonetheless, a stronger hypothesis-testing framework, which entails using the changes between 1992 and 2002 observations, was used to shed light on the hypothesized relationship between marital dissatisfaction and poor mental health, physical health, and physical appearance.

In addition to the marital satisfaction variable, the 1992 and 2002 rounds include the nine relevant items which were summed to construct the CES-D variable used in this study.[1] This method of constructing the CES-D variable, i.e., using the nine indicators, is consistent with those found in the literature. For the purpose of this study, in addition to mental health, physical health, and physical appearance, other relevant explanatory variables, such as length of marriage, income, number of children, and race were also extracted. These variables allow for controlling other potential influences, such as those of socio-economic and demographic factors, on marital dissatisfaction.

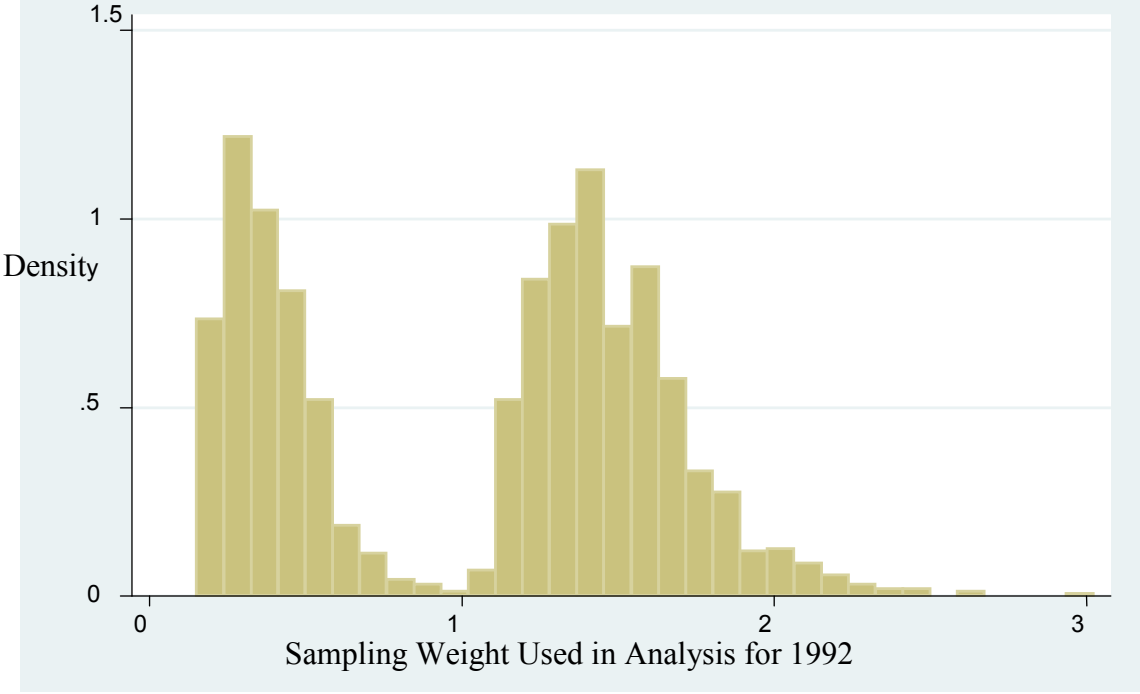
[1] These indicators are based on the responses to nine specific questions, which were asked from the NLSY respondents in 1992.

Properties of the Sample

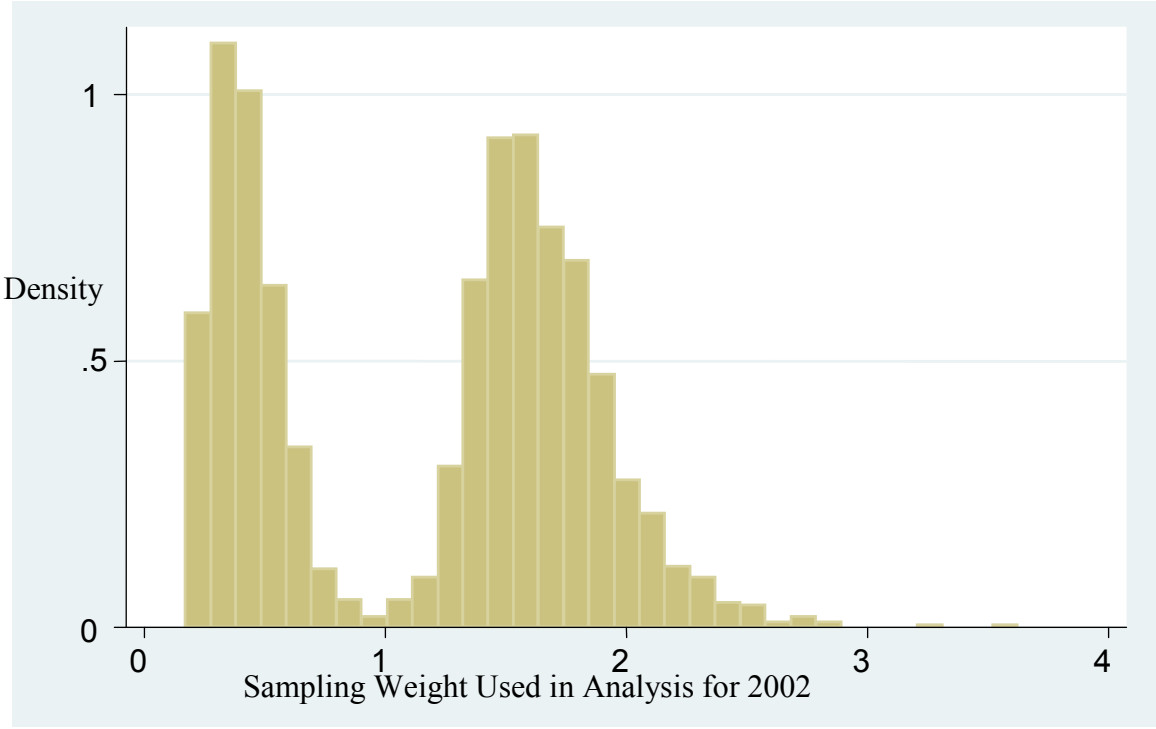
Throughout the analysis proper consideration was given to the way NLSY79 sampled respondents (because the investigators oversampled minority race categories). Therefore, throughout this study, proper weights were used to adjust to the oversampling design. Graph 1 and Graph 2 depict the histograms of the weights for 1992 and 2002 rounds. The weights used in 1992 and in 2002 are not that different from each other, as the histograms in Graph 1 and Graph 2 exemplify. These histograms show that the weights are bi-modal and a bit skewed to the left. However, in practice, weighted results and unweighted results did not materially change the inferences from this study.

Throughout the analysis, properties of data and variables of interest were considered when conducting statistical analysis. Since the dependent variable (marital satisfaction) is an ordinal variable (coded from 1 to 4: 1=very happy, 2=fairly happy, 3= not too happy, and 4=extremely unhappy), appropriate statistics, like Spearman Correlations and Ordered Logistic Regressions were used. These statistical tools appropriately handle the limited (and ordered) nature of the underlying variables of interest in this study.

Graph 1: Sample Weights Used in NLSY79 Data Round in 1992



Graph 2: Sample Weights Used in NLSY79 Data Round in 2002



Weighted and Unweighted Descriptive Statistics

Before conducting statistical analysis, all of the variables were cleaned by dropping observations with missing values. The missing values were generated when respondents refused to answer, did not know the answer, or were not asked the question due to other reasons. Also, a few respondents were not interviewed due to attrition. Subsequently, weights were adjusted by dividing by the mean weight to allow for proper interpretation of the results.

Marital Dissatisfaction

The dependent variable, marital dissatisfaction, was coded from 1 to 3 (1=very happy, 2=fairly happy, and 3=not too happy with a "4" added from respondents who were divorced as indicating extreme unhappiness. Graph 3 and Graph 4 provide relevant histograms for 1992 and 2002 data, respectively. Tables 3 through Table 6 provide more detailed statistics for marital dissatisfaction and other variables. In 1992, 63% of respondents rated their marriage as very happy, 17% as fairly happy, 1% as not too happy and 17% as extremely unhappy (See Table 4). In 2002, 56% of respondents rated their marriages as very happy, 20% as fairly happy, 4% as not too happy and 19% as extremely unhappy (See Table 6). It is worth noting that reported weighted and unweighted relative frequencies show that the difference between these two measures is plus or minus 5 percentage points.

There is substantial research showing that marital satisfaction declines over time - a normal course in relationships and that divorce is more likely to occur once marital satisfaction has decreased substantially (Gottman & Levenson, 2002). Gottman and Levenson's argument is exemplified in the very low percentage of

respondents who reported a marital satisfaction of not too happy (1% in 1992 and 4% in 2002), as the coding of extremely unhappy with their marriages (coded "4") are respondents who are divorced. Therefore, very few people stay in marriages that are not happy.

