A CROSS-CULTURAL COMPARISON OF THE RELATIONSHIP BETWEEN OPTIMISM AND SUBJECTIVE WELL-BEING IN JAPAN AND THE UNITED STATES

A Thesis

Presented to

The Faculty of the Department

of Psychology

University of Houston

In Partial Fulfillment

of the Requirements for the Degree of

Master of Arts

By

Laura J. Long

December 2018

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Abstract

Dispositional optimism is robustly associated with positive mental health outcomes such as greater subjective well-being. The relationship between optimism and subjective well-being may be mediated by positive control strategies. However, it is unclear whether the benefits and mechanisms of optimism are consistent across cultures. Differences in the use of primary and secondary control strategies between Western and East Asian cultures may influence the relationship between optimism and subjective well-being. The current study used data from the nationally representative Midlife in the US study and the Midlife in Japan study to explore the relationship between optimism and subjective well-being in these populations. Structural equation modeling was used to investigate, 1) measurement invariance of scales 2) differences in levels of optimism across cultures, 3) the strength of the relationship between optimism and subjective well-being across Japanese and American cultures, and 4) mechanisms underlying the relationship between optimism and well-being across cultures. Americans showed greater optimism and less pessimism than Japanese adults. Levels of optimism and pessimism explained a large amount of variance in subjective well-being in both samples, though greater optimism was a stronger predictor of greater subjective well-being than lower levels of pessimism. Relationships between optimism, pessimism, and control strategies were inconsistent across cultures, and the results did not provide support for the role of control strategies as mechanisms underlying these relationships. While the two-factor structure of the LOT-R demonstrated partial weak invariance, the control scales did not show evidence of configural invariance. Thus, while the relationships between optimism, pessimism, and subjective well-being were consistent across cultures, results associated with control strategies cannot confidently be interpreted.

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Introduction

Optimism

Researchers have long been interested in whether positive thinking can result in discernable positive outcomes. One form of positive thinking that has received considerable attention is dispositional optimism, a personality trait involving the tendency to anticipate favorable outcomes of events, or positive "generalized outcome expectancies" (Scheier & Carver, 1985). While optimism may appear similar to other forms of positive cognition associated with goal-directed behavior such as hope and self-efficacy, optimism theory places less emphasis on personal resources such as agency. Optimism and its counterpart pessimism may arise from a variety of additional sources, including those that are external (e.g. luck), but expectancies are considered the critical influence on goal-directed behavior. When a goal becomes salient or an obstacle is encountered, individuals pause to reflect and engage in self-feedback in order to ensure that their behavior is in line with their goals or reduce any discrepancy between them. Expectations that goal-related efforts will result in positive outcomes elicit positive emotions as well as enhanced motivation and effort towards one's goals, while negative outcome expectancies promote negative emotions and disengagement from goal-directed behaviors or mental withdrawal (Carver, Blaney, & Scheier, 1979; Scheier & Carver, 1982, 1992). Because people high in optimism expect their goals will be met with success, they are active and engaged when pursuing their goals and responding to obstacles.

Optimism is robustly associated with mental health and positive functioning. Theories of optimism propose that those who have successfully navigated challenges in the past are more likely to expect positive outcomes and view themselves as competent and in

control of their circumstances. Thus, it follows that optimism is associated with greater self-esteem, self-efficacy, and internal locus of control/causality (Alarcon, Bowling, & Khazon, 2013; Scheier & Carver, 1985). This form of dispositional positive thinking may act as a protective factor against the development of mental health problems given that it is inversely related to depression, anxiety, and suicidal ideation (Alarcon et al., 2013). Optimism is also associated with markers of positive functioning such as quality of life and subjective well-being.

Optimism and Subjective Well-being

The hedonic perspective of well-being emphasizes ample pleasurable experiences in the relative absence of pain and is represented by the psychological construct of subjective well-being (Ryan & Deci, 2001). Subjective well-being constitutes peoples' global perceptions of their lives, including their emotional reactions and cognitive evaluations of their experiences (Diener, Lucas, & Oshi, 2002). The most widely studied model proposes that subjective well-being is composed of life satisfaction as well as the comparative frequency of experiencing positive vs. negative affect (Diener, 1984). Though there is some debate about the structure of the components, they appear to be related but somewhat distinct (Busseri, 2015; Lucas, Diener, & Suh, 1996). Therefore, subjective well-being is commonly modeled as a latent factor subsuming positive affect, negative affect, and satisfaction with life (Arthaud-day, Rode, Mooney, & Near, 2005; Metler & Busseri, 2017).

Subjective well-being appears to be greatly influenced by personality. Personality dimensions such as dispositional optimism (Carver, Scheier, & Segerstrom, 2010; Scheier & Carver, 1992) as well as big 5 personality traits (Lucas & Diener, 2009; Steel, Schmidt, & Shultz, 2008) are strong predictors of subjective well-being. Subjective well-being is

moderately heritable like personality characteristics tend to be. However, subjective well-being is not a static trait-like quality as it is still responsive to changing life circumstances (Chamberlain & Zika, 1992; Lucas & Diener, 2009). Subjective well-being is thought to be influenced by a person's environment and whether their needs are being met, yet as a whole, external influences tend to account for only a small amount of variance in subjective well-being (Lucas & Diener, 2009). Subjective well-being involves global evaluations of one's life based on personal standards, so it is influenced by perceptions of progress towards ones goals and aspirations as well as the availability of the resources to achieve them (Carver, Lawrence, & Scheier, 1996; Diener, Lucas, & Smith, 1999). Given that optimism is associated with engaged goal pursuit and active responding to obstacles, promoting positive coping strategies may be one mechanism through which optimism contributes to well-being.

Potential Mechanisms Underlying the Relationship Between Optimism and Subjective Well-being

Optimism may be associated with positive outcomes through promoting more productive forms of coping with potentially stressful obstacles. Stress and coping theory asserts that the degree of stress a person experiences depends on their perceptions of their ability to effectively cope with the stressor (Lazarus & Folkman, 1984). Thus, those with positive outcome expectancies perceive obstacles as less stressful (Fernández-González, González-Hernández, & Trianes-Torres, 2015). In general, optimism is associated with resilience in response to stress (Petros, Opacka-Juffry, & Huber, 2013). Because optimists see the possibility for positive outcomes, they are driven to re-engage in goal pursuit and make more active attempts to respond to obstacles (Scheier, Weintraub, & Carver, 1986). Optimism is robustly associated with more adaptive, engaged coping styles including active

coping, approach coping, and problem-focused coping (Nes & Segerstrom, 2006; Scheier & Carver, 1985). Optimism is also associated with positive internal coping strategies such as positive reappraisal and acceptance (Carver et al., 1993; Scheier et al., 1986). Individuals low in optimism are more likely to focus on distress surrounding negative outcome expectancies and engage in maladaptive forms of avoidance and emotion-focused coping such as coping through escapism, denial, and distancing (Carver, Scheier, & Weintraub, 1989; King, Rowe, Kimble, & Zerwic, 1998; Nes & Segerstrom, 2006; Scheier et al., 1986).

Those high in optimism respond to salient goals and cope with obstacles by exerting control over their environment in specific ways. Several theories of self-regulation emphasize two main overarching control strategies (Heckhausen & Schulz, 1993, 1995; Rothbaum, Weisz, & Snyder, 1982; Weisz, Rothbaum, & Blackburn, 1984). The first is primary control, which involves attempts to make changes in one's environment and existing reality. This type of control subsumes more specific strategies such as selective primary control, which involves focused investment of internal resources towards goal attainment, and compensatory primary control, which involves recruiting external resources such as help and advice from others to aid in goal pursuit (Heckhausen, Wrosch, & Shultz, 2010; Wrosch, Heckhausen, & Lachman, 2000). These strategies should be associated with optimism because they promote active and engaged goal pursuit, even when things get difficult. The other overarching strategy is secondary control, which involves aligning oneself with one's environment and existing reality while exerting control over internal responses. Specific strategies within this category such as positive reappraisal, which constitutes a situation in a positive way, are associated with optimism (though some strategies which promote greater goal disengagement may not be). Overall, optimism appears to be associated with both

general primary control and secondary control usage (Lacković-Grgin, Grgin, Penezić, & Sorić, 2001; Tobin & Raymundo, 2010). Those with greater optimism show a tendency to favor the specific goal engagement strategies of selective primary control, compensatory primary control, and positive reappraisal (Carver et al., 1993; Pavlova & Silbereisen, 2013).

Primary and secondary control strategies are also related to positive functioning and mental health outcomes, including aspects of subjective well-being. Greater utilization of primary and secondary control has been associated with better mental health (Bettis et al., 2016; de Quadros-Wander, McGillivray, & Broadbent, 2014; Hallford, Mellor, & Cummins, 2013; Kutsunai, 2001; Santiago, Etter, Wadsworth, & Raviv, 2012; Smith et al., 2000; Wadsworth & Compas, 2002), including more specific forms such as selective primary control, compensatory primary control, and positive reappraisal (Owusu-Ansah, 2004; Windsor, 2009; Wrosch, Schulz, & Heckhausen, 2002; Wrosch et al., 2002). However, higher levels of selective primary control and secondary control strategies were related to greater self-reported happiness, while compensatory primary control was not in a study addressing progressive vision loss in older adults (Schilling et al., 2016). Thus, the ways in which different control strategies are related to mental health and well-being warrants further attention.

Optimism Across East Asian and Western Cultures

While optimism has demonstrated a robust relationship with positive mental health, additional research is necessary to clarify whether optimism operates consistently across cultures. In a recent study examining levels of optimism across 142 countries, Japan was among the ten countries with the lowest optimism, or positive expectations for the future (Gallagher, Lopez, & Pressman, 2013). In fact, Japan was the only country in which

individuals on average did not have more positive expectations for their future compared to their present life satisfaction. Similarly, average levels of optimism were found to be lowest in Japan in a meta-analysis comparing 22 countries (Fischer & Chalmers, 2008). Other research has focused on comparing patterns of dispositional generalized outcome expectancies across those with Eastern and Western cultural backgrounds. However, findings may be influenced by the way optimism is measured. One of the earliest studies found that Caucasian Americans were comparatively more optimistic than Asian Americans when dispositional optimism was measured as a unidimensional construct (Chang, 1996). When optimism and pessimism have been treated as separate constructs, Asian Americans often appear comparatively more pessimistic than Caucasian Americans, while levels of optimism are consistent (Chang, 1996a, 1996b; Hardin & Leong, 2005). However, observed differences may depend on the domain being examined. Asian American college students in the United States have shown similar levels of optimism regarding their performance in the social domain (e.g. maintaining positive relationships, expressing themselves, and achieving social goals) compared to Caucasian students, but greater pessimism regarding their emotional reactions to social interactions (e.g. feeling guilt and anxiety; Zane, Sue, Hu, & Kwon, 1991). Furthermore, Westerners may be more likely to demonstrate what is known as unrealistic optimism, which constitutes predicting a greater likelihood of positive events occurring to themselves compared to others, while those from Eastern cultures show the opposite pattern, perhaps because self-enhancement may not be congruent with collectivist or interdependent cultural ideals (Chang & Asakawa, 2003; Chang, Asakawa, & Sanna, 2001; Heine & Lehman, 1995).

When conducting a cross-cultural comparison, measurement influences on outcomes must also be considered. Optimism is most commonly measured with the Life Orientation Test (LOT; Scheier & Carver, 1985) or the revised version of the scale (LOT-R; Scheier, Carver, & Bridges, 1994). These measures are based on a one-factor conceptualization of generalized outcome expectancies in which optimism represents one end of a bipolar construct with pessimism as the opposing pole. While the bipolar structure has received substantial research support, some studies evaluating the factor structure and psychometric properties of these measurements in both East Asian and Western samples have revealed a two-factor structure that appears to represent optimism and pessimism (Chang, D'Zurilla, & Maydeu-Olivares, 1994; Creed, Patton, & Bartrum, 2002; Lai & Yue, 2000; Lai, 1994). One possibility is that these findings reflect response bias due to the negative wording of the pessimism items (Scheier & Carver, 1985). Yet, there is also evidence that optimism and pessimism demonstrate different relationships with outcome measures such as stress (Chang et al., 1994), depression (Chang, 1997) extraversion, and neuroticism (DeNeve & Cooper, 1998; Marshall, Wortman, Kusulas, Hervig, & Vickers, 1992), and some have argued that the two are better understood as separate constructs (Kubzansky, Kubzansky, & Maselko, 2004; Marshall, Wortman, Kusulas, Hervig, & et al, 1992). Given that these outcomes are related to subjective-well-being, it will be important to determine whether the LOT-R demonstrates a consistent factor structure in addition to establishing equivalence of measurement properties across East Asian and Western samples.

