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Matthew Elias Kahler
Brigham Young University

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The Association Between Locus of Control
and Marital Satisfaction Throughout
Adulthood

Matthew Elias Kahler

A dissertation submitted to the faculty of
Brigham Young University
in partial fulfillment of the degree of
Doctor of Philosophy

Dawson Hedges, Chair
Patrick Steffen
Chad Jensen
Lance Erickson
Vaughn Call

Department of Psychology
Brigham Young University

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ABSTRACT

The Association Between Locus of Control and Marital Satisfaction Throughout Adulthood

Matthew Elias Kahler
Department of Psychology, BYU
Doctor of Philosophy

The correlation between locus of control and marital satisfaction is examined as part of a longitudinal study spanning 44 years and 3 time points. It is predicted that as locus of control has more of an external orientation marital satisfaction will be lower. Participants include high school juniors and seniors in the state of Washington from 1966 with follow-up surveys in 1980 and 2010. Using ordinary least squares regressions, marital satisfaction scores in 1980 or 2010 are predicted by locus of control scores from either 1966 or 1980 with control variables that include gender, income, educational attainment, occupational prestige, and military service. Partial support for the presented hypotheses is found and discussed. Locus of control as measured in middle adulthood predicted marital satisfaction measured contemporaneously. However, in contrast to previous reports, none of the control variables significantly predicted marital satisfaction. A primary limitation that is discussed regards the measurement of locus of control occurring in a manner without any established psychometric data to confirm reliability or validity. Understanding the relationship between locus of control and marital satisfaction may help improve case conceptualization and treatment for couples seeking treatment. Considerations for future research are explored.

Keywords: Marital satisfaction, marriage, locus of control, personality, attribution theory, longitudinal

Table of Contents

ABSTRACT	ii
Introduction	1
Locus of Control	2
Marital Satisfaction.....	4
Locus of Control and Marital Satisfaction.....	7
Present Study.....	8
Hypothesis 1.....	9
Hypothesis 2.....	9
Hypothesis 3.....	10
Hypothesis 4.....	10
Method	11
Participants.....	11
Measures.....	11
Statistical Analysis	18
Results	19
Demographics.....	19
Locus of Control Stability Over Time.....	20
Linearity.....	20
Homoscedasticity	21
Model Specification	21
Hypothesis 1.....	23
Hypothesis 2.....	23
Hypothesis 3.....	24
Hypothesis 4.....	24
Discussion	25
Locus of Control Stability	28
Limitations.....	29
Future Directions	31
Summary.....	33
Reference List.....	34

The Association Between Locus of Control and Marital Satisfaction Throughout Adulthood

Marital satisfaction is a major contributor to feeling good about the general circumstances of one's life (Hawkins & Booth, 2005; Perrone-McGovern, Boo, & Vannatter, 2012). Despite the importance of marital satisfaction, robust findings indicate that marital satisfaction tends to decline over time across a diverse set of measures (Umberson, Williams, Powers, Chen, & Campbell, 2005). No matter how the construct of marital satisfaction is defined, the same general trend is observed –marital satisfaction tends to decline with age. In therapy rooms and advice columns, remedies for low marital satisfaction is likely to include topics such motivation and the investment of personal resources to the success of the relationship. However, it may also be important for therapy to address whether individuals believe improvement (or even the maintenance of a good marriage) is within their control. Aside from the countless variables that combine in unique ways to define any given relationship, control attribution – the extent to which people believe that they have control over their circumstances – has only been superficially studied in regards to its association with marital satisfaction.

The present study will utilize a large longitudinal dataset to determine the impact of general beliefs about control on marital satisfaction across the adult lifespan. The Life and Family Legacies project is a longitudinal project started in the 1965-1966 school year with high-school juniors and seniors from the state of Washington. Coinciding with the height of the Vietnam War, about half of the male respondents went on to serve in the military. Most notable about this project is the 44 years of data it provides across three time points, providing information from late adolescence, middle adulthood, and late adulthood.

The two variables of principle interest in the present study are marital satisfaction and locus of control. Gender, socioeconomic status, and military service will also be considered as moderating variables. Marital Satisfaction was measured in middle and late adulthood using the Marriage Adjustment Balance Scale (Orden & Bradburn, 1968), a two-axis model that measures marital satisfactions and marital tensions for a rich understanding of marital happiness. Locus of control was measured at all three time points using items that were adapted from the seminal Rotter's Internal-External Scale that was under development during the first data collection in 1965-1966. Rotter's Internal-External Scale was first published in 1966 (Rotter, 1966).

Locus of Control

Locus of control (LOC) is a construct that attempts to explain how a sense of control influences human behavior (Ryon & Gleason, 2013). LOC answers the question in regards to what source does a person attribute the cause of a certain event. In behavioral terms, LOC theory accounts for some of the variability in a reinforcement's influence on learning. There are occasions when a reward is not perceived as primarily contingent on the behavior but is perceived as dependent on luck, fate, or powerful others, or is judged to be simply unpredictable (Rotter, 1966). In these cases, a person would be considered to have an external LOC. In such instances, the reward does not serve to reinforce learning or to increase the frequency of behavior repetition. In contrast, a reward does act as a reinforcer for learning and behavior frequency when it is perceived to be contingent on the person's preceding behavior. In such cases, a person is deemed to have an internal LOC. The theory goes further to propose that some people are more inclined to attribute control to either internal or external factors regardless of the context (Rotter, 1966). By adulthood, trait-level LOC is thought to be relatively fixed (Doherty, 1983).

Thus, LOC is proposed to be a stable personality trait with both predictive and explanatory power.

One study found that extreme scores on either internal or external LOC beliefs were more vulnerable to the effects of life stressors than those with more moderate scores (Krause, 1986). The impact was worse for extreme external LOC beliefs. Extreme internal LOC beliefs were explained to produce negative effects compared to more moderate beliefs because extreme internal LOC beliefs would suggest the individual is solely responsible for life stressors, inflating guilt and pressure to perform. However, extreme internal LOC beliefs were not as deleterious as extreme external LOC beliefs because of the enhanced ability to avoid certain stressors displayed by those endorsing extreme internal LOC beliefs. Importantly, Landau (1995) established that LOC is separate from actual resources represented by measures of socioeconomic status; in fact, both an internal LOC and socioeconomic status are independently associated with life satisfaction and mental health.