Based on reported weighted statistics for both 1992 and 2002 rounds of observations, the majority of respondents appear very happy with their marriage. Table 1 and Table 3 show that, while the majority of respondents in both 1992 and in 2002 reported very happy marriages, over the course of ten years, respondents' marriages became slightly less happy on average. Also, based on Table 4 and Table 6, almost a quarter reported they were not at all happy with their marriage (around 20% had gotten divorced by 2002, which is 3 percentage point is higher than that of 1992).

Graph 3: Marital Dissatisfaction Histogram for 1992

Graph 4: Marital Dissatisfaction Histogram for 2002

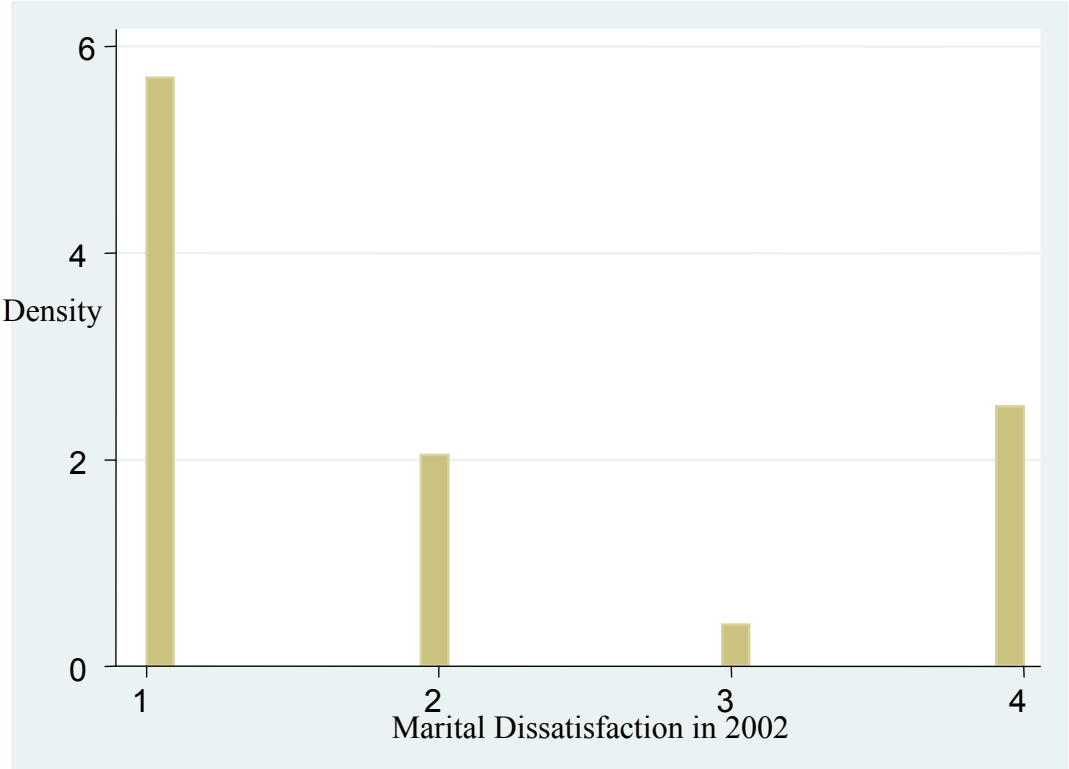


Table 3: Descriptive Statistics for Variables in 1992

	Mean	Std. Dev.
Marital Dissatisfaction 1992	1.72	0.03
Physical Health 1992	0.06	0.01
Physical Appearance 1992 (BMI)	24.86	0.13
Mental Health 1992 (CESD)	5.07	0.12
Income 1992	63,923.13	3,938.01
Length of Marriage 1992	9.92	0.10
Race	0.12	0.01

Number of Children 1992	0.25	0.01

Note: n=2279, population size = 2325.22; Std. Dev. = Linearized Standard Deviation.

Table 4: The Frequency of the Marital Dissatisfaction variable in 1992:

Marital Dissatisfaction 1992	Proportions
1	0.63
2	0.18
3	0.01
4	0.17

Note: Respondents answered "1" if they were "very happy" with their marriage, "2" if they were "fairly happy" with their marriage, "3" if they were not so happy with their marriage, and "4" if they were extremely unhappy with their marriage. N=2279, population size = 2325.22

Table 5: Weighted Descriptive Statistics for the Variables in 2002

	Mean	Std. Dev.
Marital Dissatisfaction 2002	1.86	0.03
Physical Health 2002	0.11	0.01
Physical Appearance (BMI) 2002	26.74	0.16
Mental Health (CESD) 2002	3.45	0.12
Income 2002	63,093.22	1,859.941
Length of Marriage 1992	9.91	0.12
Race	0.12	0.01
Number of Children 2002	2.39	0.03

Note: n=1831, population size = 1898.21; Std. Dev. = Linearized Standard Deviation.

Table 6: Frequency Table for the Marital Dissatisfaction Variable for 2002

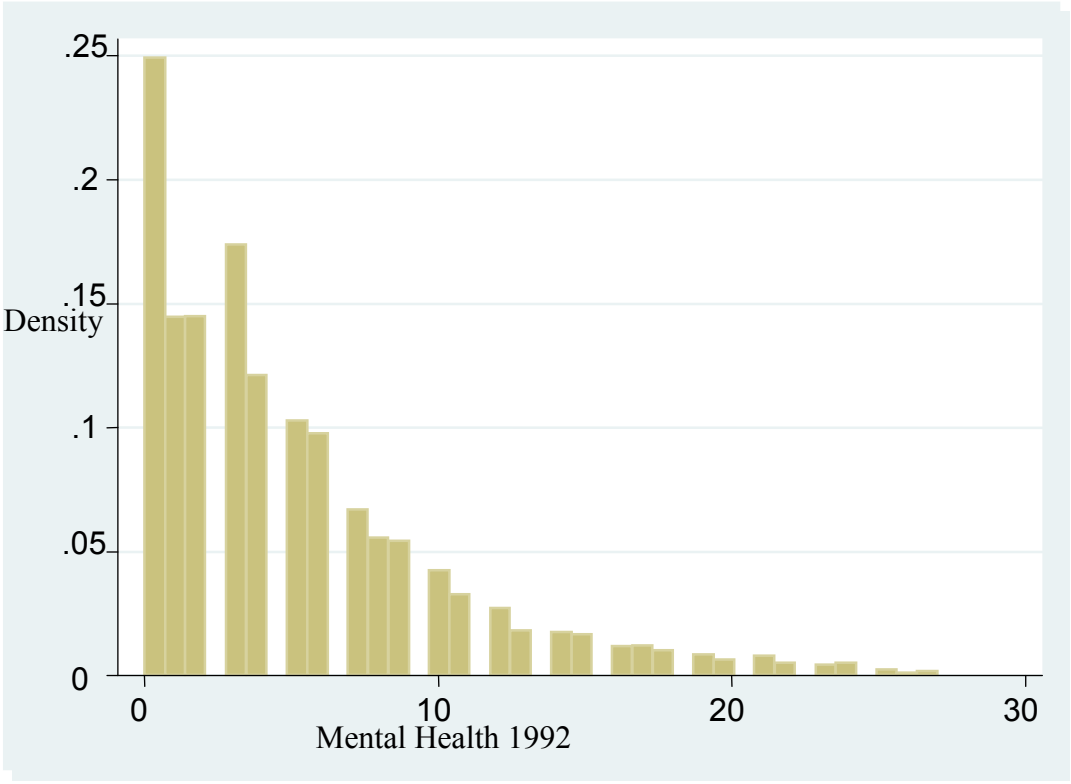
Marital Dissatisfaction 2002	Proportions
1	0.56
2	0.20
3	0.04
4	0.19
Total	1

Note: Respondents answered "1" if they were "very happy" with their marriage, "2" if they were "fairly happy" with their marriage, "3" if they were not so happy with their marriage, and "4" if they were extremely unhappy with their marriage.