Optimism and Subjective Well-being Across East Asian and Western Cultures

Theories of dispositional optimism propose that its benefits should be consistent across cultures (Carver et al, 2010). However, culture-driven conceptualizations of the self

may influence the relationship between optimism and subjective well-being across cultures. Western cultures tend to promote an individualist or independent view of the self as a free agent responsible for his or her own goals and success. More focus is directed towards aspects of the self that make a person unique and set them apart from others (Triandis, 1989). East Asian cultures tend to promote a collectivist or interdependent view of the self as inherently connected with others. More value is placed on social harmony, conformity, and prioritizing the needs of one's social groups above personal needs. Person-associated variables such as self-esteem tend to be more predictive of subjective well-being in individualist cultures compared to collectivist cultures (Suh, Diener, Oishi, & Triandis, 1998). Thus, the strength of the relationship between optimism and subjective well-being may be greater for Western cultures compared to East Asian cultures.

Cross-cultural Differences in Control Strategies

Consistent with the potential differences in optimism and well-being across East Asian and Western cultures, cultural differences may also be expressed in the underlying mechanisms through which they are associated. If control strategies serve as mechanisms that underlie the relationship between optimism and subjective well-being, cultural differences in control orientations must be considered when conducting a cross-cultural comparison between these East Asian and Western populations. East Asians may be more likely to use secondary control and less likely to engage in primary control compared to those from Western backgrounds (Gould, 1999; Tweed & White, 2004; Weisz et al., 1984). High power-distance cultures characteristic of East Asia in which lower ranking individuals expect and assent to unequal power distribution promote acceptance of one's environment. Both Buddhist and Taoist values fall in line with secondary control strategies as well. Those from

collectivist cultures may also be less likely to engage in primary control because it has the potential to strain relationships if others are content with the status quo. Japanese individuals have demonstrated greater secondary control and lower primary control compared to Americans, and greater interdependence among the Japanese has been linked to greater secondary control (Ashman, Shiomura, & Levy, 2006; Morling, 2000; Tweed & White, 2004).

Furthermore, differences in the frequency and function of social support seeking behavior may have specific implications for how compensatory primary control relates to subjective well-being in East Asian and Western cultures. People from Asian cultural backgrounds may be less willing to engage in compensatory primary control strategies that involve seeking explicit social support than European Americans and may perceive social support as less effective (Kim, Sherman, Ko, & Taylor, 2006; Taylor et al., 2004). Reservations can stem from fear of burdening others and losing face. People from collectivist cultures typically view themselves as interconnected with others and are more closely bound to social norms, which prioritize personal goals below those of the group. Thus, relationships with others tend to be associated with greater obligations and personal impact. People from individualist cultures tend to view themselves as independent agents in charge of personal goal seeking behavior, and relationships with others are viewed as more voluntary. East Asians may benefit less from compensatory primary control strategies that involve seeking explicit social support (i.e. seeking advice, emotional support, or instrumental support from others) compared to implicit social support (i.e. a sense of comfort from belonging within a social network or merely spending time with others; Taylor, Welch, Kim, & Sherman, 2007). Another study found that compensatory primary control was more

strongly related to life satisfaction for those with higher levels of individualism versus collectivism. However, compensatory primary control has also been related to collectivist self-construal (Owusu-Ansah, 2004). Thus, additional research is needed to elucidate cross-cultural differences in compensatory primary control and its relationship to well-being.

The Present Study

The present study contributes to our understanding of how optimism operates across cultures by investigating potential differences in the relationship between optimism and well-being in Japanese and American adults. Many cross-cultural comparisons of dispositional optimism in Eastern and East Asian cultures have utilized student samples. The current study also enhances generalizability by employing representative samples of the populations of the United States and the Japanese capital. The direct examination of the measurement equivalence of the constructs of interest helps to determine whether they are being assessed in a consistent manner across both cultural groups. Furthermore, few studies have investigated mechanisms underlying the relationship between optimism and subjective well-being using structural equation modeling, a robust method for determining mediation that helps account for variance due to measurement error. The primary aims of the study were as follows:

- **Aim 1**: To determine whether the assessments for constructs of interest (i.e. optimism, selective primary control, compensatory primary control, and positive reappraisal) demonstrate measurement invariance across the Japanese and American samples. As a part of this aim, the optimal factor structure of the Life Orientation Test - Revised was determined within each sample before examining measurement invariance across the American and Japanese samples.

- **Hypothesis 1**: Each assessment would exhibit measurement invariance across both samples, and the Life Orientation Test – Revised will exhibit a bipolar factor structure.
- **Aim 2:** To evaluate whether there are overall differences in levels of optimism between Americans and the Japanese.
- **Hypothesis 2:** In light of research findings reflecting greater optimism in Western population compared to East Asian populations when optimism is measured as a unitary construct, it was hypothesized the Americans will show greater optimism than Japanese adults.
- **Aim 3:** To evaluate whether there are differences in the strength of the relationship between optimism and subjective well-being between Americans and Japanese adults.
- **Hypothesis 3:** It was hypothesized that greater optimism will be associated with greater subjective well-being, and the strength of this relationship would be consistent across cultures.
- **Aim 4:** To investigate whether different self-regulatory control strategies mediate the relationship between optimism and subjective well-being in both the American and Japanese samples.
- **Hypothesis 4:** A significant indirect relationship between optimism and well-being via each control strategy was expected across both cultures, with optimism predicting greater selective primary control, compensatory primary control, and positive reappraisal, which would each in turn predict greater subjective well-being. However, because people from western cultures may engage in more

primary control than those from East Asian cultures, optimism was expected to be more strongly associated with selective primary control for Americans compared to Japanese adults. Those from East Asian cultures also appear less likely to engage in overt forms of social support seeking, so optimism was expected to be less strongly associated with compensatory primary control in the Japanese sample. Furthermore, because overt forms of social support seeking are also viewed as less useful in East Asian samples, it was expected that the association between compensatory primary control and well-being would be weaker for Japanese adults than Americans adults as well. Finally, given that people from East Asian cultures engage in more secondary control in compared to those western cultures, it was expected that optimism would be more strongly related to the more culturally congruent secondary control strategy of positive reappraisal for Japanese adults compared to American adults.

Methods

Procedures

Data from the second wave of the Midlife in the U.S. National Study of Health and Well-being (MIDUS) as well as the first wave of the corresponding Midlife in Japan (MIDJA) project was utilized for the present study. Participants from the first wave of the MIDUS (MIDUS1) were recruited by random digit dialing to obtain a nationally representative main sample of English-speaking adults during the period of 1995-6. Participants completed a 30-minute telephone interview and were mailed two self-administered questionnaires covering aspects of their mental and physical health. For the second wave of the study (MIDUS2) during 2004-6, participants who completed at least the

telephone interview completed a second battery of the same measures with minor alterations. Respondents were compensated with $20 for participating in the MIDUS1 and $60 for completing all waves of the study. Recruitment for the first wave of the MIDJA was conducted in Tokyo, Japan from April-September 2008. Individuals were selected from the Basic Resident Register Book using stratified random sampling by age and gender to obtain a representative sample of Japanese-speaking residents of the 23 wards of Tokyo. Participants were mailed a recruitment package with instructions and offered 3000 yen (around $28-30) to participate.

Participants

The current study included 1,805 American adults from the main sample of the MIDUS2 who completed the self-administered questionnaires (52% of the MIDUS1 Main sample and 80% of the phone interview completers from MIDUS 2) and 1027 Japanese adults from the MIDJA. The MIDUS2 Main sample was 45.3% male, and ages ranged from 30-84 (M = 56.85, SD = 12.62). The MIDJA sample was 49.2% male and ages ranged from 30 – 79 (M = 54.4, SD = 14.15). In terms of marital status, 68.8% of the MIDUS 2 main sample was married (with 31.0% unmarried), while 70.3% of the MIDJA sample was married (with 29.3% unmarried). Additional demographic information is provided in Table 1.

Measures

An English version of each of the following scales was used for the American sample and a Japanese version of each scale was used for the Japanese sample. The original English versions of the scales were translated into Japanese, back-translated, and adjusted by native Japanese speakers in order to achieve equivalent meanings.

Dispositional Optimism was measured with the revised version of the Life Orientation Test (LOT-R) developed by Scheier, Carver, and Bridges (1994). The LOT-R is comprised of two 3-item subscales measuring optimism and pessimism, to which participants respond on a 5-point likert scale. Items were coded so that higher scores represent greater levels of optimism. The internal consistency for the full LOT-R was greater than .6 across the MIDUS2 and MIDJA samples. Internal consistency was $\alpha = .58$ for the optimism subscale and $\alpha = .51$ for the pessimism subscale within the Japanese sample. In the American sample, internal consistency was $\alpha = .69$ for the optimism subscale and $\alpha = .81$ for the pessimism subscale.

Satisfaction with Life was measured using a scale assessing global perceptions of satisfaction within different life domains (i.e. work, health, relationship with spouse/partner, relationship with children, and finances; Fleeson, 2004; Prenda & Lachman, 2001). This scale was composed of 6 items rated on an 11-point likert scale, so that higher scores are associated with greater life satisfaction. The score for this scale was produced by first calculating the mean of the items assessing relationship with spouse/partner and relationship with children (consistent with Prenda & Lachman's methods), and then calculating the mean of the resulting 5 scores. Internal consistency for this scale tends to range from .66 - .72 (Boehm, Chen, Williams, Ryff, & Kubzansky, 2015; Robustelli & Whisman, 2016). Internal consistency was $\alpha = .71$ in the American sample and $\alpha = .75$ in the Japanese sample. In terms of validity, individual items from this scale are correlated with the widely used Satisfaction with Life Scale (Diener, Emmnos, Larsen, & Griffin, 1985; Robustelli & Whisman, 2016).

Positive and Negative Affect was measured using 12 items from the Negative and Positive Affect Scale (NAPAS; Mroczek , 2004; Mroczek & Kolarz, 1998) and 9 items from the Positive and Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The NAPAS consists of 6 items measuring positive affect and 6 items measuring negative affect based off of commonly used instruments including the Affect Balance Scale (Bradburn, 1969), The General Well-Being Schedule (Fazio, 1977), The Center for Epidemiological Studies Depression Scale (Radloff, 1977), The University of Michigan's Composite International Diagnostic Interview (Kessler, 1994), The Health Opinion Survey (Macmillan, 1957), and The Manifest Anxiety Scale (Taylor, 1963). These items were supplemented with 5 items measuring positive affect and 4 items measuring negative affect from the PANAS. Frequency of experiencing different forms of affect during the last 30 days was recorded on a 5-point likert scale and coded so that high frequency was associated with greater scores. A score for positive affect and a score for negative affect were created by taking the mean of item responses associated with each. The NAPAS has demonstrated internal consistencies greater than .8 for both positive and negative affect (Mroczek, 2004). Internal consistency for positive affect was $\alpha = .93$ in the American sample and $\alpha = .92$ for the Japanese sample. Internal consistency for negative affect was $\alpha = .91$ in the American sample and $\alpha = .90$ in the Japanese sample. This scale has also demonstrated sufficient criterion validity as evidenced by correlations with personality factors and life satisfaction, as well as configural invariance across American and Iranian samples (Joshaloo, 2017; Joshanloo & Bakshi, 2016). The PANAS is one of the most widely used measures of affect, and has demonstrated reliability and validity across a variety of samples (Crawford & Henry, 2004; Merz et al., 2013).

Control Strategies was measured using items from the Optimization of Primary and Secondary Control Scales as well as some items constructed in the context of the MIDUS study (Heckhausen & Schulz, 1993; Heckhausen, Schulz, & Wrosch, 1998; Wrosch et al., 2000). The battery included 5 items measuring selective primary control, 4 items measuring compensatory primary control, which involves asking others for help when encountering obstacles, and 4 items measuring positive reappraisal. Items were rated on a 5-point likert scale and coded so that higher scores were associated with greater utilization of the designated control strategy. The score for each scale represents the mean of item responses. Internal consistencies for the three scales were greater than .6 across the samples from the MIDUS2 and MIDJA. Internal consistency for selective primary control was $\alpha = .78$ in the American sample and $\alpha = .82$ in the Japanese sample. Internal consistency for compensatory primary control was $\alpha = .73$ in the American sample and $\alpha = .62$ in the Japanese sample. Internal consistency for positive reappraisal was $\alpha = .78$ in the American sample and $\alpha = .81$ in the Japanese sample.

Analytic Plan

Descriptive statistics were calculated using IBM SPSS version 24.0. Means and standard deviations of optimism, selective primary control, compensatory primary control, positive reappraisal, life satisfaction, positive affect, and negative affect were calculated for both the Japanese and the American samples. The effect size of the difference in means (cohen's d) between the samples with 95% confidence intervals were calculated for each variable.