Fundamentally, LOC refers to an individual's relationship with his or her environment. However, is LOC primarily an evaluation of a person's ability to influence the environment, or the environment's susceptibility to influence? Judge, Locke, Durham, and Kluger (1998) included LOC with other variables in a higher-order construct termed core self-evaluations (CSE). In this way, LOC is grouped with other constructs such as self-esteem and self-efficacy as an evaluation of the self, more than one of the environment. Judge et. al reported that LOC, on average, correlated with CSE $r= 0.54$ across three samples. The authors concluded that LOC primarily speaks to self-evaluation and any conclusions about the control imposed by the environment are only secondary to that self-assessment. However, responding to concerns about the structural validity of CSE, Johnson, Rosen, Chang, and Lin, (2015) argue that it is more

accurate to construe LOC as more fundamentally an evaluation of the environment and distinct from CSEs. Johnson et. al demonstrate across 4 samples an improved model fit for CSE when LOC is excluded. The authors go on to demonstrate that LOC is a meaningful moderator for CSE's influence on measures of work and life satisfaction as well as supervisor-rated job performance where an internal LOC strengthened the relationship between CSE and the aforementioned outcome variables.

Marital Satisfaction

Marital satisfaction generally refers to an individual's global assessment of his or her relationship, determining if it is more or less favorable overall (Mattson, Rogge, Johnson, Davidson, & Fincham, 2013). Marital happiness and marital satisfaction are generally considered to be interchangeable terms (Belanger, Laporte, Sabourin, & Wright, 2015; Graham, Diebels, & Barnow, 2011; Gray-Little & Burke, 1983; Langer, Storer, & Syrjala, 2010; Levin, Grene, & Solomon, 2016; Spanier, 1976). By whatever name, it has important implications for a variety of physical and mental-health factors. Marital dissatisfaction has been linked to depression (Beach, Katz, Kim, & Brody, 2003), physiological reactivity (Levenson, Carstensen, & Gottman, 1994), and suppressed immune functioning (Kiecolt-Glaser et al., 1993). More recent evidence suggests that marital satisfaction can produce a type of gene-by-environment interaction known as the orchid effect. Namely, especially high and especially low levels of marital satisfaction correlate with greater heritability of self-reported health (South & Krueger, 2013). Using 347 married twin pairs as part of a larger study, South and Krueger found that genetic influences on self-reported health were lowest for those reporting average levels of marital satisfaction ($h^2 = .10$, where h^2 is the ratio of variance in the average effect of alleles over the variance in phenotype), whereas the genetic influence on health was much higher when marital satisfaction was high or low ($h^2 =$

.30 and $h^2 = .38$ respectively). These findings suggest that at least part of marital satisfaction's influence on health is accomplished by influencing gene expression.

Given the benefits of a healthy marriage, the downward trend of marital satisfaction ratings during middle adulthood (Rollins & Feldman, 1970) underscores the need for greater understanding of factors involved in declining marital satisfaction with age. Rollins and Feldman, using cross-sectional data, demonstrated a shallow but statistically significant decrease in marital satisfaction during the middle aged years with an upturn in late adulthood.

VanLaningham, Johnson, and Amato (2001) replicated the U-shaped relationship between marital happiness and length of marriage using cross-sectional census data. However, using a 5-wave panel study, spanning 17 years of census data, they found declines in marital happiness "at all marital durations and no support for an upturn in marital happiness in the later years." (p.1313). After controlling for life-course variables, they continued to report a negative relationship between marriage duration and marital happiness.

The number of theories attempting to account for the general decline in marital satisfaction indicates there is more we need to understand about this phenomenon (DeMaris, Sanchez, & Krivickas, 2012). Baumeister and Bratslavsky (1999) argue that the continual newness of learning more about a spouse in very intimate ways fuels the vitality of the relationship early in marriage. As both the dosage and frequency of new discoveries decrease, so does the vitality of the marriage. Kurdek (2002) suggests that the disparity between reality and the ideals projected during courtship lead to disillusionment. Another model argues that the inevitable disagreements that arise in a marriage often produce a pattern of hostility and negative reciprocity (Huston, Caughlin, Houts, Smith, & George, 2001). The authors argue this emerging distress is a cause of declining marriage quality.

In addition to broad models to account for the phenomenon of marriage quality, research has also investigated potential moderating variables. In a meta-analysis of 226 studies, involving 110,110 participants, there was no significant difference between men and women in marital satisfaction ratings (Jackson, Miller, Oka, & Henry, 2014). The meta-analysis also reported no significant difference when data was available to pair women directly with their husbands. This contradicts what the authors of the analysis called a “widely held assumption that women experience lower marital satisfaction than men.” Even so, Loscocco and Walzer (2013) warn against discussing marriage as a single entity and argue for the need to consider gender differences in heterosexual marriage. Even when there is no difference between men and women in the case of marital satisfaction ratings generally, it is important to know a potential difference has been explored.

Compared to men in the general population, McLeland and Sutton (2005) found that military men report significantly lower marital satisfaction scores. Another study examining the impact of a six-month deployment demonstrates a moderate decrease in marital satisfaction during deployment but a return to pre-deployment satisfaction ratings two years later (Schumm, Bell, & Gade, 2000). Together, the findings from these two studies suggest that military service is an important factor to study in marital satisfaction.

A study comparing first marriages to second marriages concluded that the presence of a previous divorce moderates marital satisfaction within a current relationship, accounting for 2% of the variance in marital satisfaction in the model (Mirecki, Chou, Elliott, & Schneider, 2013). While length of marriage did not account for a significant portion of the variance as a global variable, Mirecki and colleagues reported that among people in their first marriage only, those

having between 7 and 19.9 years of marriage report significantly lower satisfaction compared to other marriage lengths.

Predictors of divorce include ethnicity, immigration status, education, marrying as teenagers, cohabitation prior to marriage, premarital birth, bringing children from a previous marriage into a new marriage, interracial marriage, growing up with separated or divorced parents, domestic violence, frequent conflict, infidelity, the number of perceived relationship problems, and low levels of love, trust or commitment (Amato, 2010). Amato's review also cites evidence contradicting early assumptions that wives' employment and income level are risk factors for divorce. At best, the divorce literature only speaks to a portion of those who would report low marital satisfaction. Those with low marital satisfaction who remain married as well as those with moderate to high marital satisfaction are not represented by this data. A review of longitudinal studies of marriage satisfaction and marriage stability found that the correlation between marital satisfaction and marital stability ranged from $r = .06$ to $r = .42$ (Karney & Bradbury, 1995). Therefore, while the divorce literature is useful in understanding marital satisfaction, divorced people do not speak for all of those with low marriage satisfaction.

Locus of Control and Marital Satisfaction

Preliminary research has explored the association between locus of control and marital satisfaction. Mlott and Lira (1977) failed to find a difference in locus of control between couples in marital counseling and those not in counseling. However, they report that locus of control was statistically different between husbands and wives attending counseling. Specifically, women in marital counseling report a more external locus of control than do their husbands. Doherty (1981) utilized robust measures of marital quality but only looked at the difference in locus of control between newlywed spouses in a simple correlational design, not between marriages of

varying quality or duration. He concluded that when a wife had a greater external locus of control than the husband, marital dissatisfaction was more likely. He hypothesized this is explained by the wife's increased need for external validation from the husband above what husbands with internal locus of control typically provide.