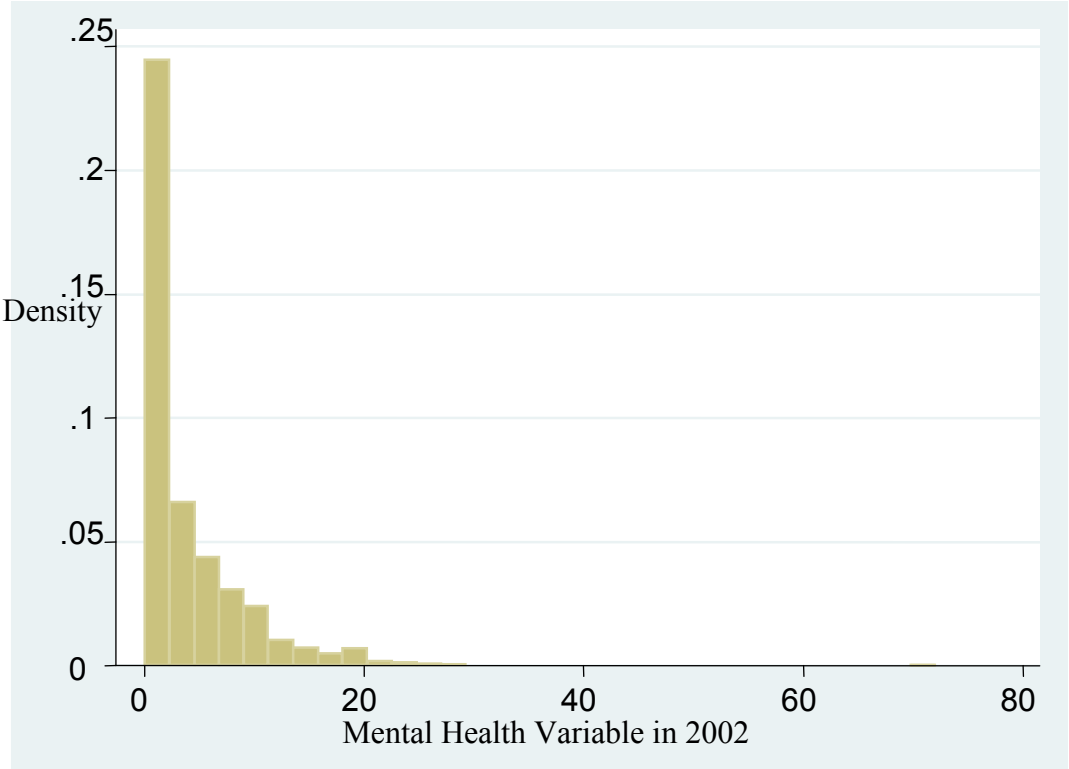
Mental Health

The mental health variable was created by summing the nine question CESD scale – creating a scale of 0-27 – the higher the score, the more depressed the respondent. Based on the descriptive statistics in Table 3 and Table 4, in 1992, respondents reported on average a CESD score of 5.07 with a standard deviation of 0.12 compared to 3.45 and 0.11, respectively, in 2002. A score of 5 on the CESD scale reflects a low level of depression; therefore, the average depression score for respondents in both years indicate very few depressive symptoms. The histograms for mental health (CESD) indicators in 1992 and 2002 rounds show that this variable is becoming more tightly distributed, although, it is highly skewed to the left (see Graph 5 and Graph 6). Over the ten year period, respondents became less depressed

Graph 5: Mental Health Histogram for 1992



Graph 6: Mental Health Histogram for 2002



Physical Health

The physical health variable was created by merging the two questions "does health limit kind of work respondent can do?" and "does health limit amount of work respondent can do?" into one physical health variable (see Table 3 and Table 5). A "0" indicates no physical health limitations, and a "1" indicates a physical health limitation. In 1992, the average physical health limitation was 0.06 with a standard deviation of 0.01 (see Table 5). These must be respectively compared to 0.11 and 0.01in 2002 (see Table 5). In 1992, 94% of respondents reported having no physical health limitation, and 6% reported having a physical health limitation. In 2002, 89%

of respondents reported having no physical health limitations, and 11% reported having a physical health limitation. Thus, most respondents did not report having a physical health limitation – though 11% is a large number of respondents reporting having a physical health limitation (nearly double from 1992 to 2002), and is surprising in a fairly young (all respondents under the age of 45) respondent pool.

Table 7: Frequency Table for the Physical Health Variable for 1992

Physical Health 1992	Proportions
0	0.94
1	0.06
Total	1

Note: "0" is respondent does not have any physical health limitations, and "1" is respondent has a physical health limitation. n=2279, population size=2325.22.

Table 8: Frequency Table for the Physical Health Variable for 2002

Physical Health 2002	Proportions
0	0.89
1	0.11
Total	1

Note: "0" is respondent does not have any physical health limitations, and "1" is respondent has a physical health limitation. n=1831, population size=1898.21.

Physical Appearance

The physical appearance variable was created for 1992 and 2002 by using the following formula for BMI (Fu & Goldman, 2000):

$$BMI = 703(\text{ weight in pounds}) / (\text{height in inches})^2$$

The inputs to this process (computation of BMI index) were respondents' heights and weights, which were extracted from the NLSY79 dataset. Table 3 and Table 5 depict descriptive statistics for these variables. A BMI of under 18.5 is considered underweight, 18.5-24.9 is considered normal weight, 25-29.9 is considered overweight and over 30 is considered obese (see Sobal, Rauschenbach & Frongillo, 2003).

In 1992, the average respondent was overweight, with an average BMI of 24.86, and a standard deviation of 0.12, compared to 2002, when the average respondent was even more overweight with an average BMI of 26.73 (SD =0.16). Though the average BMI in 1992 is within the "normal" range (up to 24.9), the 2002 BMI average is clearly within the "overweight" category, both the sample mean and the sample standard deviation increase---the distribution became wider. The respondents from 1992 to 2002 became slightly more overweight (increase of about 2 points). This is consistent with previous research that found that people are more likely to gain weight after they marry and as they age (Rauschenbach, Sobal & Frongillo, 1995). Also, this study found that the range of their BMI increased from 1992 to 2002 –some respondents were thinner (minimum went from a BMI of 9 to 7) and some fatter (maximum went from a BMI of 58 to 70) relative to the past period.[2]

Control Variables

The number of children, household income, the length of marriage, and race were used as controls to examine the relationship between mental health, physical

[2] In 2002, less than 1% of respondents weighed under 100lbs, approximately 13% of respondents weighed between 100 and 125lbs, 31% of respondents weigh between 125 and 150lbs, 20% of respondents weigh between 150 and 175lbs, 15% weigh between 175 and 200 lbs, 5% weigh between 200 and 225lbs, and 5% weigh above 225lbs.

health and physical appearance and marital satisfaction. Tables 9, 10, 11 and 12 depict descriptive statistics for these variables.

Reported weighted frequencies, depicted in Table 9, show that, in 1992, 75% of respondents did not have any children, 23% had one child, and the rest 2 or more children. By 2002, 15% of respondents had one child, 48% had two children, and the rest had three or more children (see Table 10). Based on weighted statistics in Table 3, in 1992, respondents had on average 0.25 children (SD = 0.01) compared to 2.39 (SD=0.02) in 2002 (see, Table 5).

Table 9: Frequency Table for Number of Children Respondents have in 1992

Number of Children 1992	Proportions
0	0.76
1	0.23
2	0.01
3	<0.01
Total	1

Note: "0" = no children, "1" = one child, "2" = two children, and "3" = three children.
n = 2279, population size = 2325.22

Table 10: Frequency Table for Number of Children Respondents have in 2002

Number of Children 2002	Proportions
1	0.15
2	0.47
3	0.24
4	0.09
5	0.03
6	0.01
>7	<0.01
Total	1

Note: "0" = no children, "1" = one child, "2" = two children, and "3" = three children etc. n = 1831, population size = 1898.21

Based on weighted descriptive statistics in Table 3 and Table 5, in 1992, the average income was $63,923.13 (SD=3,938.01), compared to $63,093.22 (SD=1,859.94) in 2002. This implies a 1.29% decline in the household's income over the 1992 to 2002 decade. This is a rather large decline in household income, if cost of inflation (erosion of purchasing power) is also taken into account.[3]

Length of marriage was calculated by subtracting the age at marriage from age at interview in 1992. As depicted in Table 3 and Table 5, the weighted average length of marriage in 1992 is 9.92 years with a standard deviation of 0.10. Similar estimates are obtained from 2002 round (see Table 5). Table 11 shows that the length of marriage for 53% of respondents is less than 10 years. Also the same Table show that 16% of responded are married for 5 years or less (see Table 11).

Table 11: Frequency Table for Length of Marriage in 1992

Length of Marriage 1992	Proportions
0	0.01
1	0.02
2	0.02
3	0.03
4	0.04
5	0.05
6	0.06
7	0.06

[3] Over the 1992-2002 decade, the nominal economy, as measured by the nominal Gross Domestic Product, grew by 5.2 percent on annual basis. Since, inflation rate during the same period was close to 2% on annual basis, then one could conclude that the real economy grew at around 3.2 percent on annual basis during the 1992-2002 decade.

8	0.07
9	0.09
10	0.09
11	0.07
12	0.09
13	0.09
14	0.07
15	0.05
16	0.04
>16	0.10
Total	1

Note: n = 2279, population size = 2325.22

Table 10 shows that, in 1992, 88% of respondents were white (non-minorities were coded "0") and the rest (12%) were minorities (all minorities were coded "1"). This appears close to the U.S. population distribution, which is reported by the 2000 U.S. Census (US Census 2000, http://www.census.gov/prod/2005 pubs/censr-22.pdf) 2000 U.S. Census reports that 75% of the U.S. population is non-minorities and 25% are minorities (versus 12% in Table 12).