Study hypotheses were tested with structural equation modeling using Mplus version 8.0 (Muthén & Muthén, 1998-2017). First, multiple-group confirmatory factor analysis was

used to determine whether the scales employed in the study demonstrated measurement invariance across the Japanese and American samples. Next, the measurement models with correlations between latent constructs of interest were examined. Finally, the structural models demonstrating the relationship between optimism and subjective well-being were examined. Fit was evaluated for each model using common indices including χ^2, the Root Mean Square Error (RMSEA), the Comparative Fit Index (CFI), and the Tucker-Lewis Index (TLI), and the Standardized Root Mean Square Residual (SRMR). The Satorra-Bentler scaled χ^2 (Satorra & Bentler, 1988), appropriate when using robust maximum likelihood estimation for non-normal data, was also employed when assessing measurement invariance. Models show an acceptable fit to the data when The RMSEA and SRMR are below .08 (Hu & Bentler, 1999; MacCallum et al, 1996), the CFI and TLI are above .90 (Hu & Bentler, 1995; Kline, 2005), and the χ^2 is significant at α = .05 (Bollen, 1989). Missing data was handled using robust maximum likelihood estimation (MLR) for measurement invariance models, direct effects models, and the first measurement model including optimism, pessimism, and subjective well-being. The indirect effects models required the use of maximum likelihood estimation (ML), which was also used for the corresponding measurement model including optimism, pessimism, subjective well-being, and all control strategies.

Measurement invariance was examined for optimism and each of the control strategies (selective primary control, compensatory primary control positive reappraisal and positive reappraisal) across both samples (see Figure 1). Measurement invariance was not determined for subjective well-being since this construct was just identified with three indicators representing the means of other scales. For each construct, three nested models

with increasingly strict criteria were examined in succession to determine configural, weak, and strong factorial invariance (Little, 2013). Configural invariance occurs when the patterns of fixed and free parameters are consistent across samples (Cheung & Rensvold, 2002). This was determined by examining model fit as reflected by the χ^2, RMSEA, CFI, TLI, and SRMR. Weak invariance occurs when factor loadings of items onto latent constructs are equivalent across the samples. Weak invariance was evidenced if the χ^2 difference test between models was non-significant at α = .005, if the change in CFI between the models was less than .01, and the RMSEA values of both models fell within each other's confidence intervals, and thus were not significantly different (Cheung & Rensvold, 2002). Strong invariance occurs when the means of indicator items associated with latent constructs are consistent across samples (Cheung & Rensvold, 2002). The same criteria was used to determine strong invariance, which was achieved if the indicator means were equivalent across the samples. When full weak or strong invariance were not achieved, it was explored whether scales demonstrated partial invariance. Parameters with the highest modification indices were sequentially freed (so that they were no longer constrained as equal between samples) until the model fit reached acceptable levels, if partial invariance was indicated. Because there is some debate regarding the factor structure of the Life Orientation Test-Revised, nested model comparisons were conducted between the unipolar factor structure and a bipolar factor structure representing optimism and pessimism within each sample (see Figure 1). Given that the same two-factor structure emerged in both samples, measurement invariance was examined using this configuration across the American and Japanese samples. Afterwards, the measurement models including the latent associations between the constructs of interest were examined. The first measurement model included optimism, pessimism, and

subjective well-being. The second measurement model also included these constructs in addition to each control strategy.

The structural models were then examined in order to elucidate the relationship between optimism and subjective well-being. For each model, an additional version including covariates of age, gender (coded 0 for male and 1 for female), and social support (e.g. marital status, coded 0 for married and 1 for unmarried) was examined. The first structural model determined the direct effect of culture (Japanese, American) on optimism and pessimism in order to determine whether average levels of these constructs differed across cultures. Culture was represented as a categorical variable with "American" coded as 0 and "Japanese" coded as 1. Next, the direct effect of optimism and pessimism on well-being was examined in both the American and Japanese samples, respectively (see Figure 2). Then, the direct effects of both optimism and pessimism predicting all three control strategies were examined (see Figure 3). Next, for each culture, three different models were tested to examine the indirect effects of optimism and pessimism on subjective well-being through each method of control, respectively (see Figure 4). Afterwards, separate models for each culture were tested to examine the indirect effect of optimism and pessimism on subjective well-being through all three methods of control simultaneously (see Figure 5). These indirect effects were determined by multiplying the effects of each respective generalized outcome expectancy (i.e. optimism and pessimism) on the designated control strategies by the effects of the designated control strategies on subjective well-being, controlling for the generalized outcome expectancy. The indirect effects for the sum of control strategies were also included. The statistical significance of each indirect effect was determined using the bootstrapping method. This involved resampling the data 1000 times in order to create a

sampling distribution for the indirect effect, which was used to calculate a 95% confidence interval (Little, Bovaird, & Card, 2007). In addition, 95% confidence intervals were calculated for all beta effect sizes, latent associations, and R^2 values. All reported effect sizes were completely standardized (except for betas corresponding to the direct effects of binary predictors including culture, gender, and marital status, which required y-standardized).

Results

Descriptive Statistics

Means, standard deviations, and mean differences are provided for each study variable in Table 2. Comparisons of group means revealed that Americans had higher levels of optimism (d = .76, .67 : .84) and lower levels of pessimism (d = -.66, -.76 : -.56) than Japanese adults, with medium-to-large effect sizes. Furthermore, Americans showed higher levels of life satisfaction, demonstrating a large effect size, as well as both positive and negative affect, both demonstrating medium effect sizes. Americans also demonstrated higher levels of selective primary control, with a large effect size, as well as positive reappraisal, with a medium effect size. Levels of compensatory primary control did not statistically differ between cultures, though, similarly, Americans demonstrated slightly higher levels of compensatory primary control (see Table 1).

Comparison of the Factor Structure of Optimism

The factor structure of optimism was examined in each respective sample using CFA in order to determine which model demonstrated the best fit and would be used in subsequent analysis. The model fit for the one-factor model of optimism was unacceptable in both samples, (Japanese sample: χ^2 (df = 8) = 127.067, $p < .05$, RMSEA = .11, CFI = .77, TLI = .62, SRMR = .08), though model fit was slightly better in the US sample (χ^2 (df = 9) =

368.576, $p < .05$, RMSEA = .15, CFI = .83, TLI = .71, SRMR = .06). The model fit for the two-factor model was superior to the one-factor model fit in both samples (Japanese sample: χ^2 (df = 8) = 63.03, $p < .05$, RMSEA = .08, CFI = .90, TLI = .80, SRMR = .04), but only demonstrated acceptable levels for all 4 indicators in the US sample (χ^2 (df = 8) = 105.03, $p < .05$, RMSEA = .08, CFI = .95, TLI = .91, SRMR = .04). Thus, the two-factor model was chosen for the measurement invariance analysis, as well as the measurement and structural models.

Measurement Invariance

Next, measurement invariance analysis was conducted using the two-factor model of optimism, followed by each of the three control strategies. The two-factor model of optimism demonstrated evidence of configural invariance across both samples, reflecting a generally acceptable model fit with acceptable values for three out of four model fit indices (χ^2 (df = 16) = 168.47, $p < .05$, RMSEA = .08, .07 : .09, CFI = .94, TLI = .89, SRMR = .04). This suggests that the factor structure of optimism is consistent across the samples. For the weak invariance test, three out of four model fit indices demonstrated acceptable values (χ^2 (df = 20) = 216.99, $p < .05$, RMSEA = .08, .07 : .09, CFI = .93, TLI = .89, SRMR = .06). However, the 2-factor model of optimism did not demonstrate full weak invariance, as indicated by the significant χ^2 difference test (scaled χ^2 (df = 4) = 48.17, $p < .00$), though the change in CFI between the models was less than .01 and the RMSEA values of the nested models fell within each other's confidence intervals. Simulation studies have indicated that change in CFI and RMSEA may be less sensitive to weak invariance when there is an imbalance in sample size (Yoon & Lai, 2018). Furthermore, the chi squared difference test is a more direct statistical test of group differences. Thus, the chi squared difference test may

represent a better indicator of model fit indicating weak invariance. The first item of both the optimism and pessimism subscales demonstrated weaker factors loadings compared to other items, particularly in the Japanese sample ($\lambda = .47$ for optimism item 1, $\lambda = .46$ for pessimism item 1 in the Japanese sample; $\lambda = .53$ for optimism item 1, $\lambda = .63$ for pessimism item 1 in the American sample). Given that a number of model fit indices reached acceptable levels for the weak invariance model, it was examined whether the LOT-R demonstrated partial invariance. The model demonstrated partial weak invariance when the factor loadings of item 1 of both the optimism subscale ("In uncertain times, I usually expect the best") and the pessimism subscale ("If something can go wrong for me, it will") were not constrained as equal, (χ^2 (df = 18) = 163.99, $p < .05$, RMSEA = .08, .07 : .09, CFI = .95, TLI = .91, SRMR = .04, and scaled χ^2 (df = 2) = .25, $p = .88$ for the difference test). This suggests that the relationships between items 2 and 3 of both subscales and their associated latent constructs are consistent across cultures, while the first items of these subscales do not relate to optimism and pessimism in a consistent way across the samples. The full two-factor model of optimism did not demonstrate strong invariance. All four model fit indices showed poor model fit (χ^2 (df = 24) = 750.06, $p < .05$, RMSEA = .15, 14 : 16 , CFI = .73, TLI = .66, SRMR = .18, and scaled χ^2 (df = 6) = 657.14 , $p = .00$ for the difference test), The χ^2 difference test between the nested models was statistically significant, the change in CFI was greater than .01, and RMSEA values that did not fall with eachother's confidence intervals. Furthermore, sequentially freeing item intercepts with high modification indices (so they were not constrained as equal across samples) did not achieve partial strong invariance. This indicates that any differences in levels of optimism and pessimism across these cultures are, to a certain degree, influenced by the measurement properties of the LOT-R.

None of the measurement models of the control strategies demonstrated configural invariance, with values for model fit indices falling below acceptable levels (selective primary control: χ^2 (df = 10) = 332.37, $p < .05$, RMSEA = .15, CFI = .89, TLI = .78, SRMR = .05; compensatory primary control: χ^2 (df = 10) = 341.23, $p < .05$, RMSEA = .15, CFI = .90, TLI = .80 SRMR = .07; positive reappraisal: χ^2 (df = 4) = 158.91, $p < .05$, RMSEA = .17, CFI = .94, TLI = .83 SRMR = .05). This indicates that the factor structure of each type of control strategy differed across samples, and suggests that potential differences in levels of control across cultures may be influenced by differences in the measurement properties of these scales. These results were likely influenced by the poor measurement properties of the control scales. CFAs indicated that the model fit for selective primary control (Japan: $\chi 2$ (df = 5) = 114.71, p < .05, RMSEA = .15, .12 : .17, CFI = .94, TLI = .87, SRMR = .05; US: $\chi 2$ (df = 5) = 295.64, p < .05, RMSEA = .18, .16 : .20, CFI = .88, TLI = .77, SRMR = .06) compensatory primary control (Japan: $\chi 2$ (df = 5) = 65.28, p < .05, RMSEA = .11, .09 : .13, CFI = .97, TLI = .94, SRMR = .04; US: $\chi 2$ (df = 5) = 324.72, p < .05, RMSEA = .19, .17 : .21, CFI = .87, TLI = .73, SRMR = .08) , and positive reappraisal scales (Japan: $\chi 2$ (df = 2) = 69.60, p < .05, RMSEA = .18, .15: .22, CFI = .96, TLI = .87, SRMR = .04; US: US ($\chi 2$ (df = 16) = 124.45, p < .05, RMSEA = .19, .16 : .21, CFI = .95, TLI = .85, SRMR = .05) were generally poor within each sample as well.

Measurement Models

The measurement models including latent associations between constructs of interest were examined within each sample using CFA before examining the structural models. First, a model including optimism, pessimism, and subjective well-being was examined within each sample. Within the US sample, the model demonstrated a good fit (χ^2 (df = 24) =

163.08, $p < .05$, RMSEA = .06, CFI = .96, TLI = .95, SRMR = .04), while model fit was generally acceptable but poorer in the Japanese sample, with acceptable values for three out of four model fit indices (χ^2 (df = 24) = 165.13, $p < .05$, RMSEA = .08, CFI = .91, TLI = .86, SRMR = .05). In both samples, subjective well-being was associated with greater levels of optimism (Japan: r = .66, 59 : .74; US: r = .70, .64 : .75) and lower levels of pessimism (Japan: r = -.51, -.62 : -.39; US: r = -.56, -.61 : .51), with large effect sizes. Again, optimism and pessimism demonstrated a strong inverse relationship in both samples (Japan: r = -.61, -.75 : -.47; US: r = -.63, -70 : .57).

Then, in each respective sample, latent associations between optimism, pessimism, subjective well-being, and each control strategy were examined using CFA (see Table 3). The model fit was below acceptable levels for two out of four indices in both the Japanese sample (χ^2 (df = 215) = 1830.75, $p < .05$, RMSEA = .07, CFI = .89, TLI = .87, SRMR = .06) as well as in the American sample (χ^2 (df = 215) = 1189.54, $p < .05$, RMSEA = .07, CFI = .89, TLI = .87, SRMR = .06). Thus, results must be interpreted with caution. In the Japanese sample, optimism was associated with greater levels of subjective well-being (r = .67 , -.70: -.53), selective primary control (r = .50, .43 : .57), and positive reappraisal (r = .59, .53 : .66), as well as lower levels of pessimism, all demonstrating large effect sizes. Optimism was associated with greater compensatory primary control as well, but the effect size was small (r = .14, .06 : .22). Conversely, pessimism was associated with lower levels of subjective well-being (r = -.50, -.58 : -.42) and positive reappraisal (r = -.47, -.54 : -.39), demonstrating large effect sizes. Pessimism was also associated with lower levels of selective (r = -.28, -.37 : .-20) and compensatory primary control (r = -.14, -.22 : -.05), but effect sizes were small. Selective primary control (r = .45, .39 : .52) and positive reappraisal (r = .51, .45 : .57)

demonstrated strong direct associations with subjective well-being, while compensatory primary control was only weakly directly related (r = .05, -.02 : .13), and the effect was not statistically significant. Positive reappraisal and selective primary control showed a strong direct association. However, both showed small direct associations with compensatory primary control.