In a separate study that followed women longitudinally for 7 years, Doherty (1983) found no correlation between locus of control orientation and divorce. Doherty argues that either party in a marriage can initiate a divorce. Extending his argument, a complete investigation into any causal relationship between locus of control and divorce should have data on both parties in a marriage or be restricted to those who initiate the divorce.

The next study available in the literature found that an internal locus of control positively correlated with one's own marital satisfaction and that spousal internal locus of control orientation also correlated but to a lesser degree (Camp & Ganong, 1997). In this study, a measure of locus of control specific to the marital relationship was utilized in a basic correlational design with couples married at least 18 years ($M= 26.2$ years). The only other study available in the literature measuring the relationship between locus of control and marriage quality comes from an honors research thesis published on Ohio State University's website. The study found partial support for the relationship between locus of control and marital satisfaction using a clinical sample in a basic correlational design (Gabelman, 2012). While gender has been investigated in some of these preliminary studies, no studies have examined the moderating effects of military service, a variable known to influence marital satisfaction.

Present Study

Using survey data that follows a single cohort spanning 44 years and three primary time points, the present study seeks to extend what we understand about the relationship between

locus of control and marital satisfaction. The dependent variable in each of the hypotheses outlined below is marital satisfaction as measured by a standardized questionnaire with published reliability and validity statistics (Orden & Bradburn, 1968). Because the data follows a single cohort, this study will provide information in addition to that found in previous studies that were limited to newlyweds, and/or cross-sectional designs. Broadly, the present study addresses the following question: Does locus of control in late adolescence and middle adulthood predict marriage satisfaction later in life?

Hypothesis 1

An externally oriented locus of control in late adolescence will predict lower ratings of marital satisfaction in middle adulthood.

Using a linear regression model with marital satisfaction at middle adulthood as the dependent variable, a main effect will be calculated for locus of control as measured in late adolescence. Prior research comparing the effects of locus of control and socioeconomic status found that each have effects that are significant and distinct from the other (Landau, 1995). In order to isolate the effect of locus of control, education attainment, income, and occupational prestige, all as measured in middle adulthood, will serve as the operational definition of socioeconomic status and be included as control variables. Gender, the number of prior marriages, and military service in a combat zone, assessed in middle adulthood, will also be included as control variables.

Hypothesis 2

An externally oriented locus of control in late adolescence will predict lower ratings of marital satisfaction in late adulthood.

Using a linear regression model with marital satisfaction at late adulthood as the dependent variable, a main effect will be calculated for locus of control as measured in late adolescence. Educational attainment, income, gender, prior marriages, and military service in combat zone, all as measured in late adulthood, will be included as control variables. Occupational prestige was not available for the late adulthood time wave.

Hypothesis 3

An externally oriented locus of control in middle adulthood will predict lower ratings of marital satisfaction in middle adulthood.

Using a linear regression model with marital satisfaction at middle adulthood as the dependent variable, a main effect will be calculated for locus of control as measured in middle adulthood. Educational attainment, income, occupational prestige, gender, prior marriages, and military service in a combat zone, all as measured in middle adulthood will be included as control variables.

Hypothesis 4

An externally oriented locus of control in middle adulthood will predict lower ratings of marital satisfaction in late adulthood.

Using a linear regression model with marital satisfaction at late adulthood as the dependent variable, a main effect will be calculated for locus of control as measured in middle adulthood. Educational attainment, income, gender, prior marriages, and military service in a combat zone, all as measured in late adulthood, will be included as control variables. Occupational prestige was not available for the late adulthood time wave.

Method

Participants

Participants were recruited in their junior and senior year of high school in 1965 and 1966 (Otto & Call, 1981). The original study assessed the early life course of men and women as they transitioned from adolescence to young adulthood. The participants were recruited from a stratified sample of public high-school students in the state of Washington during the 1965-66 academic school year ($n = 6,729$). During this initial round of data collection, two separate forms were used. Items pertaining to locus of control were included on only one of the two forms, limiting the 1966 original sample for the present study to 3,665. In 1980, 98.2% of the original participants were contacted and 88.8% provided follow-up information through a telephone interview (V. R. A. Call & Teachman, 1996). In 2010, a third round of data collection occurred through surveys sent out in the mail followed by a phone interview. Almost all who completed the phone interview also completed the paper and pencil survey sent through the mail. At the time of the last data collection, participants in the study are in their seventh decade of life.

Measures

Marriage Adjustment Balance Scale (MABS). Using a two-axis model, MABS measures two orthogonal variables, marital satisfactions and marital tensions. Together, the two variables are thought to describe marital happiness more broadly than measuring either domain separately (Orden & Bradburn, 1968). Marital happiness defined in this way correlates to both reports of overall happiness and positive-affect measures. The MABS consists of 18 yes-or-no self-report questions equally divided between the two domains and asks respondents to reference the past several weeks when answering each question. The composite score is the difference between marital satisfactions and marital tensions, adjusted for skewed item endorsement by

collapsing certain subscale scores before the MABS is totaled (Orden & Bradburn, 1968). Note that in MABS terminology “marital satisfactions” refers to a collection of enjoyable activities and should not be confused with “marital satisfaction” as used throughout the literature (and this paper) as a global assessment of marriage quality (Marini, 1976). The distinction between satisfying activities and marital satisfaction is an important one that was often acknowledged when other studies referenced Orden and Bradburn’s article on the MABS (Barnett & Nietzel, 1979; Fincham, Ajayi, & Beach, 2011; Johnson, White, Edwards, & Booth, 1986; Mattson et. al, 2013; Whisman, & Li, 2015; Whisman, Rhee, Hink, Boeldt, & Johnson, 2014).

The 9 marital satisfactions questions are further divided into two indexes: marital companionship comprising 4 items and marital sociability comprising 5 items. Scores of 0 and 1 on the sociability index and scores of 0, 1, or 2 on the companionship index are collapsed into a zero score, causing all higher scores to shift downward. Both indexes then range from 0-3 and are combined into a marital satisfaction domain ranging from 0-6. The 9 questions in the marital tensions domain are adjusted differently. Tension scores from 4 to 9 are collapsed into a score of 4, leaving lower scores unaffected. After these adjustments as outlined by Orden & Bradburn (1968), the MABS score is calculated by subtracting the marital tensions domain score from the marital satisfactions domain score. The MABS scores range from -4 to 6 as a result. For simplicity, the score is reported in a range of 0 to 10 where a score of 4 indicates a balance between marital tensions and satisfactions (Orden & Bradburn, 1968).