Table 12: Frequency Table for the Race Variable in 1992

Race 1992	Proportions
0	0.88
1	0.12
Total	1

Note: Respondents Race. "0" are respondents who are non-minorities, and "1" are respondents who are minorities. n = 2279, population size = 2325.22.

The Change from 1992 to 2002

To compute the change within the variables from 1992 to 2002, the reported variable in 1992 was subtracted from the same variable in 2002. This generated a positive number (indicating a worsening condition; i.e., less happy marriage, higher level of depression, weight gain, and a physical limitation), a negative number (indicating a better condition; i.e., happier marriage, less depression, lower weight and no physical limitations), or zero (indicating no change in the variable from 1992 to 2002).

Table 14 shows that, from 1992 to 2002, respondents on average reported a change of 0.14 in their marital dissatisfaction (SD =1.254) – given the standard deviation and the small change that 0.14 implies, this means that from 1992 to 2002 respondents reported on average virtually no change in marital dissatisfaction. Respondents reported an average change of 1.92 in their body mass indexes (SD = 0.09) – indicating an increase in respondents body weight as their BMI scores increased by almost 2 points. Respondents reported an average change of -1.63 in their mental health (SD = 0.15) indicating a decrease in their level of depression by nearly two points. On average, respondents had about two children more (2.13) in 2002 than in 1992 (SD = 0.03) and saw a decrease in their income by over $800 (Table 3-Table 5). Table 14 represents the descriptive statistics for the change in the variables in this study from 1992 to 2002.

From 1992 to 2002, 24% of respondents became more dissatisfied with their marriages, 15% of respondents became less dissatisfied with their marriages, and

63% of respondents had no change in their dissatisfaction with their marriages (Table 13).

Table 13: Change in Marital Dissatisfaction from 1992 to 2002

Change in Marital Dissatisfaction From 1992 to 2002	Proportions
-3	0.05
-2	0.02
-1	0.07
0	0.62
1	0.13
2	0.06
3	0.05
Total	1

Note: A positive number (ex. 1, 2 or 3 indicates respondents who became more dissatisfied with their relationship), a negative number (ex. -1, -2, or -3 indicates respondents who became less dissatisfied with their relationship) and 0 indicates no change in marital dissatisfaction. n = 1831, population size = 1898.21.

Table 14: Descriptive Statistics for Change from 1992 to 2002

	Mean	Std. Dev.
Change in Marital Dissatisfaction	0.15	0.03
Change in Physical Health	0.05	0.01
Change in Physical Appearance (BMI)	1.92	0.09
Change in Mental Health (CESD)	-1.64	0.15
Change in Number of Children 2002	2.14	0.03

Note: n = 1829, population size = 1898.21. Std. Dev. = Linearized Standard Deviation

In 1992, 6% of respondents had a physical limitation due to health compared to 11.3% in 2002. From 1992 to 2002, 4% of respondents' physical health declined, 9% of respondents' physical health improved, and 87% of respondents' physical health stayed the same (Table 15).

Table 15: Change in Physical Health from 1992 to 2002

Change in Physical Health From 1992 to 2002	Proportions
-1	0.04
0	0.87
1	0.09
Total	1

Note: A positive number indicates an increase in physical health, a negative number indicates a decrease in physical health and 0 indicates no change in physical health from 1992 to 2002. n = 1831, population size = 1898.21.

Hypothesis Testing

The hypothesized relationship between marital satisfaction, mental health, physical health, and physical appearance is based on marital exchange theory and social norms theory. Marital exchange theory predicts that deterioration of the wife's mental health, physical health and physical appearance leads to a decrease in her marital dissatisfaction. Thus, if the wife's CESD increases, or her ability to work (Physical Health) decreases, or her BMI increases, then her marital dissatisfaction will decrease. It also predicts that, if the wife's mental health, physical health, and physical status deteriorate (i.e., interaction term Mental Health * Physical Health *

Physical Appearance increases), then the wife's marital dissatisfaction would decrease even more.

Social norms theory predicts the opposite directions of the same hypotheses – deterioration of the wife's mental health, physical health and physical appearance leads to an increase in her marital dissatisfaction. Thus, if the wife's CESD increases, or her ability to work (Physical Health) decreases, or her BMI increases, then her marital dissatisfaction will increase. Just like with marital exchange theory, the last hypothesis predicts that, if the wife's mental health, physical health, and physical appearance deteriorate (i.e. interaction term Mental Health * Physical Health * Physical Appearance increases), then the wife's marital dissatisfaction would increase even more.

Bivariate Analysis: Correlation Analysis

In order to find out which hypotheses (if any) the data support, Spearman Correlations and Ordered Logistic Regressions were run. Spearman correlations were used to capture the bivariate relationship between ordinal (those lending themselves to ranking) variables. Since marital dissatisfaction is an ordinal variable, the Spearman correlation is the most relevant test looking for association and strength.

At first, a Spearman correlation (rho) was computed among the independent variables (mental health, physical health and physical appearance) and marital dissatisfaction, along with the control variables (race, income, length of marriage and number of children), for 1992, 2002 and for the change from 1992 to 2002 (see Table 16). The Spearman correlation (rho) shows the relationship between marital dissatisfaction and the other variables.

Marital Dissatisfaction in 1992

Table 16 shows the Spearman correlations for NLSY79's 1992 round data.

Table 16: Correlations for NLSY79's 1992 Round Data for all of the Variables with Marital Dissatisfaction

	Marital Dissatisfaction	
Variable	Correlation Coefficient	P>|t|
	(n = 2043)	
Physical Appearance (BMI) 1992	-0.01	0.52
Mental Health (CESD) 1992	0.24**	0.00
Physical Health 1992	0.02	0.29
Number of Children 1992	-0.14**	0.00
Length of Marriage 1992	0.14**	0.00
Race	0.20**	0.00
Interaction of Mental Health, Physical Health, Physical Appearance 1992	0.03	0.17
Interaction of Mental Health & Physical Appearance 1992	0.33**	0.00
Income 1992	-0.34**	0.00

Note: * = Correlation is significant at the 0.05 level (2-tailed). ** = Correlation is significant at the 0.01 level (2-tailed).

In 1992, marital dissatisfaction was found to be significantly correlated with mental health, number of children, length of marriage, race, income and the interaction of mental health and physical appearance. Direction wise, mental health as measured by CESD was found to be significant ($p<0.01$) and positively related to marital dissatisfaction indicating that respondents who reported high levels of depression were more likely to be dissatisfied with their marriages. The number of children respondents had was found to be significant ($p<0.01$) and negatively related to marital dissatisfaction indicating that the more children a respondent had the less dissatisfied they were with their marriages. Length of marriage was found to be significant ($p<0.01$) and positively related to marital dissatisfaction indicating that respondents who were married longer in 1992 were more likely to be dissatisfied with their marriages. The interaction of mental health and physical appearance was found to be significant ($p<0.01$) and positively related to marital dissatisfaction indicating that if respondents were depressed and reported a high body weight they were more likely to be dissatisfied with their marriages. The respondents' income was found to be significant ($p<0.01$) and negatively related to marital dissatisfaction indicating that the higher the income the respondent had the less dissatisfied they were with their marriages.

Poor physical health ($p=0.28$) and poor physical appearance ($p=0.52$) were found to not be significantly related to marital dissatisfaction – indicating that no relationship was found between physical health limitations and marital dissatisfaction and body weight and marital dissatisfaction. However, poor physical appearance coupled with poor mental health led to high marital dissatisfaction. Thus the

correlation shows that among women aged 27-35 poor physical appearance alone did not affect marital dissatisfaction, but if a respondent had high body weight and a high level of depression they had a high rate of marital dissatisfaction as well. All in all, the Spearman correlation shows that respondents who reported a high level of depression, a high level of depression with high body weight, and a long length of marriage were more likely to be dissatisfied with their marriages. Furthermore, respondents who had a large number of children and a high income were found to be less dissatisfied with their marriages. Thus, on a bivariate basis, the 1992 data supports that for those between the ages of 27 to 35, if a respondent had a high level of depression they were more likely to be dissatisfied with their marriage.

Marital Dissatisfaction in 2002

Table 17 shows the Spearman correlations for NLSY79's 2002 round data.

Table 17: Correlations for NLSY79's 2002 round data

	Marital Dissatisfaction	
Variable	Correlation Coefficient	P>|t|
	(n = 2068)	
Physical Appearance (BMI) 2002	0.34	0.12
Mental Health (CESD) 2002	0.17**	0.00
Physical Health 2002	0.09**	0.00
Number of Children 2002	-0.06**	0.01
Length of Marriage 2002	0.01	0.79

Race	0.16**	0.00
Interaction of Mental Health, Physical Health, Physical Appearance 2002	0.18**	0.00
Interaction of Mental Health & Physical Appearance 2002	0.06**	0.01
Income 2002	-0.35**	0.00

Note: * = Correlation is significant at the 0.05 level (2-tailed). ** = Correlation is significant at the 0.01 level (2-tailed).