These relationships were largely consistent in the measurement model for the American sample. Again, optimism was associated with greater SWB (r = .69, .65: .74) and less pessimism, demonstrating large correlations (see Table 3). Optimism showed large positive correlations with all control strategies except compensatory primary control (selective primary control: r =.58, .53 : .63; positive reappraisal: r = .67 , .63 : .71). Optimism was only weakly correlated with compensatory primary control (r = 35, .29 : .40), but the correlation was stronger in the American sample compared to the Japanese sample. Furthermore, pessimism was associated with lower levels of subjective well-being, demonstrating a large effect size (r = -.55, -.60 : -.51). Inverse correlations between pessimism and other control strategies were comparatively weaker in the American sample, though all still demonstrated medium effect sizes. Again, subjective well-being was strongly correlated with both positive reappraisal (r = .46, .41 : .50) and selective primary control (r = .46, .41 : .51). Compensatory primary control was more strongly correlated with other control strategies as well as subjective well-being (r = .26, .21 : .32) in the American sample, all demonstrating medium effect sizes.

Direct Effects Models

Group differences in optimism and pessimism were examined using structural equation modeling. The model demonstrated an acceptable fit (χ^2 (df = 12) = 229.19, p <

.05, RMSEA = .08, CFI = .94, TLI = .90, SRMR = .04). Americans showed higher levels of optimism (β = -.94; -1.02 : -.86) and lower levels of pessimism than Japanese adults (β = .82; .75 : .90), and both effect sizes were large in magnitude. Optimism and pessimism showed a large inverse correlation in the full sample (β = -.64, -.69 : -.58).

Next, the relationship between optimism, pessimism and subjective well-being was examined in each sample (see Figure 2). The structural model demonstrated a an overall acceptable fit for the Japanese sample, with three out of four model fit indices reaching acceptable values (χ^2 (df = 24) = 165.13, $p < .05$, RMSEA = .08, CFI = .91, TLI = .86, SRMR = .05). However, results should be interpreted with caution. Optimism predicted greater subjective well-being, demonstrating a large effect size (β = .57; .42 : .71). Pessimism predicted lower levels of subjective well-being, however, the effect size was small and only marginally significant (β = -.16; -.34: .01). Optimism and pessimism accounted for a large amount of variance in subjective well-being (46%). The corresponding structural model demonstrated a good fit in the US sample (χ^2 (df = 24) = 165.08, $p < .05$, RMSEA = .06, CFI = .96, TLI = .96, SRMR = .04), and the relationships between optimism, pessimism, and subjective well-being were largely consistent. Again, optimism predicted greater subjective well-being, demonstrating a large effect size (β = .58; .48 : .67). Pessimism predicted lower levels of subjective well-being, demonstrating a small but significant effect size (β = -.19; -.28 : -.10). Optimism and pessimism showed a large inverse correlation, and accounted for a large amount of variance in subjective well-being (51%), similar to the Japanese model.

Afterwards, the direct effects of optimism and pessimism on the three control strategies were examined (see Figure 3). Because the measurement properties of the control

scales difference significantly across cultures, the following results cannot be interpreted with confidence. The structural model demonstrated a poorer fit for the Japanese sample with two out of four model fit indices reaching acceptable levels, which also indicates that results must be interpreted with caution (χ^2 (df = 160) = 833.32, $p < .05$, RMSEA = .06, CFI = .89, TLI = .87, SRMR = .06). Optimism predicted greater levels of both selective primary control (β = .52, .37 : .68) and positive reappraisal (β =.49, .36 : .63), demonstrating large effect sizes (see Table 4). However, pessimism was more weakly related to these control strategies. Greater levels of pessimism was a statistically significant predictor of lower levels of positive reappraisal only, demonstrating a small effect size (β = -.17, -.31 : -.02). Selective primary control and positive reappraisal were highly correlated, but were more weakly correlated with compensatory primary control. Optimism and pessimism accounted for the largest amount of variance in positive reappraisal (37%), followed by selective primary control (25%). However, these predictors accounted for a minimal amount of variance in compensatory primary control (3%), which was not statistically significant.

The structural model of optimism and pessimism predicting the three control strategies demonstrated a poor fit for the American sample as well (χ^2 (df = 160) = 1415.19, $p < .05$, RMSEA = .07, CFI = .88, TLI = .86, SRMR = .06), and thus must be interpreted with caution. Within this sample, optimism and pessimism were more predictive of control strategies in general compared to the Japanese sample (see Figure 3 and Table 5). Optimism was a strong predictor of greater levels of selective primary control (β = .66, .57 : .75) and positive reappraisal (β =.76, .68 : .85), but also predicted greater levels of compensatory primary control, demonstrating a medium effect size (β =.33, .23 : .42). However, unlike in the Japanese sample in and the measurement models, pessimism predicted *greater* levels of

both selective primary control (β = 13, .04 : .22) and positive reappraisal (β = .14, .05 : .23), demonstrating small effect sizes. Pessimism was not a statically significant predictor of compensatory primary control. Optimism and pessimism accounted for the larger amount of variance in both positive reappraisal (47%) and selective primary control (35%) in this sample. Furthermore, these expectancies accounted for a small, but statistically significant amount of variance in compensatory primary control (12%).

Indirect Effects Models

Next, the structural models including the indirect effects of optimism and pessimism on subjective well-being via each respective control strategy were examined within the respective samples (see Figure 4). Again, given the significant differences in measurement properties of the control scales, the following results cannot be interpreted with confidence and must be considered with great caution. The indirect effects model including selective primary control demonstrated an acceptable for all indices except the TLI in the Japanese sample (χ^2 (df = 71) = 426.89, $p < .05$, RMSEA = .07, CFI = .91, TLI = .88, SRMR = .05 for Japan; χ^2 (df = 71) = 742.97, $p < .05$, RMSEA = .07, CFI = .92, TLI = .90, SRMR = .05 for the US). Again, optimism predicted greater subjective well-being in the Japanese sample, showing a large effect size (see Table 6). Pessimism was a marginally statistically significant predictor of lower subjective well-being, demonstrating a small effect size. Optimism was also a statistically significant predictor of selective primary control (β = .50, .34 : .68), demonstrating a large standardized effect, while pessimism was not (β = .03, -.12 : .23). Selective primary predicted greater subjective well-being, demonstrating a small standardized effect (β = .17, .06 : .26). Also, the indirect effect of optimism on subjective well-being through selective primary was statistically significant, but the effect was very

small (b = 08, .03 : .14). The predictors in the model explained a large amount of variance in subjective well-being (48%) and a small-to-medium amount of variance in selective primary control (23%).

Within the indirect effects model including selective primary control for the American sample, optimism also predicted greater subjective well-being, demonstrating a large effect size, while pessimism predicted less subjective well-being, showing a small-to-medium effect size (see Figure 4 and Table 7). Again, optimism was a strong predictor of selective primary control, showing a large standardized effect (β = .65, .56 : .75). However, unlike in the Japanese sample, pessimism was a statistically significant predictor of lower levels of selective primary control, though the standardized effect was small (β = .13, .05 : .23). Yet similarly to the Japanese sample, selective primary predicted greater subjective well-being, demonstrating a small standardized effect (β = .10, .02 : .18). The indirect paths of *both* optimism (b = .04, .01 : .07) and pessimism (b = .01, .00 : .01) to subjective well-being through selective primary control were statistically significant in this model, but effects were close to zero. Like in the Japanese sample, the predictors included in the model explained a large amount of variance in subjective well-being (51%) and a small-to-medium amount of variance in selective primary control (33%).

The indirect effects model including compensatory primary control demonstrated an acceptable fit for both samples (Japanese: χ^2 (df = 71) = 385.06, p < .05, RMSEA = .07, CFI = .92, TLI = .90, SRMR = .05; American: χ^2 (df = 71) = 642.02, p < .05, RMSEA = .07, CFI = .93, TLI = .91, SRMR = .05). Within the Japanese sample, optimism predicted greater subjective well-being, demonstrating a large standardized effect (see Figure 4 and Table 8). Pessimism was associated with lower levels of subjective well-being, but standardized effect

was not statistically significant. Neither optimism nor pessimism were statistically significant predictors of compensatory primary control. Furthermore, compensatory primary control was not a statistically significant predictor of subjective well-being (β = -.05, -.13 : .03), demonstrating only a very small inverse association. None of the indirect effects were statistically significant and all were close to zero. Optimism and pessimism accounted for a large amount of variance in subjective well-being (50%), but did not account for a significant amount of variance in compensatory primary control (2%).

Regarding the indirect effects model including compensatory primary control within the American sample, optimism was a stronger predictor of subjective well-being than pessimism (see Figure 4 and Table 9). Specifically, optimism predicted higher levels of subjective well-being, demonstrating a large standardized effect, while pessimism predicted lower levels of subjective well-being, demonstrating a small standardized effect. Compensatory primary control was not a statistically significant predictor of increased subjective well-being (β = 02, -.05 : .08). Unlike for the Japanese sample, optimism was a statistically significant predictor of compensatory primary control, demonstrating a medium standardized effect (β = .33, .24 : .43). Pessimism, however, was not a statistically significant predictor, demonstrating only a weak inverse relationship (β = -.02, -.11 : .07). None of the indirect effects were statistically significant. The predictors explained 51% of the variance in subjective well-being and 12% of the variance in compensatory primary control, which was relatively greater than in the Japanese sample.

The indirect effects model including positive reappraisal demonstrated a generally acceptable fit, with for three out of the four indices reaching acceptable levels for the Japanese sample (χ^2 (df = 59) = 362.64, $p < .05$, RMSEA = .07, CFI = .92, TLI = .89, SRMR

= .05) and all four indices reaching acceptable levels for the American sample (χ^2 (df = 59) = 448.13, $p < .05$, RMSEA = .06, CFI = .96, TLI = .94, SRMR = .04). Within the Japanese sample, optimism predicted greater subjective well-being, demonstrating a large standardized effect, while pessimism was not a statistically significant predictor of lower levels of subjective well-being (see Figure 4 and Table 10). The relationship between positive reappraisal and greater subjective well-being reached statistical significance in this model (β = .48, .33 : .62), though the standardized effect was small. Optimism predicted greater positive reappraisal, demonstrating a large effect size (β = -.18, -.32 : -.03), while pessimism predicted lower levels of positive reappraisal, demonstrating a small standardized effect (β = .15, .03 : .25). The indirect path of optimism to subjective well-being through positive reappraisal reached statistical significance, though the effect was very small (b = .07, .02: .12). The predictors accounted for a large amount of the variance in subjective well-being (47%), and a medium amount of variance in positive reappraisal (37%).

Next, the indirect effects model including positive reappraisal was examined within the American sample (see Figure 4 and Table 11). Optimism predicted greater subjective well-being, showing a large standardized effect, while pessimism predicted lower levels of subjective well-being, showing a small-to-medium standardized effect. Positive reappraisal did not significantly predict greater levels of subjective well-being, and the associated standardized effect was close to zero (β = .01, -.09 : .09). Both optimism (β = .75, .67 : .84) and pessimism (β = .14, .06 : .24) predicted greater levels of positive reappraisal, though the magnitude of the standardized effect was much larger for optimism (showing a large effect size compared to a small effect size for pessimism). The indirect effects were non-significant

and close to zero. The predictors explained a large amount of variance in both positive reappraisal (46%) and subjective well-being (51%).