Missing responses on the MABS were estimated based on the proportion of positively endorsed items for each of the domains. For example, assume a respondent only completed six of the nine items on the marital tensions domain with four “no” and two “yes” responses. In such a case, the missing three items would randomly be filled with two “no” and a single “yes”

response to match the two-thirds proportion of provided responses. Because of the scoring method described by Orden and Bradburn (1968) that rounded down raw scores in each domain, and most respondents not missing more than one or two items in a subscale, in many cases it would have been irrelevant whether missing data was entered as a “yes” or a “no”.

The MABS is designed to improve upon the data obtainable from a single self-report question regarding marriage happiness such as: “Taking all things together, would you say your marriage was very happy, pretty happy, or not too happy?” The MABS score moderately correlates with responses to this question ($\gamma = .47$). As a partial explanation for the attenuated correlation, Orden and Bradburn (1968) highlight the complexity of the MABS as it is comprised of two independent domains that are both correlated to the single-item marital happiness question but in opposite directions. Marini (1976) noted that the marital satisfactions scale only reflects positive affect whereas the marital tensions scale reflects only negative affect. However, neither scale directly asks the respondent about happiness or any other emotional state. Instead, they measure activities and situations that are generally correlated with positive or negative affect. As a result, multiple domain score combinations produce the same MABS score. The retest reliability over time using a subsample in a Detroit suburb was good ($\gamma = .88$ for men and $.82$ for women) (Orden & Bradburn, 1968). In the present study, the MABS was administered in its entirety both in 1980 and 2010. While the MABS was no longer in common use in 2010, it was used to maintain consistency across the two time points.

Tables 1-3 show the item-total correlations for each MABS subscale. Generally, the items produce similar item-total correlations in 1980 and 2010. The correlation coefficients generally ranged between $.30$ and $.40$.

Table 1

Item-Total Correlations for Marital Tension Subscale

	Item-total correlation 1980	Item-total correlation 2010
“Being Tired”	.29	.30
“Irritating Personal Habits”	.30	.25
“Household Expenses”	.31	.24
“Being Away From Home”	.30	.26
“How to Spend Leisure”	.38	.37
“Time Spent With Friends”	.38	.28
“Your Job”	.35	.29
“In-Laws”	.26	.23
“Not Showing Love”	.42	.37

Table 2

Item-Total Correlations for Marital Sociability Subscale

	Item-total correlation 1980	Item-total correlation 2010
“Visited Friends Together”	.42	.41
“Entertained Friends in Your Home”	.33	.33
“Gone out Together”	.38	.35
“Ate Out in a Restaurant Together”	.34	.30

Table 3

Item-Total Correlations for Marital Companionship Subscale

	Item-total correlation 1980	Item-total correlation 2010
“Had a Good Laugh Together”	.52	.41
“Being Affectionate Toward Each Other”	.51	.46
“Spent One Evening Just Chatting”	.46	.39
“Did Something the Other Particularly Appreciated”	.50	.37
“Taken a Drive or Walk for Pleasure”	.33	.35

Prior to the MABS items, there was a skip point where respondents were asked the number of times they had been married. In 1980, 295 people (09%) reported never being married and were therefore instructed to skip the MABS items. As a result, there were a maximum of

$n=2958$ respondents who were potentially eligible to respond to the MABS items. 80% of those eligible responded to the MABS (Table 4). Of the 1,839 participants that responded to the 2010 survey, 390 people reported not currently being married or living with a partner in the skip point question. These individuals were therefore instructed to skip the MABS questions, leaving 1,449 potentially eligible respondents to the MABS items. 95% of those eligible responded to the MABS (Table 4).

Table 4

Missing Values: Number (%) of Respondents Who Answered Each Item

	1966	1980	2010
<i>N</i>	3645	3253	1839
Locus of Control	3501(97)	2731(84)	1578(86)
Military Service	--	3239(100)	1789(96)
Income	--	3579(87)	2051(89)
Education	--	2425(75)	1816(99)
Occupation	--	3075(95)	--
MABS		2361(80)**	1376(95)**

**Percentage among those eligible based on marital status (2958 in 1980 / 1449 in 2010)*

Locus of control measurement (LOC). The data for this study comes from a multidimensional longitudinal survey project. The statements comprising the LOC measure were selected from Rotter's Internal-External (I-E) scale (Rotter, 1966), which included 23 I-E items. Rotter's scale offered two statements in a forced-choice format where one statement was indicative of internal locus of control and the other was externally oriented. The surveys that provided the data for the present study administered the statements in a 5-point Likert-type format with the anchors stated as strongly agree and strongly disagree. LOC scores consisted of the average strength of agreement reported across the five items. Because the LOC measure

produces a mean score, it was scored with partial data when some but not all of the items were answered. A higher score indicates a more externally oriented locus of control. Table 5 reports the items-total correlations for each item included in the present study. Though there was some variability in the correlation values across time points, most values ranged between .20 through .33. The exception was the item “people are lonely because they don’t try to be friendly” which produced item-total correlations of either .03 or .08 across the three time points.

Table 5

Items Included from Rotter’s I-E scale

	Item-total correlation 1966	Item-total correlation 1980	Item-total correlation 2010
It is not wise to plan too far ahead because most things turn out to be a matter of good or bad fortune anyhow	.18	.24	.33
People are lonely because they don't try to be friendly	.03	.08	-.03
Many times I feel that I have little influence over the things that happen to me	.15	.20	.33
<i>I do not believe that chance and luck are very important in life</i>	.28	.33	-.01
Becoming a success is a matter of hard work. Luck has little or nothing to do with it	.24	.32	.21

Note. Italics indicate modified wording compared to Rotter (1966).

Of the 3,645 participants in 1966, 97% responded to the locus of control items. Of the 3,253 participants that responded to the 1980 survey, 84% responded to the locus of control items (See table 4 above).

Gender, Prior Marriages, Combat Environment, Education, Income, Occupational Prestige. Gender and prior marriages were each assessed within a single item where respondents selected the label that described them. Those who denied ever serving in the military would

combined with those who served in the military but denied serving in a combat environment for our combat environment variable. Less than 1% did not answer the question regarding military service in 1980 while 96% responded to the question about military service in 2010 (See table 4 above). It was assumed that those who did not responded to items regarding military service did not experience a combat environment.

Education was assessed in a single item where respondents are asked to indicate their highest level of education with 8 options to choose from. 75% of respondents reported their educational attainment in 1980 while 99% answered that question in 2010 (See table 4 above).