In 2002, marital dissatisfaction was found to be significantly correlated with more of the variables than in 1992 – mental health (CESD), physical health, number of children, race, the interaction of mental health, physical health and physical appearance, the interaction of mental health and physical appearance, and income. Poor physical appearance ($p=0.12$) and the length of a respondent's marriage in 1992 ($p=0.79$) were found to not be significantly correlated to marital dissatisfaction. Direction wise, poor mental health was found to be significant ($p<0.01$) and negatively related to marital dissatisfaction indicating that respondents who reported a high level of depression were more likely to be dissatisfied with their marriages. Poor physical health was found to be significant ($p<0.01$) and positively related to marital dissatisfaction indicating that respondents who reported having a physical health limitation were more likely to be dissatisfied with their marriages. The number of children a respondent had in 2002 was found to be significant ($p<0.01$) and negatively related to marital dissatisfaction indicating that the more children a respondent had the less dissatisfied they were with their marriage. The interaction of mental health, physical health and physical appearance was found to be significant

($p<0.01$) and positively related to marital dissatisfaction indicating that if respondents were depressed, had a high body weight and a physical limitation, they were more likely to be dissatisfied with their marriages. Furthermore, the interaction between mental health and physical appearance was likewise found to be significant and positively related to marital dissatisfaction indicating that respondents who were depressed and had high body weight were more likely to dissatisfied with their marriages. Income was found to be significant ($p<0.001$) and negatively related to marital dissatisfaction indicating that respondents who reported a high income were more likely to be less dissatisfied with their marriages. Length of marriage was found to not have a relationship ($p=0.79$) with marital dissatisfaction indicating that in 2002 the length of respondents marriage in 1992 had no influence on their marital dissatisfaction in 2002.

All in all, the Spearman correlation shows that respondents who reported poor physical health and a high level of depression, were more likely to be dissatisfied with their marriages. Furthermore, the higher the income and the more children, the happier respondents were with their marriages. Thus, the 2002 data support that between the ages of 40 to 45, respondents who had a physical limitation or had a high level of depression or were depressed, physically limited and had a high body weight, were more likely to be dissatisfied with their marriages.

Changes in Marital Dissatisfaction from 1992 to 2002

Table 18 shows the correlations between the change in marital dissatisfaction and the change in the other variables in this study from 1992 and 2002. It is worth noting that changes in inherently constant factors (e.g., race) equals zero; hence, are

not reported.

Table 18: Correlations between the Change in Marital Dissatisfaction and the Change in the other variables during the 1992 – 2002 Period

	Change in Marital Dissatisfaction	
Variable from 1992 to 2002	Correlation Coefficient	P>|t|
	(n = 2068)	
Change in Physical Appearance (BMI)	-0.04*	0.05
Change in Mental Health (CESD)	0.06**	0.01
Change in Physical Health	-0.07**	0.00
Change in Number of Children	-0.07**	0.00
Change in Income	-0.23**	0.00

Note: * = Correlation is significant at the 0.05 level (2-tailed). ** = Correlation is significant at the 0.01 level (2-tailed).

The changes in marital dissatisfaction from 1992 to 2002 were found to be significantly correlated with changes in all of the variables from 1992 to 2002 (physical appearance, mental health, physical health, children, and income). Changes in respondents' physical appearance ($p=0.05$), mental health ($p=0.05$), physical health ($p<0.01$), number of children ($p<0.01$) and income ($p<0.01$) were found to be significantly related to changes in marital dissatisfaction. Remember that the 2002 data and the 1992 to 2002 change data use the reduced sample size n=1,831.

Direction wise, changes in physical appearance were found to be significant and negatively related to marital dissatisfaction indicating that respondents who gained weight from 1992 to 2002, reported a decrease in their marital dissatisfaction. Changes in mental health (as measured by the CES-D scale) were found to be significant and positively related to changes in marital dissatisfaction from 1992 to 2002 indicating that as respondents' depression levels increased they became more dissatisfied with their marriages. Changes in physical health were found to be significant and negatively related to changes in marital dissatisfaction indicating that as respondents became physically limited they became less dissatisfied – happier – with their marriages.

The Spearman correlation shows that as respondents' mental health deteriorated (i.e., they became more depressed) respondents became more dissatisfied with their marriages. The rest of the change variables were found to be negatively correlated with changes in marital dissatisfaction. As respondents' became physically limited, gained weight, had more children and increased their income, respondents became happier with their marriages and hence less dissatisfied. Thus, from 1992 to 2002, the data support that changes in marital dissatisfaction over a decade seem to be related to changes in mental health, physical health and physical appearance.

Multivariate Analysis: Ordered Logistic Regression

Multivariate analysis overcomes the limitation of bivariate analysis by allowing for the inclusion of all variables that could influence marital dissatisfaction in the same model. Multivariate analysis also allows the researchers to capture the impact of each individual variable on the dependent variable (i.e., marital

dissatisfaction) separately, while controlling for other variables. Given the fact that marital dissatisfaction is an ordered (ordinal) variable with limited variation, ordered logistic regression (ordered logit) provides the proper modeling framework.

For the purpose of this study, using the extracted sample data from NLSY79 and '*svy: ologit'* command in STATA (statistical software), a series of logistic regressions for marital dissatisfaction, as a function of other hypothesized variables, were estimated. The general model for this analysis could be summarized as:

Marital Dissatisfaction = *f* (poor physical health, poor mental health, poor physical appearance, other variables)

In addition to interaction terms and nonlinear (squared) terms, which are included to test the hypotheses of interest in this model, 'other variables' (household income, race, length of marriage and number of children) are used. Inclusion of these (auxiliary) variables controls other factors that could influence marital dissatisfaction at the same time.

Since the influence of weight gain or weight loss (physical appearance) on marital dissatisfaction could be different if respondents are very thin or very obese, this model was augmented by including squared values of the indicator for physical appearance (BMI). Similarly, because the theories in this study suggest that mental health may have an asymmetric impact on marital dissatisfaction, squared values of the mental health (CESD) variable were also included in the empirical model to capture this possible impact. Inclusion of squared values of the underlying variables---those that are predicted by intuition or other theoretical analysis---allow the researchers to incorporate potential nonlinear (or asymmetric) impacts on the dependent variable. However, retaining such nonlinear factors in the model will also

depend on their statistical significance, hence, their contribution to predicting the dependent variable.

Ordered logistic regressions were run using 1992 data to investigate the relationships between marital dissatisfaction, mental health, physical health, and physical appearance while controlling for income, race, length of marriage and number of children. Similarly, ordered logistic regressions were used to investigate the change from 1992 to 2002 in marital dissatisfaction as a function of the change in the above variables. An ordered logistic regression is the proper technique for investigation because the measure of marital dissatisfaction in this study is an ordered ordinal variable, i.e., it is not continuous.

In the analysis, the variable of interest, marital dissatisfaction, was coded from 1 to 4, where 1=very happy, 2=fairly happy, and 3=not too happy, and 4=extremely unhappy. These properly indicate the degree of unhappiness (dissatisfaction) with the marital situation. Because of potential nonlinear influences on marital dissatisfaction from the physical appearance and the mental health variables, these variables (BMI and CESD, respectively) were also allowed to have quadratic (or squared) terms in the empirical (ordered logistic regression) model. Clearly, if any of these variables (BMI or CESD) starts from a very low value and continuously rises, then the impact on the dependent variable (marital dissatisfaction) does not have to be constant throughout the rise in any of these variables. For example, at a very low level of weight (or being too tall for one's weight), additional body weight may reduce marital dissatisfaction. Conversely, at a very high level of weight (or being too short for one's weight), additional body weight may increase marital dissatisfaction. Therefore, there

is a potential nonlinear relationship between poor physical appearance and marital dissatisfaction. Similarly, if the proper data are available, one can consider a nonlinear relationship between other continuous variables (i.e., mental health and physical health) and the dependent variable (marital dissatisfaction). But, since physical health is a dichotomous (dummy) variable, this precludes including this variable in a nonlinear form in the final empirical model.

Evidence from the 1992 Round

Table 19 also shows the ordered logistic regression that was run to test how well the mental health, physical health and physical appearance variables in 1992 were able to predict changes in marital dissatisfaction, using children, income, race and length of marriage as control variables. As noted above, in order to capture potential nonlinearity of the independent variables the physical appearance and mental health variables were squared. In addition, the estimated model includes the interaction terms for mental health, physical health and physical appearance, as well as, the interaction term for mental health and physical appearance. Mental health and physical appearance were found to be significantly related to marital dissatisfaction, though physical health was not found to be related to marital dissatisfaction. These relationships with marital dissatisfaction will specifically be discussed below.

Physical Health and Marital Dissatisfaction

Table 19 shows that for the 1992 round, poor physical health was not found to influence marital dissatisfaction (t=0.31) significantly. Therefore, whether

respondents were physically limited or not had no influence on how dissatisfied they were with their marriages.