Afterwards, the indirect effect models examining the relative contributions of each control strategy as mechanisms underlying the relationship between optimism and subjective well-being were investigated within each sample (see Figure 5). Again, given the results of the measurement invariance analysis for the control scales, results cannot be interpreted with confidence and must be considered with significant caution. The model fit was below acceptable for two out of the four indices in the Japanese sample (χ^2 (df = 215) = 1189.54, p < .05, RMSEA = .07, CFI = .89, TLI = .87, SRMR = .06) and the American sample (χ^2 (df = 215) = 1830.75, p < .05, RMSEA = .07, CFI = .89, TLI = .87, SRMR = .06), indicating a relatively poor model fit. Consistent with the other indirect effects models within the Japanese sample, optimism predicted greater subjective well-being (β = .48, .33 : .68), demonstrating a large standardized effect, while the direct effect of pessimism predicting subjective well-being was small in magnitude and not statistically significant (β = -.14, -.33 : -.05) when indirect effects were included in the model (See Table 12). Optimism was also a strong, statistically significant predictor of greater levels of selective primary control (β = .52, .36 : .71) and positive reappraisal (β = .49, .34 : .63) but not compensatory primary control (β = -.08, -.25 : .09). Pessimism was only a statistically significant predictor of greater positive reappraisal (β = -.17, -.32 : -.01) consistent with the other indirect effects models, but the magnitude of the standardized effect was relatively small. The only statistically significant indirect effect was optimism predicting subjective well-being via the sum of the control strategies (b = .09, .03 : .15), but the effect was small, similar to the indirect effects in the previous models for this sample. None of the standardized effects of

control strategies predicting subjective well-being were statistically significant. Together, optimism, pessimism, and the control strategies explained a large amount of variance in subjective well-being (48%). Furthermore, optimism and pessimism explained a medium amount of variance in positive reappraisal (37%) and a small-to-medium amount of variance in selective primary control (25%), but explained relatively little of the variance in compensatory primary control (only 2%).

Within the full indirect effects model for the American sample, optimism was again a stronger predictor of subjective well-being than pessimism (see Figure 5 and Table 13). Optimism predicted greater subjective well-being, demonstrating a large relationship (β = .53, .39 : .68) even when accounting for indirect effects. Pessimism was also a statistically significant predictor of lower levels of subjective well-being when accounting for indirect effects. This relationship was not statistically significant in the Japanese sample (β = -.20, -.29 : -.10). However, the strength of this relationship was close in magnitude to the relationship between pessimism and subjective well-being in the sample. Consistent with the other indirect effects models within this sample, optimism predicted greater use of each control strategy when accounting for indirect effects, with large standardized effects for selective primary control (β = .66, .58 : .76) and positive reappraisal (β = .76, .68 : .85), as well as a medium effect size for compensatory primary control (β = .33, .23 : .42). Again, pessimism surprisingly predicted greater selective primary control (β = .13, .04 : .23) and positive reappraisal usage in the American sample (β = .14, .05 : .23), but the standardized effects were small. Pessimism was not a statistically significant predictor of compensatory primary control (β = -.03, -.12 : .06). The standardized effect of selective primary control predicting greater subjective well-being was also statistically significant when indirect effects

were included in the model, but the magnitude of the effect was also small (β = .12, .03 : .21). None of the other control strategies were statistically significant predictors of subjective well-being. The cumulative effects of optimism, pessimism, and the control strategies explained a large amount of variance in subjective well-being (51%) in the American sample like in the model from the Japanese sample. However, optimism and pessimism explained much more variance in control strategies in general compared to the Japanese model, particularly for compensatory primary control. Again, the predictors explained the largest amount of variance in positive reappraisal (46%, a large effect size), followed by selective primary control (35%, a medium effect size), and then compensatory primary control (12%, a small effect size).

Results from the measurement models and structural models of both the direct and indirect effects were consistent when covariates were included. Thus, results from models including covariates will not be presented due to redundancy.

Discussion

Measurement Invariance

Results from the measurement invariance analysis suggest that optimism and pessimism are better conceptualized as distinct latent constructs, as opposed to opposite poles of a unitary construct representing generalized outcome expectancies. The two-factor structure of the LOT-R with separate latent constructs for optimism and pessimism demonstrated a superior fit to the one-factor dimensional model across both samples, suggesting that the factors representing optimism and pessimism were distinct but strongly associated. Thus, the hypothesis that the LOT-R would exhibit a 1-factor structure was not supported. Dispositional optimism was originally conceptualized as a bipolar construct

constituting trait-like generalized outcome expectancies, with pessimism representing one pole and optimism representing the opposing pole. While the corresponding 1-factor structure of the LOT-R has generally been well-supported in the literature, other studies have indicated a two factor structure of the LOT-R with separate factors of optimism and pessimism (Chang, D'Zurilla, & Maydeu-Olivares, 1994; Creed, Patton, & Bartrum, 2002; Lai & Yue, 2000; Lai, 1994; Lui et al, 2016). While it is possible that such findings reflect a methodological confound given the negative wording of pessimism items (Scheier & Carver, 1985), there is some evidence that optimism and pessimism demonstrate different relationships with mental health outcomes in both Eastern and Western samples, and thus may represent separate constructs (Chang et al., 1994, 1997; DeNeve & Cooper, 1998; Marshall, Wortman, Kusulas, Hervig, & Vickers, 1992). The present study also indicated that optimism was more strongly related to subjective well-being. Additional research in this area will help settle the debate about the nature of optimsim and pessimsim.

Furthermore, the LOT-R demonstrated partial weak invariance, indicating that the relationships between certain items and their requisite subscales were not consistent across cultures. This partially supports the hypothesis that the LOT-R would demonstrate measurement equivalence across cultures. Factors loadings of the first items of both the optimism subscale ("In uncertain times, I usually expect the best") and the pessimism subscale ("If something can go wrong for me, it will") were comparatively poorer in general and did not demonstrate invariance across samples, as they were more strongly related to their associated latent constructs in the American sample. Group differences in optimism and pessimism were relatively large and the associated subscales demonstrated partial weak invariance, so there are likely true group differences in levels of optimism and pessimism.

However, a relatively small degree of variance in group differences in optimism and pessimism may be explained by differences in the properties of item intercepts given that the scales did not demonstrate strict invariance. Previous research examining the measurement properties of the LOT-R in Asian samples have indicated problems with this pessimism item (Bieda et al., 2017). The wording of this item appears similar to the wording of the adage deemed "Murphy's Law," that is well-known in American culture. The conceptual link between optimism-pessimism and "Murphy's Law" is significant enough that it has inspired title of self-help book by a prominent optimism researcher ("Breaking Murphy's Law; Segerstrom, 2007). It may be speculated that the wording of this item could be more familiar and salient to Americans, and may have been more difficult to translate into the Japanese version of the LOT-R. It may also be speculated that cultural differences in the factor loadings of optimism item 1 may stem from the explicit mention of positive expectations in uncertain conditions. Japanese individuals have been shown to have among the highest levels of uncertainty avoidance compared to other countries, demonstrating discomfort with uncertain conditions (Hofstede, 1980, Hofstede, 2001). As a result, Japanese adults may spend a greater amount of time preparing for the future and preventing negative outcomes. Thus, Japanese adults may be more cautious when making positive predictions about explicitly uncertain conditions. Additional research examining cultural differences associated with these items will help elucidate the reasons for differential item functioning.

Furthermore, the control scales demonstrated poor measurement properties both within and across samples, contrary to what was hypothesized. CFAs indicated that model fit for the control scales were poor in general within both samples, and results of the measurement invariance analysis indicated differences in the basic structure of measures of

control across cultures. These scales measuring control were slightly briefer and have not received such extensive efforts towards validation as measures such as the LOT-R. Given these model fit issues, relationships between control and other study variables cannot be interpreted confidently.

Cross-Cultural Comparison of Optimism and its Relationship to Subjective Well-being

Americans demonstrated higher levels of optimism and lower levels of pessimism,. These results are consistent with the hypothesis that Americans would demonstrate higher levels of optimism, as well as previous studies indicating that Japanese adults have lower levels of optimism compared to adults of other nationalities, particularly those from western nations (Gallagher, Lopez, & Pressman, 2013, Fischer & Chalmers, 2008). Studies utilizing the two-factor model of optimism have also shown that Asian Americans have greater levels of pessimism compared to Caucasian Americans, consistent with the present study (Chang, 1996a, 1996b; Hardin & Leong, 2005). However, these studies indicated that levels of optimism were consistent across individuals from both Caucasian and Asian ethnic backgrounds living in a Western cultural context. Thus, there may be differences in optimism between people with Asian ethnic backgrounds living in Western countries and those who are native or residing in Asia, and generalization between these two groups may ill advised. However, it is important to note that the present study also indicated inconsistencies in the measurement properties of the LOT-R between Japanese and American samples. Thus, though there appear to be large differences in optimism and pessimism, a relatively small degree of variance may be accounted for by measurement bias.

In both cultures, greater optimism was associated with greater subjective well-being, while greater pessimism was associated with lower levels of subjective well-being.

Furthermore, optimism was a stronger predictor of subjective well-being. The results of the present study supported the hypothesis that optimism and pessimism function similarly across American and Japanese cultures in relation to well-being. Optimism has been found to be associated with greater well-being and other positive outcomes such as lower levels of depression in both Western individuals and people with Asian ethnic backgrounds (Chang, 1996a; Lui et al, 2016). Furthermore, optimism has demonstrated a stronger association with subjective well-being than pessimism for Asian Americans (Lui et al., 2016). However, cross-cultural findings related to pessimism may be more complex. In collectivist cultures typical of the East Asian countries, individuals are rewarded for fostering self-criticism and are more sensitive to negative self-relevant information, which is believed to foster the good of the group (Chang & Asakawa, 2003; Kitayama et al, 1997). As a result, these individuals may hold negative expectations for themselves, typically in comparison to others (i.e. a pessimistic bias), while people from Eastern cultures hold more positive expectations about themselves in relation to others (i.e. an optimistic bias; Chang & Asakawa, 2003; Heine & Lehman, 1995; Weinstein, 1980).

Other research has indicated that pessimism is associated with other positive coping strategies for Asian Americans such as problem-solving, and thus may represent a motivating strategy encouraging action to prevent negative outcomes (i.e. defensive pessimism; Chang 1996a; Chang, 2001; Norem, 2007). Pessimism also appears to be less strongly related to negative outcomes such as general distress in Asian American samples compared to Caucasian samples (Chang, 1996a). Thus, pessimism may have other functions in Asian cultural contexts, with one potential downside being that it associated with lower levels of subjective well-being (Lui et al, 2016). There may also be notable differences between

people native to Asian countries and those with Asian ethnic backgrounds either born or living in Western nations, who may also experience different degrees of exposure and impact from Western culture.

Furthermore, Americans demonstrated greater subjective well-being and appeared to experience more affect in general, with greater levels of both positive and negative affect compared to the Japanese adults. This is consistent with previous research in which Japanese adults tend to report lower levels of subjective well-being compared to adults from other countries, particularly those from the West (Lau et al., 2005; Lau et al 2013; Suh & Oishi, 2002). Such differences have been attributed to a "cultural response bias" influenced by Asian schools of thought (e.g. Buddhism and Taoism), which preach transcendence of desires and discourage intense emotion (Cummins, 2012; Lu, 2001). Thus, Asian individuals tend not to respond at the extremes of rating scales in general, choosing values closer to the midpoint (Chen & Stevenson, 1995). Furthermore, people from Asian cultures may also value and express more low arousal emotional states such as calm or tranquility compared to people from Western nations, (Lim, 2016). The truncated measure of the PANAS included in the study may not have adequately covered such forms of affect that may be more salient and common to these cultures. In addition, people from collectivist countries (typical of East Asia) also tend to demonstrate a self-depreciating response style, while individualistic countries tend to engage in self-enhancement (Heine & Lehman,1995; Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997). Thus, they may be more likely to report lower satisfaction with their lives.

Cross-Cultural Comparison of the Relationship Between Optimism and Control

As expected, optimism predicted greater levels of selective primary control and positive reappraisal across both cultures. These findings are consistent with previous research and theories of optimism, which suggest that expectations of positive outcomes motivate beneficial, engaged coping strategies (Carver et al., 2010; Scheier & Carver, 1992). Given that pessimism did not predict greater levels of selective primary control in Japanese adults, the current study did not suggest that Japanese adults engaged in greater defensive pessimism, in which expectations of negative outcomes promote engaged coping in order to avoid such circumstances. Surprisingly, pessimism was associated with greater levels of selective primary control and positive reappraisal in the American sample, similarly to optimism. Pessimism tends to be associated with negative outcomes for people from western cultures, such as poorer mental health and less subjective well-being (Carver, 2010; Scheier & Carver, 1992). Given the cross-sectional nature of the data, it is possible that pessimistic Americans were experiencing these poorer circumstances, and thus needed to engage in greater coping or control usage in response to these stressors. It is also possible that pessimism also promoted greater usage of adaptive control strategies for different reasons than optimism did in the American sample. For example, greater pessimism may have motivated attempts to exert control over one's environment in order to prevent expected negative outcomes from occurring in the American sample (i.e. defensive pessimism).

Furthermore, Americans tended to utilize greater selective primary control as expected. However, Americans also demonstrated greater levels of the secondary control strategy positive reappraisal, while levels of compensatory primary control appeared comparatively lower but consistent across cultures. This pattern of results is not fully

consistent with theories that those from western cultures tend to demonstrate greater levels of primary control while people from Eastern cultures demonstrate greater levels of secondary control (Gould, 1999; Tweed & White, 2004). Lifespan theories of control suggest that compensatory control strategies may be more relevant in old age when functioning declines and individuals must turn to compensatory strategies (Heckhausen, 1995; Heckhausen et al, 2010). Additional research examining a wider range of control strategies and more specific contexts in which they are used may help elucidate cross-cultural differences. Given the link between optimism and positive outcomes, it is possible that Americans demonstrate greater adaptive coping due to greater levels of optimism. However, a relatively small amount of positive coping strategies were measured in the context of this study. It is also possible that people in Western cultural contexts engage in greater levels of secondary control strategies other than positive reappraisal. Yet, these results are significantly impacted by method factors, given that the scales measuring control strategies indicated poorer internal consistency compared to other scales and demonstrated structural variance across cultures. Thus, these results cannot be interpreted with confidence.