1980 income was calculated for each respondent and reported in thousands of dollars based on reported rates of income and, in the case of hourly wages, hours worked per week. Those who report weekly or monthly income are assumed to work 52 weeks or 12 months per year, respectively. 2010 income was assessed in a single item where respondents are asked to select the income range that best estimates their total household income from 2009. Responses were then coded as the midpoint dollar amount for the range selected, reported in thousands of dollars. Item-level missing income data was estimated when other data was available. Missing income data was estimated based on the average income of other same-gender participants who reported the same occupation as reported in the same year the income was being estimated. Outliers were not included in the calculation of average income for each occupation. After estimating missing values when occupation information was available, there was income information for 87% and 89% of respondents in 1980 and 2010, respectively (See table 4 above).

1980 occupational prestige was assigned from reported job title using Duncan's Socioeconomic Index (1961) where scores range from 0 to 96 and the higher the score the higher

the prestige that is generally associated with any specific occupation. Data to determine the occupational prestige of respondents was provided by 95% of respondents (See table 4 above).

Statistical Analysis

Data is prepared and analyzed using statistical software (StataCorp, 2013). Demographic variables of the sample are reported including age, gender, and military status. Given the timeframe covered in this study, nonrandom dropout due to death is considered. A two-tailed t-test is performed on the locus of control variable from late adolescence where those reported as deceased in 1980 are compared to the remainder of the sample yields $t=0.699$. A two-tailed t-test on the locus of control variable from middle adulthood where those reported as deceased in 2010 are compared to the remainder of the sample yields $t=-1.43$. Using a critical value of 1.96, both t-tests identified no difference in average LOC scores based on nonrandom dropout due to death.

For hypotheses 1 through 4, we predict that an externally oriented locus of control, whether measured at a previous time point or contemporaneously, will predict lower ratings of marital satisfaction. The dependent variable is the MABS score, either measured in 1980 or 2010. The predictor variable of primary interest is locus of control either administered in 1966 or 1980. Gender, prior marriages, income, educational attainment, and military service in a combat zone (all measured contemporaneously with the MABS) are also included as predictor variables. Occupational prestige was included as a predictor variable for hypotheses 1 and 3 because data was only available for the 1980 time point.

Scatterplots for each combination of LOC and MABS measurements are analyzed for possible nonlinearity in response to the report in the literature that extremely high levels of either an internal or external locus of control orientation both negatively impact an older adults ability to cope with the effects of life stressors (Krause, 1986).

Results

Demographics

Demographic variables for each wave of the study are presented in Table 6 in percentages. The first wave of the study included 3645 respondents when students were in their junior or senior years of high school during 1966. That first year 1853 (51%) were male. Males and females were similarly represented with 49% of respondents identifying as male in 1980 and 50% of respondents identifying as male in 2010. In 1980, 82% reported being in their first marriage and by 2010 that number dropped to 60%. The income reported in 1980 and 2010 are both unadjusted values and therefore should be interpreted based on the value of the dollar during their respective time periods. In 1980, 49% of respondents earned between \$10,000 and \$20,000. In 2010, 26% of respondents earned less than \$60,000 and 27% earned between \$60,000 and \$80,000. 45% of respondents in both 1980 and 2010 had graduated college with a 4-year degree.

Table 6

Descriptive Statistics of Study Variables by Time Wave: Number of Respondents (%)

	1966	1980	2010
Sex (Male)	1853(51)	--	--
Marriages		<i>n</i> =2856	<i>n</i> =1718
1 st Marriage	--	2345(82)	1026(60)
2 nd Marriage	--	454(16)	491(29)
3 rd + Marriage	--	57(2)	201(11)
Income (unadjusted)		<i>n</i> =3579	<i>n</i> =2051
< \$10,000	--	994(28)	30(1)
\$10,000-19,999	--	1772(49)	79(04)
\$20,000-29,999	--	626(18)	91(04)
\$30,000-39,999	--	111(03)	162(08)

Table 6

Descriptive Statistics of Study Variables by Time Wave: Number of Respondents (%)

	1966	1980	2010
\$40,000-59,999	--	44(01)	179(09)
≥ \$60,000	--	32(01)	--
\$60,000-79,999	--	--	559(27)
\$80,000-99,999	--	--	308(15)
\$100,000-149,999	--	--	366(18)
≥ \$150,000	--	--	277(14)
Highest Educational Attainment		<i>n</i> =2425	<i>n</i> =1816
Less than 1 year college	--	321(13)	361(20)
Freshman-Junior	--	1001(41)	633(35)
College Graduate	--	659(27)	348(19)
Graduate School	--	444(18)	474(26)
Veteran Status		<i>n</i> =3239	<i>n</i> =1789
Service Record	--	741(23)	439(25)
Service by women	--	31(04)	25(06)
<i>N</i>	3645	3253	1839

**Note: samples listed (n=) indicate the number of respondents with available data for the corresponding variable*

Locus of Control Stability Over Time

When LOC measured in 1966 was correlated with LOC measured in 1980 it yielded a small effect size where $r = 0.23$. LOC measured in 1966 and 2010 also yielded a small effect size where $r = 0.19$. LOC measured in 1980 and 2010 yielded a medium effect size where $r = 0.29$.

Linearity

Figure 1 shows scatterplots for each of the LoC and MABS pairs. Overall, the scatterplots suggest a linear relationship between LoC and MABS. The line of predicted

values and the lowess smoothed line for each hypothesis shows some variability. The data used in hypothesis 3 demonstrates the closest fit between the predicted values and the lowess smoothed line whereas the data used in hypothesis 4 manifests the greatest deviation from expected values. The deviations in the lowess line for hypothesis 4 turn towards the mean of MABS on one extreme of LoC scores. The mean of MABS in the 2010 wave is 6.65.

Homoscedasticity

To test the homoscedasticity for the relationship between locus of control and MABS the Breusch-Pagan / Cook-Weisberg test for heteroscedasticity was used. The null hypothesis is that variance is constant. For Hypothesis 1 using locus of control in 1966 to predict MABS in 1980 the null hypothesis could not be rejected, $\chi^2 = 0.84$ and $p = 0.3606$. For Hypothesis 2 using locus of control in 1966 to predict MABS in 2010 the null hypothesis could not be rejected, $\chi^2 = 3.59$ and $p = 0.0582$. For Hypothesis 3 using locus of control in 1980 to predict MABS in 1980 the null hypothesis could not be rejected, $\chi^2 = 1.64$ and $p = 0.1998$. For Hypothesis 4 using locus of control in 1980 to predict MABS in 2010 the null hypothesis could not be rejected, $\chi^2 = 1.32$ and $p = 0.2505$. The Breusch-Pagan / Cook-Weisberg test for heteroscedasticity suggests that the variance of the errors is constant across the range of fitted values for the relationship between each set of LOC and MABS pairs in this study.