Table 19: Cross Sectional Analysis – Weighted Ordered Logistic Regression for 1992 Round

	Marital Dissatisfaction 1992			
Variable	Coefficient	Std. Dev.	t-value	P>|t|
Physical Appearance 1992	-0.23	0.06	-3.91*	0.00
Physical Appearance Squared 1992	0.00	0.00	3.74*	0.00
Mental Health 1992	0.14	0.04	3.80*	0.00
Mental Health Squared 1992	-0.00	0.00	-2.55*	0.01
Physical Health 1992	0.11	0.37	0.31	0.76
Number of Children in 1992	-0.31	0.12	-2.55*	0.01
Length of Marriage in 1992	0.07	0.01	5.52*	0.00
Race	1.16	0.11	10.01*	0.00
Interaction of Mental Health, Physical Health & Physical Appearance 1992	-0.00	0.00	-0.61	0.54
Interaction of Mental Health & Physical Appearance 1992	0.00	0.00	0.37	0.71
Income 1992	<-0.01	<0.01	-2.93*	0.00

Note: n = 2279, population size = 2325.22, F (11, 2268) = 24.41, Prob > F = 0.00.
* = significant.

Physical Appearance and Marital Dissatisfaction

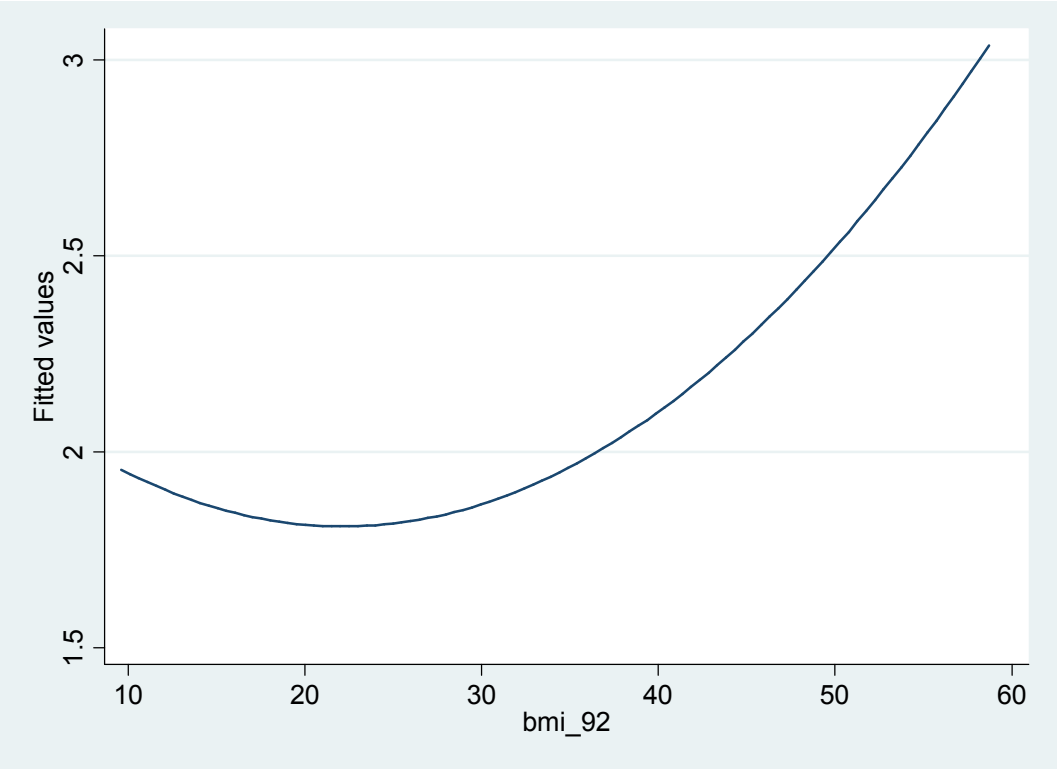
Using 1992 data, the physical appearance variable (BMI) was found to be nonlinear and significantly ($p<0.01$) related to marital dissatisfaction. For 1992, the physical appearance measure has a negative ($t=-3.91$) and a positive relationship ($t=3.74$) with marital dissatisfaction – indicating that the influence of physical appearance on marital dissatisfaction is nonlinear, and hence, relatively complex. The nonlinear relationship seems to indicate that when BMI scores increase from its low values, marital dissatisfaction decreases with BMI, but beyond some point, further increase in BMI leads to an increase in marital dissatisfaction.

Unlike the Spearman correlations, the ordered logistic regression, among other things, captures potential nonlineality among the variables and provides a more accurate prediction of the relationships between the independent variables and the dependent variable. The nonlinearity of the physical appearance variable exemplifies the different meanings of a respondent's BMI score. For example, gaining weight by a very skinny person (i.e., BMI < 20 = underweight) could have a positive impact on the way she is perceived, just like gaining just a couple of pounds by an obese person might have no impact at all. To illustrate this point, a simple (Ordinary Least Square) regression of marital satisfaction on BMI and BMI^2 was run and the coefficient estimates were reported as follows:

$$\text{Marital Dissatisfaction} = 2.26 - 0.04\ \text{BMI} + 0.0009\ \text{BMI}^2$$

A graphical representation of the relationship between BMI and BMI^2 and the predicted values for marital dissatisfaction from this illustrative regression is provided below (see Graph 7).

Graph 7: The Nonlinear Relationship between Marital Dissatisfaction and Physical Appearance in 1992



Key: Fitted Values = Marital Dissatisfaction Variable; bmi_92 = Physical Appearance Variable

By using the above formula the point at which the relationship between physical appearance and marital dissatisfaction goes from positive to negative can be found. The computation reveals that the relationship between physical appearance and marital dissatisfaction is negative up to a point, BMI = 22, and then becomes positive as BMI increases. Over a BMI of 22 the positive relationship increases - with a sharper incline. BMI at 22 is in the middle of the "normal" weight range (20-24.9) ---but, strong caution must be exercised to draw any significant inference from

this illustrative analysis. Thus the weight of the respondent had the ability to decrease marital dissatisfaction (as the underweight respondent gained weight) and increase marital dissatisfaction (as the overweight respondent gained more weight) (Graph 7). Respondents who fell in the "normal" BMI weight ranges were found to be the least dissatisfied – thus the respondents who had a normal BMI had the happiest marriages in 1992.

Our society subjects women to a "tyranny of slenderness" (Bartky, 1990, Bordo, 1993; Benjamin & Kamin-Shaaltiel, 2003) such that the normative obsession with slenderness contributes to an individual's maintenance of self-control, social status, and femininity (Baker, 1984). The results of this study interestingly found that it is not slenderness that is the societal norm or that is related to the happiest marriages but a normal "healthy" weight.

Mental Health

For the 1992 round of the data, the coefficient estimates of the mental health variable was found to be positive ($t=3.80$) and highly significant ($p<0.01$). On the other hand, the coefficient estimate of the squared mental health was found to be negative ($t=-2.55$) and yet highly significant ($p<0.01$). This shows that the influence of poor mental health (CES-D) on marital dissatisfaction is nonlinear and, hence, relatively complex. When depression levels increase from its low values, marital dissatisfaction also increases with CES-D, but beyond some point, further increase in depression levels leads to a decrease in marital dissatisfaction.

Control Variables

With respect to the 1992 data, the children variable (the number of children the respondent has) was found to have a negative (t=-2.55) and significant (p=0.011) relationship with marital dissatisfaction. Therefore, the more children a respondent had, the less dissatisfied they were with their marriages - the happier the respondents were with their marriages.

In addition, the 1992 data shows that length of marriage has a positive (t=5.52) and significant (p<0.01) relationship with marital dissatisfaction. Thus, the longer respondents had been married prior to 1992, the less dissatisfied they were with their marriages.

For 1992, income was found to have a negative (t=-2.93) and significant (p<0.01) relationship with marital dissatisfaction,. Thus, the more money respondents had the less dissatisfied they were with their marriages.

Race (being a minority) was found to have a positive and (t=10.01) significant (p<0.01) positive relationship with marital dissatisfaction. Therefore, if the respondent was a minority they were found to be less dissatisfied with their marriages.

The Interaction of Mental Health, Physical Health, Physical Appearance

Interaction terms were also included in the ordered logistic regression to test the last hypothesis in this study. This hypothesis examines the potential interaction effect of all three variables (physical health, physical appearance and mental health) with marital dissatisfaction. The hypothesis theorizes that if all three (mental health,

physical health and physical appearance) of the wife indicate poor health/appearance, then there will be a combined effect on her marital dissatisfaction – making her either even more dissatisfied or even less dissatisfied (depending on the theory) than the effect of having just one of the poor health/appearance variables. Table 19 shows the interaction of all three of the independent variables, as well as the interaction for physical appearance and mental health (not physical health as physical health was found to be not significant), with marital dissatisfaction. In all cases in 1992, the interaction terms were not found to be statistically significant. In particular, the interaction term amongst the mental health, physical health and physical appearance variables was found to be negative but not significant at t=-0.61 (p=0.544), and just the interaction of physical appearance and mental health was also not significant (t=0.37, p=0.71). Therefore, there is no intensifying effect of poor mental health, poor physical health and poor physical appearance on marital dissatisfaction, regardless of the umbrella theory (marital exchange or social norms).