Underlying Mechanisms

The present study showed weak evidence that control strategies act as underlying mechanisms explaining the relationship between optimism and pessimism and subjective well-being, contrary to the hypotheses associated with aim 4. The indirect effects of both optimism and pessimism on subjective well-being via control strategies were negligible. Specifically, the indirect pathway of optimism predicting subjective well-being through selective primary control was statistically significant in both samples, but the effect size was close to zero. The same was found for the indirect effect of pessimism on subjective well-

being via selective primary control in the Japanese sample. However, when all control strategies were included in the indirect effects model, most of these effects were no longer statistically significant. Only the indirect effect of optimism on subjective well-being through selective primary control was statistically significant in the American sample, while the indirect effect of optimism on subjective well-being via the sum of control strategies was statistically significant in the Japanese sample. Other research examining the link between optimism and primary and secondary control strategies has been mixed. Different underlying mechanisms may explain the relationship between generalized outcome expectancies and subjective well-being, such as greater social support, flexible goal adjustment, resilience, or other types of coping strategies not included in the present study (e.g. planning, benefit finding, or acceptance in low-control circumstances; Carver, 2010; Carver & Scheier, 2014; Conversano et al, 2010; Hanssen, 2014; Hart et. al, 2008; He et al, 2013).

Strengths and Limitations

A major strength of the present study was the use of large, representative samples, which contributes to increased statistical power and generalizability of results. Structural equation modeling was also utilized, which accounts for measurement error when assessing relationships between constructs. Furthermore, the role of control strategies as mechanisms underlying the relationship between optimism and subjective well-being was examined using sophisticated methodology (e.g. bootstrapped indirect effects). However, this analysis was limited by the cross-sectional nature of the data, so conclusions regarding causality cannot be inferred from the findings.

In addition, the cross-cultural equivalency of the scales was examined using multiple group CFA. This method allows for direct examination of assumptions that constructs of

interest and the measurement properties of associated scales are invariant across the different samples, which can help to clarify the degree to which group differences are influenced by measurement artifacts. While measurement invariance could be examined for the full Life Orientation Test-Revised, other scales included in the study were abbreviated or utilized only select items from commonly used measures and had not previously been validated in Japanese samples in their current form Control strategies were measured using a smaller pool of select items from existing scales, in addition to items generated in the context of the MIDUS study. Thus, the measurement properties of these scales were poorer, which likely influenced the poorer model fit for the indirect effects models. Given that the latent variable of subjective well-being was modeled with three indicators representing means of other scales and was therefore "just identified," measurement invariance analysis could not be utilized to compare the structure of well-being across cultures. Due to the measurement issues with the control scales, results associated with control cannot be interpreted with confidence and must be considered with caution. Because the measurement properties of the LOT-R were more sound and models including optimism and subjective well-being indicated more acceptable model fits, the results depicting the relationship between generalized outcome expectancies and subjective well-being can be interpreted more confidently.

Future Directions and Practical Implications

The results from the present study supported a two-factor structure of the LOT-R, which suggests that optimism and pessimism are distinct but related constructs. Additional research examining whether optimism and pessimism show different relationships with mental health outcomes will help determine the nature of these trait generalized outcome expectancies. The LOT-R also demonstrated partial weak invariance, but not strong

invariance, indicating that mean differences in optimism between the US and Japan can, to a certain degree, be attributed to the measurement properties of the scale. Thus, these problems must be addressed in future cross-cultural research focusing on these populations. Item response theory could be employed to better characterize the differential item functioning of the first items from both the optimism and pessimism subscales. Alternatively, these items could be omitted and the remaining items from each subscale could be averaged, or new culturally equivalent items could be developed as replacements.

In addition, the present study focused on cross-cultural comparisons between the US and Japan on the national level. However, there is a significant amount of cultural and ethnic heterogeneity within the United States compared to the relatively homogenous population of Japan. Thus, the measurement properties of study scales such as the LOT-R may differ between Americans of different ethnic and racial backgrounds. Future research should also examine whether optimism functions consistently across different racial and ethnic groups within the United States.

Additionally, it may be fruitful to examine how optimism and pessimism are related to a global conceptualization of life satisfaction. Previous research has demonstrated differences between more global and domain specific measures of life satisfaction across Eastern and Western cultures (Eid & Diener, 2003; Hsieh, 2016). Japanese samples in particular have demonstrated a noticeable reversal of the "positivity bias," with the tendency to rate global domains less positively than specific domains (Diener, Scollon, Oishi, Dzokoto & Suh, 2000). Thus, future research may also examine global conceptualizations of life satisfaction or utilize multiple methods of examining this construct across cultures.

Furthermore, it would be interesting to examine whether the relationship between optimism and other forms of well-being and mental health across cultures. Future studies should also examine other underlying mechanisms that may account for the relationship between optimism and subjective well-being, such as different coping strategies and identify different moderators that impact this relationship. Longitudinal studies will help elucidate mechanisms underlying the relationship between optimism and well-being and account for temporal dependency.

Conclusions

Overall, the measurement invariance analyses revealed a stronger degree of measurement consistency in optimism and pessimism across cultures, with significant differences in measurement properties of the scales measuring control in both samples. Thus findings concerning the relationship between optimism, pessimism, and well-being can be interpreted with relative confidence, while relationships with control strategies are likely significantly impacted by measurement error. Americans showed higher levels of optimism and lower levels of pessimism compared to Japanese adults, with both relationships demonstrating large effect sizes. Optimism was a stronger predictor of subjective well-being than pessimism in both samples, though both explained a large amount of variance in this outcome. Surprisingly, *both* optimism and pessimism generally predicted greater control in the American sample, particularly selective primary control and positive reappraisal. Optimism predicted greater levels of selective primary control and positive reappraisal in the Japanese sample as well, while pessimism only predicted lower levels of positive reappraisal only. Results from the indirect effects models did now provide evidence that control strategies serve as underlying mechanisms explaining the relationships of optimism and

pessimism with subjective well-being. Furthermore, while the two-factor structure of the LOT-R demonstrated partial weak invariance, the control scales did not show evidence of configural invariance, again suggesting that results associated with control strategies cannot confidently be interpreted. Additional research will help establish the temporal dependency of the relationships of optimism and pessimism with subjective well-being and elucidate the underlying mechanisms that link them. Thus, while significant differences in the magnitude of levels of optimism and pessimism emerged across American and Japanese adults, the relationships between these generalized outcome expectancies and subjective well-being, particularly the underlying mechanisms through which they are linked, are less certain and may differ across cultures.

Tables and Figures

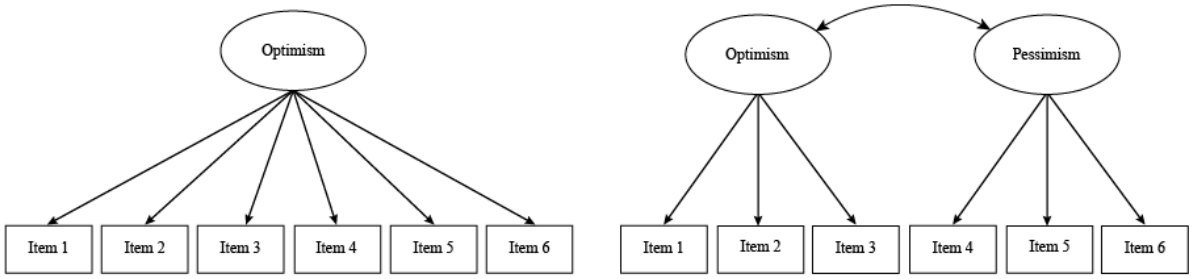

Figure 1. Two potential optimism models are depicted. The bipolar conceptualization of optimism on the right is composed of the 6 items from the LOT-R. The unipolar conceptualization on the left includes separate latent factors of optimism and pessimism composed of 3 items each.

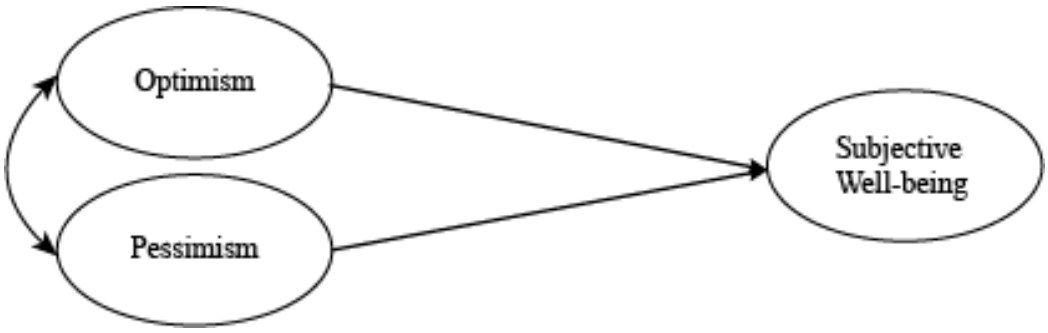

Figure 2. The direct effects of optimism and pessimism on subjective well-being.

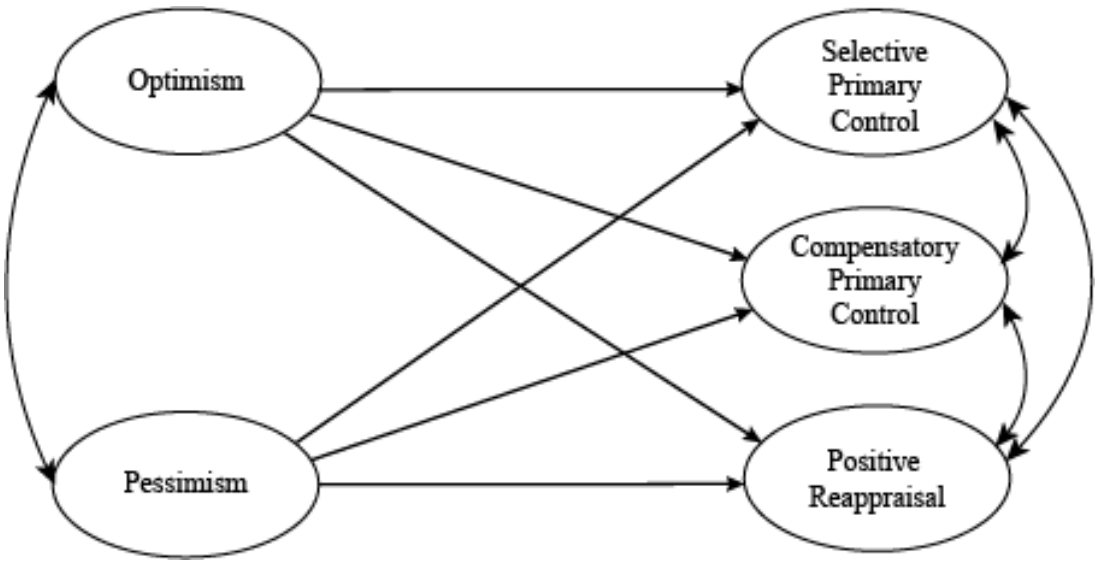

Figure 3. The direct effects of optimism and pessimism one each of the three control strategies.