Model Specification

Model specification for each hypothesis was tested using a regression specification error test for omitted variables. In this test the null hypothesis is that there are no missing variables. For Hypothesis 1 using locus of control in 1966 to predict MABS in 1980 the null hypothesis could not be rejected, $p = 0.1278$. For Hypothesis 2 using locus of control in 1966 to predict

MABS in 2010 the null hypothesis could not be rejected, $p = 0.8546$. For Hypothesis 3 using locus of control in 1980 to predict MABS in 1980 the null hypothesis could not be rejected, $p = 0.3812$. For Hypothesis 4 using locus of control in 1980 to predict MABS in 2010 the null hypothesis could not be rejected, $p = 0.2080$. The regression specification error test for omitted variables suggests an acceptable model specification for each main effect tested in this study.

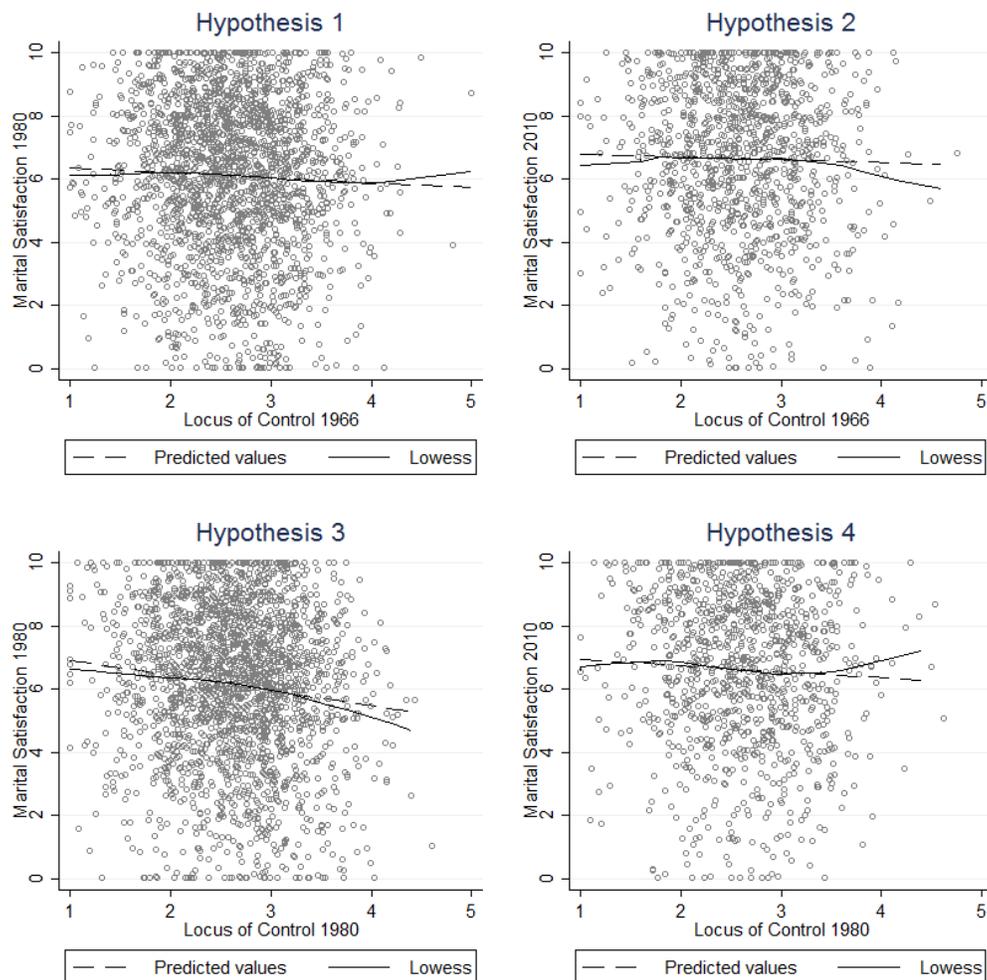


Figure 1: Scatterplots for each Hypothesis

Hypothesis 1

Using locus of control from 1966 to predict marital MABS in 1980 with an ordinary least squares regression and controlling for educational attainment through 1980, gender, prior marriages, income, occupational prestige, and military service in a combat zone produced a model with $n=1,599$ observations. The model was significant with $F(7, 1591) = 2.09, p = 0.0280$ and $R^2 = 0.010$. None of the β coefficients were statistically significant in the model except for that of educational attainment with $\beta = 0.087$ and $p = 0.020$ (Table 7). This indicates that for every year of college education there was a 0.087 point increase in marital satisfaction scores, controlling for all other variables.

Table 7

Regression Model Fit and Significant Predictors

	H ₁ (1966/1980)	H ₂ (1966/2010)	H ₃ (1980/1980)	H ₄ (1980/2010)
Observations	1,599	1,150	1,644	1,061
F	2.09*	4.39**	4.03**	4.05**
R ²	.010	.023	.017	.023
β LoC	-.144	-.130	-.452**	-.201
β Education	.087*	-.036	.074	-.021
β Gender	.169	.153	.173	.179
β Income	.009	.007**	.010	.006**
β Job Prestige	.003	--	.002	--
β Military Service	.096	-.038	.140	-.120
β # Prev. Marriages	.091	-.033	.061	-.033

Note. * $p < .05$ ** $p < .01$

Hypothesis 2

Using locus of control from 1966 to predict marital MABS in 2010 with an ordinary least squares regression and controlling for educational attainment through 2010, income, gender,

prior marriages, and military service in a combat zone produced a model with $n=1,150$ observations. The model was significant with $F(6, 1143) = 4.39$, $p = 0.0003$ and $R^2 = 0.023$. None of the β coefficients were statistically significant in the model except for that of income with $\beta = 0.007$ and $p < 0.001$ (Table 8). This indicates that for every \$10,000 increase in annual income there was a 0.07 point increase in marital satisfaction scores, controlling for all other variables.

Hypothesis 3

Using locus of control from 1980 to predict marital MABS in 1980 with an ordinary least squares regression and controlling for educational attainment through 1980, gender, income, occupational prestige, and military service in a combat zone produced a model with $n=1,644$ observations. The model was significant with $F(7, 1636) = 4.03$, $p = 0.0001$ and $R^2 = 0.017$. In this model, as locus of control becomes more externally oriented marital satisfaction decreases at an average rate of -0.45 units on the MABS for every 1 unit increase on locus of control, controlling for all other variables. This relationship was significant at $p < 0.001$. Years of college education was also statistically significant with $\beta = 0.077$ and $p = 0.045$. Income, occupational prestige, gender, prior marriages, and military service in a combat zone did not significantly predict MABS scores (Table 8).