As can be seen, the ordered logistic regression captured a more specific picture of the relationship between poor physical health, poor mental health and poor physical appearance with marital dissatisfaction in 1992 than other bivariate analysis. Added to the Spearman correlations results above, the ordered logistic regression (Table 19) gives us the nonlinear relationships of mental health and physical appearance – it basically tells us that there are different effects on marital dissatisfaction depending on the BMI and CESD score of the respondent. It also tells us that when adding the controls of length of marriage, number of children, income and race, the effects of physical health (captured by the correlation analysis) become

nonexistent, i.e., there is no relationship between poor physical health and marital dissatisfaction evident in the 1992 data. It also further supports the relationship found between poor mental health and marital dissatisfaction. Adding the controls allowed the regression analysis to identify the nonlinear relationship between physical appearance and marital dissatisfaction that the correlation analysis did not register.

Evidence from the 2002 Round

Table 20 shows the ordered logistic regression that was run using 2002 round data. The 2002 data also supports the above findings from 1992 that show how well the mental health, physical health and physical appearance variables were able to predict changes in marital dissatisfaction. In terms of sign and significance of the estimated coefficients for the main variables of interest--- the mental health, physical health and physical appearance variables---everything remains the same, except that the negative relationship of mental health squared with marital dissatisfaction, and the positive relationship of physical appearance squared with marital dissatisfaction drop off and they became linear. Thus, in 2002, respondents who were found to have a high body weight and a low level of depression were more likely to be less dissatisfied and happier with their relationships. Physical health continued to be not significantly related to marital dissatisfaction in 2002.

While the signs for the race and income control variables did not change (the higher the income and being a minority were found to be related to lower marital dissatisfaction), a distinct change relative to 1992 estimated coefficients appears to be the lack of significance of the relationships between the length of marriage and marital dissatisfaction, and the number of children and marital dissatisfaction. Thus,

indicating that for women aged 40 to 45 the number of children a respondent had in 2002 and the length of marriage in 1992 did not have any affect on their marital dissatisfaction in 2002. Remember that the length of marriage measure was not available in 2002 so the 1992 measure was included in the ordered logistic regression to control for its possible impact on marital happiness in 2002. Thus in both 1992 and in 2002 cross sectional analysis the higher the body weight of the respondent the less dissatisfied they were with their marriage and the higher the level of depression the more dissatisfied respondents were with their marriage.

Table 20: Cross Sectional Analysis – Weighted Ordered Logistic Regression for 2002 Round

	Marital Dissatisfaction 2002			
Variable	Coefficient	Std. Dev.	t-value	P>|t|
Physical Appearance 2002	-0.08	0.04	-1.99*	0.05
Physical Appearance Squared 2002	0.00	0.00	1.77	0.08
Mental Health 2002	0.06	0.02	3.43*	0.00
Mental Health Squared 2002	-0.00	0.00	-1.32	0.19
Physical Health 2002	0.13	0.17	0.76	0.45
Number of Children 2002	-0.09	0.06	-1.70	0.09
Length of Marriage 1992	-0.00	0.01	-0.53	0.59
Race	0.78	0.12	6.12*	0.00
Interaction of Mental Health, Physical Health & Physical Appearance 2002	-0.00	0.00	-0.29	0.77

Interaction of Mental Health & Physical Appearance 2002	0.00	0.00	3.23*	0.00
Income 2002	-0.00	<0.01	-6.84*	0.00

Note: n = 1829, population size = 1898.21, F (11, 1818) = 16.16, Prob > F = 0.00.
* = significant.

The Change from 1992 to 2002

An ordered logistic regression was also run to test the impact of the change in the variables from 1992 to 2002 on marital dissatisfaction while controlling for race, number of children, change in income and length of marriage (see Table 21). Modeling and estimating the impact of changes in the main variables on marital satisfaction provide a better framework for investigating the causal (or hypothesized) relationship than those of cross sectional analysis. These results give a more specific picture of the relationship between the changes in mental health, physical health, physical appearance and changes in marital dissatisfaction.

Table 21: The Weighted Ordered Logistic Regression Run with all Variables and Marital Dissatisfaction from 1992 to 2002

	Change in Marital Dissatisfaction			
Variable from 1992 to 2002	Coefficient	Std. Dev.	t-value	P>|t|
Change in Physical Appearance (BMI)	-0.01	0.02	-0.97	0.33
Change in Mental Health (CESD)	0.03	0.01	2.52*	0.01

Change in Physical Health	-0.37	0.16	-2.28*	0.02
Change in Number of Children	0.06	0.05	-1.21	0.23
Change in Income	<-0.01	<0.01	-2.62*	0.01
Race	-0.15	0.12	-1.23	0.22
Length of Marriage 1992	-0.06	0.01	-3.80*	0.00

Note: Std. Err. = Standard Error, n = 1829, population size = 1898.21, F (7, 1822) = 6.01, Prob > F = 0.00. * = significant.

Mental Health

The ordered logistic regression supports the relationship the correlation analysis found between changes in mental health and marital dissatisfaction – the higher the change in the CESD score (i.e., the more depressed the respondent becomes), the more dissatisfied the respondent was found to become with her marriage. This supports social norms theory as there is a high reward for conformity to societal expectations (e.g. no depression) therefore deviance from it (e.g. high level of depression) comes at a high cost (e.g. higher marital dissatisfaction). It could be argued that a wife who is depressed (whether her depression led to higher marital dissatisfaction, or her higher marital dissatisfaction led to her depression, or a combination of both) feels that she is not fulfilling her societal role, which leads to higher marital dissatisfaction.

Physical Health

The ordered logistic regression supports the relationship the Spearman correlation found between changes in physical health and marital dissatisfaction; an increase in physical limitations was linked to respondents' becoming less dissatisfied and happier with their relationships. This supports marital exchange theory. As women who become physically limited perceive themselves as less valuable on the marriage market, they become happier with their current relationships as a result. This study found that changes in physical health were related to changes in dissatisfaction with an individual's marriage -- thus supporting the previous research that showed that changes in physical health were correlated with changes in marital satisfaction (Wickrama, Lorenz & Conger, 1997; Goodwin, 1997 Booth & Johnson, 1994).

Physical Appearance

The ordered logistic regression did not support the relationship that the correlation analysis found between changes in physical appearance and marital dissatisfaction from 1992 to 2002 -- it found a negative but not significant relationship. Neither marital exchange theory nor social norms theory were supported since the regression did not find a significant relationship. Thus, changes in body weight can be viewed as not related to changes in marital satisfaction when controlling for income, number of children, length of marriage and race from 1992 to 2002. This seems to imply that once a relationship is cemented through marriage, changes in body weight do not seem to predict changes in marital dissatisfaction.

Control Variables

The ordered logistic regression found that from 1992 to 2002 changes in the number of children a respondent had and the race of the respondent were not related to changes in marital dissatisfaction. The longer the respondent had been married in 1992 the less dissatisfied they became with their marriage. A decrease in respondents' income was found to be related to respondents becoming more dissatisfied with their marriages, just as an increase in income was found to be related to a decrease in marital dissatisfaction.

Chapter 6: Which hypotheses are supported?

The Hypotheses in Review

Marital Exchange Theory predicted the following:

1. If the wife's level of depression increases, then her marital dissatisfaction will decrease. The results did not support this hypothesis.
2. If the wife's physical health decreases, then her marital dissatisfaction will decrease. The results supported this hypothesis in the change from 1992 to 2002.
3. If the wife gains weight then her marital dissatisfaction will decrease. The results did not support this hypothesis in the longitudinal analysis.

4. If the mental health, physical health and physical appearance of the wife all decline, then her marital dissatisfaction will decrease even more. The results did not support this hypothesis.

Social norms theory predicted the following:

1. If the wife's level of depression increases, then her marital dissatisfaction will increase. The results supported this hypothesis in 1992, 2002 and in the change from 1992 to 2002.

2. If the wife's physical health decreases, then her marital dissatisfaction will increase. This hypothesis was not supported.

3. If the wife gains weight then her marital dissatisfaction will increase. This hypothesis was not supported.

4. If the mental health, physical health and physical appearance of the wife all decline, then her marital dissatisfaction will increase even more. The results did not support this hypothesis completely. This hypothesis was partially supported in the change from 1992 to 2002 as the interaction of mental health and physical appearance with marital dissatisfaction was found to follow social norms predictions.

Discussion:

This study examined the relationship between specific health variables and the wife's marital dissatisfaction. The results of the study indicate that health is an important predictor of marital dissatisfaction. In this section, the relationship of poor physical health, poor mental health and poor physical appearance with marital

dissatisfaction will be discussed, and the relationship between the study's control variables and marital dissatisfaction will be examined. Additionally, recommendations for the application of theoretical models and consequences for therapeutic treatment and for research in the future will be explored.