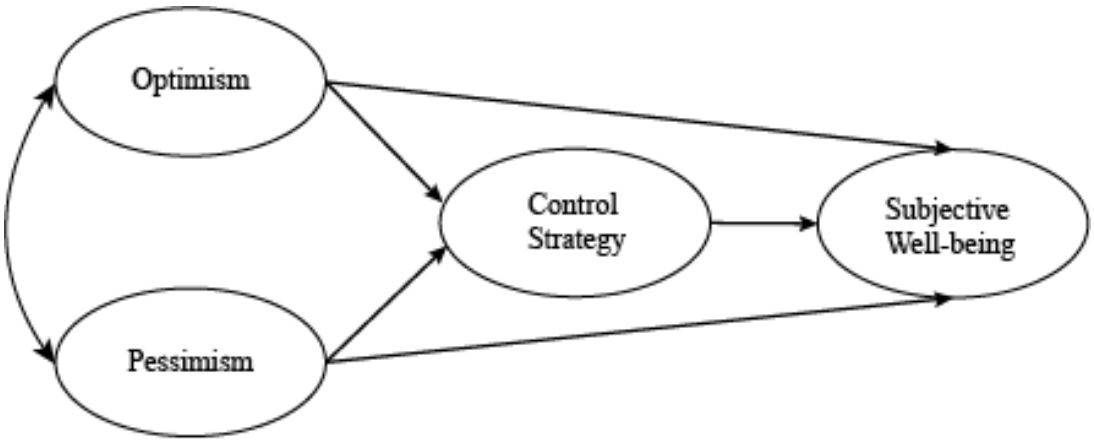

Figure 4. The indirect effects of optimism and pessimism on subjective well-being via each respective control strategy alone

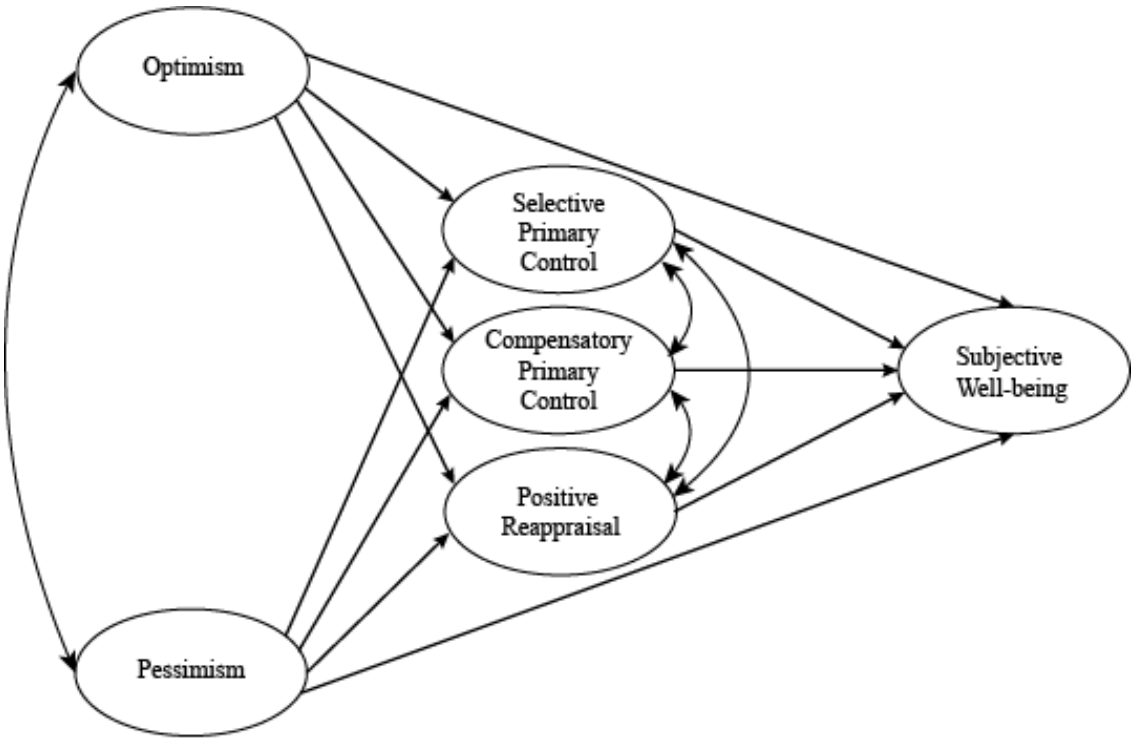

Figure 5. The indirect effect of optimism and pessimism on subjective well-being via all three control strategies simultaneously.

Table 1.

Demographics Information for the American and Japanese Samples

Variable	US	Japan
Age (M, SD)	56.85, 12.62	54.36, 14.15
Gender (%)		
Male	45.3	49.2
Female	54.7	50.8
Marital Status (%)		
Married	68.8	70.5
Unmarried	31.0	29.3
Racial Origins		
White	89.4	
Black and/or African American	4.9	
Native American or Alaska Native Aleutian Islander/Eskimo	1.7	
Asian	.6	
Native Hawaiian or Pacific Islander	.1	
Other	2.8	
Spanish/Hispanic/Latino Descent		
Yes	95.7	
No	3.8	
Highest Level of Education (%)		
No School/Some Grade School (1-6)	.4	
8th Grade/Junior High School (7-8)	1.5	9.4
Some High School (9-12)	5.2	3.2
GED	1.3	
Graduated From High School	25.9	29.8
Some College	20.8	2.5
Graduated from 2-Yr College, Vocational School, or Associate Degree	7.8	22.2
Graduated from A 4 or 5 Year College, or Bachelor's Degree	18.8	29.2
Graduate School		2.4
Some Graduate School	3.1	
Master's Degree	10.4	
PH.D., ED.D., MD, DDS, LLB, LLD, JD, or Other Professional Degree	4.7	

Notes. Highest level of education included different categories for the different samples. Blank lines indicate that the category was not present for that sample

Table 2.

Descriptive Statistics and Mean Differences Between Samples

	US			Japan				
Variable	*n*	*M*	*SD*	*n*	*M*	*SD*	*d*	95% CI
Total Optimism	1024	23.05	4.77	1793	19.4	3.59	.84	.67 1.00
Optimism Subscale	1023	11.80	2.46	1793	10.00	2.22	.76	.67 .84
Pessimism Subscale	1023	6.75	3.09	1793	8.60	2.20	-.67	-.76 -.56
Life Satisfaction	1027	7.44	1.30	1804	6.10	1.58	.95	.90 1.00
Positive Affect	1023	3.47	.69	1794	3.17	.69	.43	.40 .46
Negative Affect	1024	4.45	.55	1789	4.22	.62	.40	.38 .42
Selective Primary Control	1019	3.20	.56	1790	2.60	.65	1.02	1.00 1.04
Compensatory Primary Control	1020	2.35	.57	1788	2.34	.78	.02	-.01 .04
Positive Reappraisal	1016	3.05	.61	1790	2.64	.67	.65	.63 .68

Table 3

Measurement Models with Latent Correlations between Optimism, Pessimism, Subjective Well-being and Control Strategies (Japan n = 1027; US n = 1805)

Variable	1	2	3	4	5	6
1. Optimism	1	-.62 -.67: -.58	.69 .65: .74	.58 .53 : .63	.35 .29 : .40	.67 .63 : .71
2. Pessimism	-.61 -.70: -.53	1	-.55 -.60 : -.51	-.28 -.34 : -.23	-.24 -.29 : -.18	-.34 -.39 : -.29
3. Subjective Well-Being	.67 .60 : 73	-.50 -.58 : -.42	1	.46 .41 : .51	.26 .21 : .32	.46 .41 : .50
4. Selective Primary Control	.50 .43 : .57	-.28 -.37 : .-20	.45 .39 : .52	1	.32 .27 : .37	.66 .62 : .69
5. Compensatory Primary Control	.14 .06 : .22	-.14 -.22 : -.05	.05 -.02 : .13	.17 .10 : .24	1	.37 .32 : .42
6. Positive Reappraisal	.59 .53 : .66	-.47 -.54 : -.39	.51 .45 : .57	.81 .78 : .85	.18 .11 : .13	1

Note. All correlations are statistically significant at $p < .05$. Correlations for the Japanese sample are below the diagonal, correlations for the US sample are above the diagonal. Values separated by colons represent 95% confidence intervals

Table 4

Direct Effect of Optimism and Pessimism Predicting Control for Japan (n = 1025)

Predictor	β (95% CI)	*p*
Optimism → Selective Primary	.52 (.37 : .68)	.00
Optimism → Compensatory Primary	.09 (-.05 : .24)	.20
Optimism → Positive Reappraisal	.49 (.36 : .63)	.00
Pessimism → Selective Primary	.04 (-.12 : .20)	.64
Pessimism → Compensatory Primary	-.09 (-.25 : .08)	.30
Pessimism → Positive Reappraisal	-.17 (-.31 : -.02)	.02
Latent Correlation	***r*** **(95% CI)**	***p***
Optimism with pessimism	-.61 (-.74 : -.47)	.00
Selective Primary Control with Compensatory Primary Control	.11 (.02 : .21)	.02
Selective Primary Control with Positive Reappraisal	.76 (.69 : .83)	.00
Compensatory Primary Control with Positive Reappraisal	.11 (.01 : .21)	.02
Outcome	R^2 **(95% CI)**	***p***
Selective Primary Control	.25 (.16 : .34)	.00
Compensatory Primary Control	.03 (.00 : .06)	.07
Positive Reappraisal	.37 (.28 : .46)	.00

Notes. Direct effects were completely standaradized. SWB = Subjective Well-being.

Table 5

Direct Effect of Optimism and Pessimism Predicting Control for US (n = 1799)

Predictor	*β* (95% CI)	*p*
Optimism → Selective Primary	.66 (.57 : .75)	.00
Optimism → Compensatory Primary	.33 (.23 : .42)	.00
Optimism → Positive Reappraisal	.76 (.68 : .85)	.00
Pessimism → Selective Primary	.13 (.04 : .22)	.00
Pessimism → Compensatory Primary	-.03 (-.12 : .06)	.50
Pessimism → Positive Reappraisal	.14 (.05 : .23)	.00
Latent Correlation	*r* (95% CI)	*p*
Optimism with pessimism	-.63 (-.69 : -.56)	.00
Selective Primary Control with Compensatory Primary Control	.16 (.09: .23)	.00
Selective Primary Control with Positive Reappraisal	.43 (.35 : .51)	.00
Compensatory Primary Control with Positive Reappraisal	.20 (.13: .28)	.00
Outcome	R^2 (95% CI)	*p*
Selective Primary Control	.35 (.28 : .42)	.00
Compensatory Primary Control	.12 (.08 : .16)	.00
Positive Reappraisal	.47 (.40 : .53)	.00

Notes. Direct effects were completely standaradized. SWB = Subjective Well-being.

Table 6

Optimism & Pessimism Predicting Subjective Well-being Via Selective Primary Control for Japan (n = 1027)

Effects	β (95% CI)	*p*
Optimism → SWB	.48 (.32: .67)	.00
Pessimism → SWB	-.17 (-.35 : .02)	.07
Optimism → Selective Primary	.50 (.34 : .68)	.00
Pessimism → Selective Primary	.03 (-.12 : .23)	.71
Selective Primary → SWB	.17 (.06 : .26)	.00
Effects	*b* (95% CI)	*p*
Optimism → Selective Primary → SWB	.08 (.03 : .14)	.00
Pessimism → Selective Primary → SWB	.01 (-.02 : .04)	.71
Latent Correlation	*r* (95% CI)	*p*
Optimism with Pessimism	-.61 (-.76 : -.47)	.00
Outcomes	R^2 (95% CI)	*p*
SWB	.48 (.40 : .56)	.00
Selective Primary	.23 (.14 : .32)	.00

Notes. Direct effects were completely standaradized. SWB = Subjective Well-being.

Table 7

Optimism and Pessimism Predicting Subjective Well-being Via Selective Primary Control for the US (n=1805)

Effects	β (95% CI)	*p*
Optimism → SWB	.51 (.40 : .63)	.00
Pessimism → SWB	-.21 (-.30 : -.11)	.00
Optimism → Selective Primary	.65 (.56 : .75)	.00
Pessimism → Selective Primary	.13 (.05 : .23)	.00
Selective Primary → SWB	.10 (.02 : .18)	.02
Effects	*b* (95% CI)	*p*
Optimism → Selective Primary → SWB	.04 (.01 : .07)	.01
Pessimism → Selective Primary → SWB	.01 (.00 : .01)	.05
Latent Correlation	*r* (95% CI)	*p*
Optimism with Pessimism	-.63 (-.69 : -.56)	.00
Outcomes	R^2 (95% CI)	*p*
SWB	.51 (.45 : .58)	.00
Selective Primary	.33 (.26 : .40)	.00

Notes. Direct effects were completely standaradized. SWB = Subjective Well-being.

Table 8

Optimism & Pessimism Predicting Subjective Well-being Via Compensatory Primary Control for Japan (n = 1027)

Effects	*β* (95% CI)	*p*
Optimism → SWB	.57 (.41 : .74)	.00
Pessimism → SWB	-.16 (-.35 : .03)	.09
Optimism → Compensatory Primary	.10 (-.06 : .25)	.20
Pessimism → Compensatory Primary	-.07 (-.25 : .09)	.42
Compensatory Primary → SWB	-.05 (-.13 : .03)	.22
Effects	***b*** **(95% CI)**	***p***
Optimism → Compensatory Primary → SWB	-.01 (-.03 : .00)	0.50
Pessimism → Compensatory Primary → SWB	.00 (-.01 : .02)	0.61
Latent Correlation	***r*** **(95% CI)**	***p***
Optimism with Pessimism	-.61 (-.76 : -.47)	.00
Outcomes	R^2 (95% CI)	***p***
SWB	.46 (.37 : .55)	.00
Compensatory Primary	.02 (-.01 : .05)	.13

Notes. Direct effects were completely standaradized. SWB = Subjective Well-being.