Hypothesis 4

Using locus of control from 1980 to predict marital MABS in 2010 with an ordinary least squares regression and controlling for educational attainment through 2010, income, gender, prior marriages, and military service in a combat zones produced a model with $n=1,061$ observations. The model was significant with $F(6, 1054) = 4.05$, $p = 0.0005$ and $R^2 = 0.023$. None of the β coefficients were statistically significant in this model except for income with $\beta =$

0.006 and $p < 0.001$ (Table 8). This indicates that for every \$10,000 increase in annual income there was a 0.06 point increase in marital satisfaction scores, controlling for all other variables.

Discussion

The aim of the present study has been to examine the impact an individual's locus of control orientation (LOC) has on marital satisfaction (MS) over time. Using longitudinal data spanning 44 years and 3 time waves, we hypothesized that externally oriented LOC would predict lower ratings of MS both contemporaneously and into the future. The longitudinal design for the present study is important because it separates the identification of LOC as a personality trait from the contextual factors that coincide with the state of marital satisfaction, establishing a meaningful temporal precedence. However, we only found support for one hypothesis, that LOC would predict MS when measured contemporaneously. We found no support for our hypotheses that predicted LOC would predict future measures of MS.

The first two hypotheses use LOC as measured in 1966, when respondents were adolescents, a period characterized by considerable development of and change to one's personality (Syed & Seifge-Krenke, 2013). In addition to the issue of adolescence, hypothesis 2 also spanned the largest period of time, 44 years. Even with the most precise measurement of LOC, it is unknown how much change occurs in locus of control over such a long time period due to only cross sectional designs in the literature that offer conflicting results (Doherty & Baldwin, 1985). Even so, Rotter (1975) clarified that personality-trait theory would expect that LOC would predict a small amount of variance across a broad-range phenomenon. Hypotheses 3 and 4 use LOC as measured in 1980, when respondents were in middle adulthood and more likely to have relatively stable personality characteristics compared to adolescence (Syed &

Seifge-Krenke, 2013). However, LOC measured in middle adulthood could only significantly predict MS that was also measured in middle adulthood.

Our measurement of LOC has not undergone psychometric analyses to determine reliability, validity, or proper cut scores (see limitations). Thus, for the sake of discussion let us identify a 3-unit span as separating a distinctly internal LOC from a distinctly external LOC. Considering the only LOC β coefficient that was significant, we would estimate someone with an internal locus of control in 1980 would have an average 1.35 points higher MABS score in 1980 compared to someone with an external locus of control, holding gender, prior marriages, education, income, occupational prestige, and military service in a combat zone constant. The range of possible MABS scores in our study was 0-10, with marital tensions and marital satisfactions balancing out around a MABS score of 4 (Orden & Bradburn, 1968). A 1.35 difference between internal and external LOC orientations is consistent with the small influence Rotter (1975) expected of any single personality trait. This would suggest an internal locus of control is a significant protective factor for an individual's level of satisfaction in their marriage, though LOC should be measured at the same time as MS.

Even for those who don't measure at the extreme poles of either internal or external LOC orientations, there is clinical value to understanding the relationship between LOC orientation and clinical phenomena like low marital satisfaction. Brand (1982) argued that understanding LOC based patterns of behavior is an important element of assessment and case conceptualization. When LOC is thought to play a prominent role in problematic behavior patterns, Krampen (1985) proposed methods of addressing LOC beliefs directly through behavioral methods, cognitive behavioral methods, and meditation. The present research, therefore, adds not only to our understanding of the personality characteristics that make

someone more susceptible to experiencing marital dissatisfaction but can also directly lead to its treatment.

Beyond LOC, it is unclear why none of control variables significantly predicted MS to a meaningful degree. Income produced statistically significant values for two of the four hypotheses and while education produced one statistically significant value. However, in every case the predictive value was not practically useful. It would require an increase in annual income greater than \$140,000 in 2010 and beyond a doctoral-level education in 1980 before MS scores would increase a single point. Based on the study by Landau (1995), we also expected income, educational attainment, and occupational prestige to predict MS. While Landau (1995) found a significant effect for socioeconomic status independent of the effect of LOC, the dependent variable was life satisfaction not MS specifically.

Again, gender was not expected to have a significant influence on MS based on a meta-analysis including 226 studies (Jackson et al., 2014). However, Loscocco and Walzer (2013) argue for the importance of always examining the influence of gender when studying MS. Regarding military service in a combat zone, we expected similar findings to McLeland & Sutton's (2005) who reported that military service predicted lower marital satisfaction but we could not find support for their conclusions.

Overall, the models tested in this study predicted little of the variance in MS with R^2 values ranging from 0.010 to 0.023. While the primary goal was to understand the influence of LOC on MS, the present study did not sufficiently account for any of the major contributors to MS. Having not accounted for those major contributors to MS, their relationship to LOC's ability to predict MS remains unknown. There is at least one important difficulty with MS research that may partially explain our lack of significant findings. While the scoring conventions for the

MABS attempt to produce a normal distribution (see Orden & Bradburn, 1968), MS is a naturally skewed phenomenon with the vast majority of people reporting high levels of satisfaction. The restricted variability in MS would make it more difficult to identify predictors for that variability, especially when the impact of the predictor variable is expected to be modest. It may not be appropriate to force MS into a normal distribution, data was lost when MABS scoring requires compressing subscale scores and combining tensions and satisfiers produces identical scores from multiple combinations of subscale values.

Locus of Control Stability

The significance of these findings is tied to the stability of LOC as a personality construct. The correlation between the three measurements of LOC in the present study ranged from $r = 0.19$ and $r = 0.34$. By comparison, Roberts and Del Vecchio (2000) reported test-retest consistency correlation values for the Big 5 personality constructs as ranging from $p=0.46$ to $p=0.55$. However, the authors also found that the length of time between repeated measurement significantly influenced consistency. Based on their meta-analysis including 152 studies, Roberts and Del Vecchio reported that, holding age constant at 20 and averaging all traits, trait consistency measured “over a year 1-year period would be 0.55; at 5 years, it would be 0.52; at 10 years, it would be 0.49; at 20 years, it would be .41; and at 40 years it would be 0.25” (p.16). In the present study, our measurement intervals included 14, 30, and 44 years. Unsurprisingly, the lowest correlation at $r = 0.19$ reflects the 44-year span and is therefore an acceptable correlation value.