Greater attention will be given to the analysis of the change in the variables over time than to the cross-sectional data for 1992 and 2002. For although the cross-sectional results are interesting because they show the association between the variables of interest and marital dissatisfaction, the hypotheses in this study require examining the relationship between the variables of interest and marital dissatisfaction over time – thus allowing for an examination of the relationships from a causal viewpoint.

Physical Health

The relationship between poor physical health and marital dissatisfaction was found to only be significant when examining the effect of the deterioration of physical health over time. The results for physical health seem to support the marital exchange view that the value of women with physical limitations decreases on the marriage market thus they become happier with their relationships (less dissatisfied). This supports previous research that changes in physical health were related to changes in marital quality (Wickrama, Conger & Lorenz, 1995), but is contrary to Booth & Johnson's (1988) study that found that declines in health were related to small increases in marital dissatisfaction. This could be due to different measures of poor physical health, different time periods (1988 versus 2002), and different respondents (as the current study only measured women).

Mental Health

Poor mental health was found to consistently be associated with greater marital dissatisfaction in the cross sectional analysis and in the change from 1992 to 2002. Social norms theory consistently predicted the relationship between poor mental health and marital dissatisfaction - that an increase in respondents' level of depression led to an increase in her marital dissatisfaction. According to social norms theory, the wife internalizes society's expectations of her, thus, the more depressed she is, the less she is fulfilling her societal role, and the more dissatisfied she is with her relationship. Respondents aged 27-35 and 40-45 were rewarded for conforming to the societal norm of low levels of depression with happier marriages – while those who deviated (higher levels of depression) were more dissatisfied with their marriages. The closer to "normal" respondents were in their mental health the happier they were with their relationships.

Physical Appearance

Physical appearance was found to have an association with marital dissatisfaction in the cross sectional analysis, but not a causal relationship, as no relationship was found in the change analysis. The cross sectional data showed that respondents who had high body weight reported low marital dissatisfaction. The cross sectional data seem to support the marital exchange view that heavier women have lower value on the marriage market, thus their marital dissatisfaction decreases. This supports previous research that obese women reported less marital unhappiness (Sobal, Rauschenbach & Frongillo, 1995). However, increased weight was not found to increase marital dissatisfaction over time. Not finding a causal relationship

between body weight and marital dissatisfaction suggests that, once a marriage occurs, whether a wife gains or losses weight has no influence on her satisfaction with her relationship.

Previous research has found that men place a great deal of importance on a woman's body size and shape when they initiate romantic relationships (Singh, 1995), which may explain why the physical appearance variable was significant in the cross sectional analysis but not in the change over time analysis, as once a relationship is institutionalized through marriage, physical appearance decreases in importance; hence, changes in physical appearance are not related to changes in marital dissatisfaction. Previous research has found that once married, people generally stop feeling the need to attract a partner, especially in the face of marital role obligations that shift their eating and exercising patterns (Sobal, 1984). This could also explain why a causal relationship was not found in changes in physical appearance and marital dissatisfaction over time. Body weight may be an important factor in initiating romantic relationships but once a marriage occurs, changes in body weight have no affect on changes in marital dissatisfaction.

Intensification

Interestingly enough, this study did not reveal a combined effect of mental health, physical health and physical appearance on marital dissatisfaction. Whether the wife was depressed, overweight, and physically limited did not differ at all from the separate effects on the marital dissatisfaction of the respondent when a respondent was solely depressed, or solely overweight or solely physically limited in the cross sectional data from 1992 and 2002. However, in 2002, though the interaction of all

three independent variables was not significant, a significant relationship was found between the interaction of mental health and physical appearance in affecting marital dissatisfaction. Basically, women aged 40-45 who were depressed and overweight were more dissatisfied with their marriages – poor mental health plus poor physical appearance was associated with greater marital dissatisfaction.

Additional Results

The control variables also provide valuable information on the risk factors for marital dissatisfaction. Among young women (aged 27-35), the more children, the longer the marriage, and the more money the respondent has, the less dissatisfied they were with their marriages. Also among both the younger and older women this study sampled, minorities were less dissatisfied with their marriages than non-minorities. Among older women (aged 40-45), the number of children and the length of marriage were not risk factors for marital dissatisfaction, but the higher the income, the less dissatisfied women were with their marriages. Finally, in regards to the change from 1992 to 2002, longer length marriage and increases in income were factors that contributed to less marital dissatisfaction, e.g., happier relationships.

Summary

Taken in concert, the results indicate that in marriages over time, a worsening of wives' depression levels caused them to be more dissatisfied with their marriages, while a worsening of their physical health actually had the opposite affect and decreased their dissatisfaction. Interestingly, whether a wife gained or lost weight did not cause a change in the dissatisfaction with her marriage – indicating that, once two

people marry, changes in the wife's physical appearance do not influence her level of dissatisfaction with her marriage. This draws an interesting line between the effects of poor health (mental and physical) and the effects of poor physical appearance. The results seem to indicate that depression and physical health limitations have a significant impact on the level of wife's satisfaction with in a marriage, whereas appearance, i.e., body weight, of a wife does not.

Considering society's (the media's) preoccupation with slenderness, this is interesting as it indicates that physical appearance seems to be icing on the cake of marriage, and is not actually substantive. In contrast to the more superficial variable of weight/physical appearance, health problems that affect the quality of life strongly affect the quality of relationships. Thus, depression and physical health are predictors of marital dissatisfaction, while gaining or losing body weight is not.

Future application of theoretical models

When the physical variables (physical appearance and physical health) were significant, marital exchange theory predicted their relationship with marital dissatisfaction consistently. The worsening of physical variables among women decreases their value on the marriage market, thus making them happier with the relationships they are in currently. Therefore, marital exchange theory seems to be a good model for predicting physical variables and marital dissatisfaction.

Social norms theory consistently predicted the relationship of mental health and marital dissatisfaction in every analysis this study examined. In regards to mental health variables, the closer to normal mental health, the happier the marriage.

Therefore, social norms theory seems to be a good model for predicting the relationship between mental health and marital dissatisfaction.

Future implication for therapy

The results from this study show that examining the mental health, physical health, and physical appearance of clients within a therapeutic setting is important in understanding the many dimensions of the marital relationship. This study suggests that there are differing degrees of impact on marital dissatisfaction depending on which health variable is being examined.

This study indicates that mental health has a consistently strong and predictable causal relationship with marital dissatisfaction – when a woman is depressed her level of dissatisfaction with her marriage is likely to be high. This relates specifically to the therapeutic relationship and exemplifies the importance of assessing the woman's level of depression at the beginning of therapy and throughout treatment. Also clinicians should understand that there could be a potential compounding affect of depression with high body weight – so clinicians should be aware of examining the two issues separately and also how they influence each other.

A second issue highlighted by this study is the need to assess the physical health of clients, particularly changes over clients' lifespan and over the course of the marriage, as the results of this study indicate that increased disability is related to decreased dissatisfaction – women with physical limitations were found to be happier with their marriages.

Limitations

Of course, no single factor can determine how dissatisfied a woman is with her marriage, however, the results of this study indicate that health variables do in fact play significant roles in the happiness of a woman with her marriage. However, more research is needed to better understand these relationships. For example, looking at the whole couple and not just the wife would enable researchers to see the bigger picture of marital dissatisfaction and conversely, marital satisfaction, because a marriage is a relationship between two people. Finding out about the husbands' views could further illuminate the relationships between the variables in this study, as well as the husband's health statuses. Is he gaining weight, becoming more depressed and physically limited along with his wife? If couples' health and appearance variables change together, does that make their effect on marital dissatisfaction better or worse? Also looking at the wife's view about being depressed, overweight, and physically limited could add to the results of this study as they could detect whether the wife views them as costs or normal behavior – thus helping to further investigate which theory is the best predictor of marital dissatisfaction.

There are several areas for further study. First, having more extensive marital satisfaction and physical health scales would have allowed this study to look more deeply into their relationships with marital dissatisfaction. The effects of physical appearance that were found in the cross sectional analysis show that physical appearance has a relationship with marital dissatisfaction, yet changes in physical appearance were not found to influence changes in marital dissatisfaction. More research is needed to examine this relationship and determine whether it is a causal

one or not. Research that recognizes the continuum of health and the continuum of marital dissatisfaction could help clarify their relationship with marital dissatisfaction. Looking at how the extremes (high levels of depression or obesity) affect marital dissatisfaction and comparing these effects with the impact of more moderate levels (like moderate depression and overweight) could be helpful.

In conclusion, this study found that there is an important association between health and marital dissatisfaction. Two theories, social norms theory and marital exchange theory, are helpful in explaining why health is associated with marital dissatisfaction. It is noteworthy that, contrary to expectations, body weight does not appear to have an important impact upon marital dissatisfaction over time.

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