Table 9

Optimism & Pessimism Predicting Subjective Well-being Via Compensatory Primary Control for the US (n = 1805)

Effects	*β* (95% CI)	*p*
Optimism → SWB	.57 (.47 : .67)	.00
Pessimism → SWB	-.19 (-.28 : -.09)	.00
Optimism → Compensatory Primary	.33 (.24 : .43)	.00
Pessimism → Compensatory Primary	-.02 (-.11 : .07)	.60
Compensatory Primary → SWB	.02 (-.05 : .08)	.59
Effects	*b* (95% CI)	*p*
Optimism → Compensatory Primary → SWB	.00 (-.01 : .02)	.58
Pessimism → Compensatory Primary → SWB	.00 (-.01 : .00)	.83
Latent Correlation	*r* (95% CI)	*p*
Optimism with Pessimism	-.63 (-.70 : -.57)	.00
Outcomes	R^2 (95% CI)	*p*
SWB	.51 (.44 : .57)	.00
Compensatory Primary	.12 (.08 : .17)	.00

Notes. Direct effects were completely standaradized. SWB = Subjective Well-being.

Table 10

Optimism & Pessimism Predicting Subjective Well-being Via Positive Reappraisal for Japan (n = 1027)

Effects	β (95% CI)	*p*
Optimism → SWB	.51 (.36 : .69)	.00
Pessimism → SWB	-.12 (-.29 : .07)	.19
Optimism → Positive Reappraisal	.48 (.33 : .62)	.00
Pessimism → Positive Reappraisal	-.18 (-.32 : -.03)	.02
Positive Reappraisal → SWB	.15 (.03 : .25)	.01
Effects	*b* (95% CI)	*p*
Optimism → Positive Reappraisal → SWB	.07 (.02: .12)	.01
Pessimism → Positive Reappraisal → SWB	-.03 (-.08 : .00)	.10
Latent Correlation	*r* (95% CI)	*p*
Optimism with Pessimism	-.61 (-.75 : -.47)	.00
Outcomes	R^2 (95% CI)	*p*
SWB	.47 (.39 : .56)	.00
Positive Reappraisal	.37 (.28 : .45)	.00

Notes. Direct effects were completely standaradized. SWB = Subjective Well-being.

Table 11

Optimism & Pessimism Predicting Subjective Well-being Via Positive Reappraisal for the US (n=1805)

Effects	β (95% CI)	*p*
Optimism → SWB	.57 (.44 : .71)	.00
Pessimism → SWB	-.20 (-.29 : -.10)	.00
Optimism → Positive Reappraisal	.75 (.67 : .84)	.00
Pessimism → Positive Reappraisal	.14 (.06 : .24)	.00
Positive Reappraisal → SWB	.01 (-.09 : .09)	.86
Effects	*b* (95% CI)	*p*
Optimism → Positive Reappraisal → SWB	.00 (-.04 : .04)	.86
Pessimism → Positive Reappraisal → SWB	.00 (-.01 : .01)	.87
Latent Correlation	*r* (95% CI)	*p*
Optimism with Pessimism	-.62 (-.69 : -.56)	.00
Outcomes	R^2 (95% CI)	*p*
SWB	.51 (.44 : .57)	.00
Positive Reappraisal	.46 (.39 : .52)	.00

Notes. Direct effects were completely standaradized. SWB = Subjective Well-being.

Table 12

Optimism and Pessimism Predicting Subjective Well-being Via Each Control Strategy for Japan (n = 1027)

Direct Effects	*β* (95% CI)	*p*
Optimism → SWB	.48 (.33 : .68)	.00
Pessimism → SWB	-.14 (-.33 : -.05)	.13
Optimism → Selective Primary	.52 (.36 : .71)	.00
Optimism → Compensatory Primary	.05 (-.06 : .24)	.21
Optimism → Positive Reappraisal	.49 (.34 : .63)	.00
Pessimism → Selective Primary	.04 (-.12 : .23)	.67
Pessimism → Compensatory Primary	-.08 (-.25 : .09)	.37
Pessimism → Positive Reappraisal	-.17 (-.32 : -.01)	.03
Selective Primary → SWB	.14 (-.04 : .30)	.12
Compensatory Primary → SWB	-.07 (-.14 : .01)	.07
Positive Reappraisal → SWB	.06 (-.13 : .24)	.54
Latent Correlations	***r*** **(95% CI)**	***p***
Optimism with Pessimism	-.61 (-.75 : -.47)	.00
Selective Primary Control with Compensatory Primary Control	.11 (.02 : .21)	.02
Selective Primary Control with Positive Reappraisal	.76 (.69 : .82)	.00
Compensatory Primary Control with Positive Reappraisal	.11 (.02 : .21)	.02
Indirect Effects	***b*** **(95% CI)**	***p***
Optimism → SWB Via		
Selective Primary	.07 (-.02 : .16)	.14
Compensatory Primary	-.01 (-.03 : .00)	.41
Positive Reappraisal	.03 (-.07 : .12)	.55
Sum of Control Strategies	.09 (.03 : .15)	.00
Pessimism → SWB Via		
Selective Primary	.01 (-.06 : .06)	.72
Compensatory Primary	.01 (-.01 : .03)	.52
Positive Reappraisal	-.01 (-.05 : .02)	.62
Sum of Control Strategies	.00 (-.07 : .03)	.98

Outcome	R^2 (95% CI)	*p*
SWB	.48 (.49 : .56)	.00
Selective Primary	.25 (.16 : .34)	.00
Compensatory Primary	.02 (-.01 : .05)	.12
Positive Reappraisal	.37 (.28 : .45)	.00

Notes. Direct effects were completely standaradized. SWB = Subjective Well-being.

Table 13

Optimism and Pessimism Predicting Subjective Well-being Via Each Control Strategy for the US Sample (n = 1805)

Direct Effects	*β* (95% CI)	*p*
Optimism → SWB	.53 (.39 : .68)	.00
Pessimism → SWB	-.20 (-.29 : -.10)	.00
Optimism → Selective Primary	.66 (.58 : .76)	.00
Optimism → Compensatory Primary	.33 (.23 : .42)	.00
Optimism → Positive Reappraisal	.76 (.68 : .85)	.00
Pessimism → Selective Primary	.13 (.04 : .23)	.01
Pessimism → Compensatory Primary	-.03 (-.12 : .06)	.48
Pessimism → Positive Reappraisal	.14 (.05 : .23)	.00
Selective Primary → SWB	.12 (.03 : .21)	.01
Compensatory Primary → SWB	.01 (-.05 : .08)	.69
Positive Reappraisal → SWB	-.05 (-.15 : .04)	.28
Latent Correlations	***r*** **(95% CI)**	***p***
Optimism with Pessimism	-.62 (-.68 : -.56)	.00
Selective Primary Control and Compensatory Primary Control	.16 (.09 : .23)	.00
Selective Primary Control and Positive Reappraisal	.43 (.34 : .51)	.00
Compensatory Primary Control and Positive Reappraisal	.21 (.13 : .28)	.00
Indirect Effects	***b*** **(95% CI)**	***p***
Optimism → SWB Via		
Selective Primary	.05 (.01 : .08)	.00
Compensatory Primary	.00 (-.01 : .01)	.69
Positive Reappraisal	-.02 (-.07 : .02)	.30
Sum of Control Strategies	.03 (-.02 : .07)	.25
Pessimism → SWB Via		
Selective Primary	.01 (.00 : .02)	.04
Compensatory Primary	.00 (.00 : .00)	.84
Positive Reappraisal	-.00 (-.01 : .00)	.38
Sum of Control Strategies	.00 (-.01 : .01)	.38

Outcome	R^2 (95% CI)	*p*
SWB	.51 (.45 : .58)	.00
Selective Primary	.35 (.28 : .42)	.00
Compensatory Primary	.12 (.08 : .16)	.00
Positive Reappraisal	.46 (.40 : .53)	.00

Notes. Direct effects were completely standaradized. SWB = Subjective Well-being.

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Appendix A: List of Measures

OPTIMISM

(Self-Administered Questionnaires, Section E; Question 10)

E10. The next set of questions asks about your outlook on life. Answer according to your own feelings, rather than how you think "most people" would answer.

Optimism	AGREE A lot	A little	Neither agree nor disagree	DISAGREE A lot	Not at all
a. In uncertain times, I usually expect the best. (R)	1	2	3	4	5
c. I'm always optimistic about my future. (R)	1	2	3	4	5
f. I expect more good things to happen to me than bad. (R)	1	2	3	4	5

Pessimism	AGREE A lot	A little	Neither agree nor disagree	DISAGREE A lot	Not at all
b. If something can go wrong for me, it will.	1	2	3	4	5
d. I hardly ever expect things to go my way.	1	2	3	4	5
e. I rarely count on good things happening to me.	1	2	3	4	5

(R) = Reversed scored

SUBJECTIVE WELL-BEING: LIFE SATISFACTION

(Self-Administered Questionnaires, Section A, Question 1; Section F, Question 1; Section K, Question 1; Section L, Question 1; Section Q, Question 1; Section G, Question 1)

A1. Using a scale from 0 to 10 where 0 means "the worst possible health" and 10 means "the best possible health," how would you rate your health these days?

Worst										Best
0	1	2	3	4	5	6	7	8	9	10

F1. Please think of the work situation you are in now, whether part-time or full-time, paid or unpaid, at home or at a job. Using a scale from 0 to 10 where 0 means "the worst possible

work situation" and 10 means "the best possible work situation," how would you rate your work situation these days?

Worst										Best
0	1	2	3	4	5	6	7	8	9	10

K1. Using a scale from 0 to 10 where 0 means "the worst possible relationship" and 10 means "the best possible relationship," how would you rate your overall relationship with your children these days?

Worst										Best
0	1	2	3	4	5	6	7	8	9	10

L1. Using a scale from 0 to 10 where 0 means "the worst possible marriage or close relationship" and 10 means "the best possible marriage or close relationship," how would you rate your marriage or close relationship these days?

Worst										Best
0	1	2	3	4	5	6	7	8	9	10

Q1. Using a scale from 0 to 10 where 0 means "the worst possible life overall" and 10 means "the best possible life overall," how would you rate your life overall these days?

Worst										Best
0	1	2	3	4	5	6	7	8	9	10

G1. Using a scale from 0 to 10 where 0 means "the worst possible financial situation" and 10 means "the best possible financial situation," how would you rate your financial situation these days?

Worst										Best
0	1	2	3	4	5	6	7	8	9	10

SUBJECTIVE WELL-BEING: NEGATIVE AFFECT
(Self-Administered Questionnaire, Section A, Question 24)

A24. During the past 30 days, how much of the time did you feel...

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. so sad nothing could cheer you up?	1	2	3	4	5
b. nervous?	1	2	3	4	5
c. restless or fidgety?	1	2	3	4	5
d. hopeless?	1	2	3	4	5
e. that everything was an effort?	1	2	3	4	5

f. worthless?	1	2	3	4	5
h. afraid?	1	2	3	4	5
i. jittery?	1	2	3	4	5
j. irritable?	1	2	3	4	5
k. ashamed?	1	2	3	4	5
l. upset?	1	2	3	4	5

***All items were recoded so that higher scores represent higher negative affect**

SUBJECTIVE WELL-BEING: POSITIVE AFFECT
(Self-Administered Questionnaire, Section A, Question 26)

A26. During the past 30 days, how much of the time did you feel...

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. cheerful?	1	2	3	4	5
b. in good spirits?	1	2	3	4	5
c. extremely happy?	1	2	3	4	5
d. calm and peaceful?	1	2	3	4	5
e. satisfied?	1	2	3	4	5
f. full of life?	1	2	3	4	5
i. enthusiastic?	1	2	3	4	5
j. attentive?	1	2	3	4	5
k. proud?	1	2	3	4	5
l. active?	1	2	3	4	5

***All items were recoded so that higher scores represent higher positive affect**

CONTROL STRATEGIES
(Self-Administered Questionnaire, Section E, Question 12)

E12. The following statements are designed to help us understand how you approach managing your life. Please indicate how well the following statements describe you.

Selective Primary Control

	A lot	Some	A little	Not at all
a. When things don't go according to my plans, my motto is, "Where there's a will, there's a way."	1	2	3	4
b. When faced with a bad situation, I do what I can do to change it for the better.	1	2	3	4
g. Even when I feel I have too much to do, I find a way to get it all done.	1	2	3	4
j. When I encounter problems, I don't give	1	2	3	4

up until I solve them.				
k. I rarely give up on something I am doing, even when things get tough.	1	2	3	4

Compensatory Primary Control

	A lot	Some	A little	Not at all
y. I don't like to ask others for help unless I have to. (R)	1	2	3	4
z. Asking others for help comes naturally for me.	1	2	3	4
bb. When I cannot solve a problem by myself, I ask others for help	1	2	3	4
ff. When obstacles get in my way, I try to get help from others.	1	2	3	4
jj. When difficulties become too great I ask others for advice.	1	2	3	4

Secondary Control (Positive Reappraisals)

	A lot	Some	A little	Not at all
e. I find I usually learn something meaningful from a difficult situation.	1	2	3	4
h. When I am faced with a bad situation, it helps to find a different way of looking at things.	1	2	3	4
m. Even when everything seems to be going wrong, I can usually find a bright side to the situation	1	2	3	4
n. I can find something positive, even in the worst situations.	1	2	3	4

(R) = Reverse scored