The matter is further complicated by our evolving understanding of personality development. Roberts, Walton, and Viechtbauer (2006) reported that mean-level changes in Big 5 personality traits continue well into adult life, though individuals seem to follow

predictable patterns of personality adjustment across the lifespan. The authors identified young adulthood (20-40 years) as the period with the most mean-level changes, though they continue well into the fifth decade of life, and beyond depending on the personality construct. This may explain why the correlation between LOC as measured in 1966 and 1980 wasn't larger than $r = 0.25$ despite comprising the shortest time interval of 14 years. Overall, while the test-retest coefficients are not strong, they seem to be acceptable given the limitation imposed by the study design and support the theoretical assumption supporting the primary analysis, namely that LOC is a relatively stable though not invariable construct similar to other personality traits.

Limitations

Call and Teachman (1996) note limits to the generalizability of our dataset due to participant characteristics. Consistent with state demographics at the time, this sample includes a small proportion of ethnic minorities (2.3%). Consequently, socioeconomic indicators are higher than the national average. Because this cohort graduated high school in the middle of the Vietnam War, nearly half of male respondents served in the military, another factor limiting generalizability to the general population.

There are a few limitations to this study that may have obscured the actual relationship between LOC and MS. Our measurement of the MABS in 1980 included the following instruction "if not currently married, answer for typical week in your last marriage." This instruction was not included in the 2010 survey as only those currently living with a partner were asked to respond to the MABS items. Asking respondents to answer based on a "typical week" in a relationship that has since ended (often in divorce) is arguably very different from answering

based on current lived experience. The former is general and dependent on both recall and evolving personal narratives while the latter is an actual sampling of a specific period in time.

Our measurement of LOC involved a number of complications. The wording was taken from the seminal measure on the psychological conception of LOC. However only 4 of Rotter's (1966) 23 items were represented. The format of the questions was also changed. The original measure involved a forced choice between two phrases, each representative of either an internal or an external LOC orientation (Rotter, 1966). The items used in the present study separated the paired phrases and asked respondents to rate their level of agreement in a Likert scale format to a subset of the separated phrases. The psychometric data on the validity and reliability of Rotter's LOC measure cannot be applied to our predictor variable of interest. It is unclear what impact these changes had on the measurement of LOC.

Missing values is another factor limiting this study. Of particular concern are those people who answered some questions but not those items of interest to our study. For the variables of central interest, 652 people (20%) did not provide complete data in 1980 to measure LOC. 674 people (21%), provided incomplete MABS data in 1980, the vast majority of whom skipped all 18 items. The number of respondents providing incomplete data on the MABS in 2010 increased to 917 (42%), again with the vast majority answering none of the questions. Independent t-tests indicated that there were no differences between those who answered and those who skipped the MABS questions in 2010 in terms of income, education, gender, or military service. However, the presence of a confounding variable that we did not measure cannot be ruled out. While efforts were taken to estimate missing values where possible, there is no substitute for actual values.

There are real and unknown potentialities for residual confounding in the present study, which must also be taken into account. The high rate of missing data on certain variables highlights the possibility of unknown confounding variables. There are also a number of probable confounds that should be addressed in future studies. When considering MS, it would be ideal to measure the marriage satisfaction of both partners as has been done in other studies (Mlott and Lira, 1977; Doherty, 1981; Camp & Ganong, 1997). The relationship between the LOC and MS of a partner on one's own MS remains unclear and has never been studied in long-term marriages. Length of marital relationship is another potential confounding variable.

Future Directions

Our understanding of the relationship between LOC and MS would greatly benefit from continued research in this area. While not necessarily a limitation, a review of the literature does not suggest the MABS is still in use as a measure of MS. As the research of marital satisfaction has matured since the measures for this study were chosen, there may be a MS measure more likely to remain relevant following a longitudinal study of this kind. This would add to the usefulness of findings if the measures used are still in use long into the future. Furthermore, it is recommended that a well-designed measure of LOC be included to improve the design of the present study. This would allow not only for the researcher to measure LOC's ability to predict MS into the future but also to measure the stability of LOC overtime.

A complete consideration of MS must address the topic of divorce. Doherty (1983) found no correlation between LOC orientation and divorce and argued that either party in a marriage can initiate a divorce, making the causal factors difficult to determine. However, one might expect an external LOC to predict a pattern of divorce within the same individual, a question not yet studied. Furthermore, previous divorce might also be an important variable to consider

whenever measuring MS. One study found it to account for 2% of the variance in MS (Mirecki, Chou, Elliott, & Schneider, 2013).

Some authors have noted the conceptual confusion and overlapping terminology in the marital satisfaction literature (Fincham & Rogge, 2010; Graham, Diebels, & Barnow, 2011; Raffagnino & Matera, 2015). Terms that have been used somewhat interchangeably have included satisfaction, adjustment, non-distress, happiness, companionship, and functional marriages among others. A specific example of this interchange terminology is a study conducted by Sabatelli in 1986. The study compared LOC orientation to marital satisfaction as measured by a marital adjustment scale that asked respondents to endorse various complaints about their relationships. Fincham and Rogge suggest that there is a fundamental dichotomy between the intrapersonal focus of marital satisfaction or happiness and the interpersonal factors often investigated as part of marital adjustment measures. However, Heyman, Sayers, and Bellack (1994) point out that not only are measures of marital adjustment "... not a theoretically driven construct" but adjustment measures are generally used as "global measures of satisfaction" (p.432) despite their ability to also provide domain specific interpretations. Marital adjustment measures were constructed in an effort to improve psychometric properties as compared to the original satisfaction measures. While distinctions are sometimes made between various terms, differences remain poorly defined and are not universally acknowledged (Vaughn & Matyastik Baier, 1999). For example, the widely used Dyadic Adjustment Scale (Spanier, 1976) engages in a tautology by defining adjustment as both a marital process and an outcome of the process (Fincham & Bradbury, 1987; Heyman et al., 1994).

The MABS was created prior to the more recent efforts to bring clarity to these terms. More precisely, Orden and Bradburn (1968) helped pioneer the practice of measuring marriage

quality beyond a single item that asked respondents how happy they were in their marriages.

While arguably the best measure available during data collection in 1980, the MABS is one example among many of the conceptual confusion that continues to hinder research in this area.

As future research continues to examine the connection between LOC and marital satisfaction, care should be taken in choosing precise terminology with thorough operational definitions that parallel prior reputable publications.

Summary

The first of its kind, the present study looked at the relationship of locus of control and marital satisfaction longitudinally. We found partial support for an external locus of control to be associated with lower marital satisfaction across four temporal comparisons. None of our models found a significant relationship between marital satisfaction and income, education, gender, or military service. Understanding the relationship between locus of control and marital satisfaction may help improve case conceptualization and treatment for couples seeking treatment. Treating marital satisfaction can have a positive impact on physical and emotional health. Not using an empirically validated measure of locus of control is a major limitation of the present study.

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