

# Interdependent Happiness: Theoretical Importance and Measurement Validity

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**Abstract** We proposed the concept of “interdependent happiness,” which is interdependently pursued and attained. A nine-item Interdependent Happiness Scale (IHS) was developed to measure the happiness of individuals who are relationally oriented, quiescent and ordinary. Interdependent happiness correlated with both subjective well-being (SWB) and interdependent self-construal among Japanese students (Study 1); their SWB was more likely to be explained by IHS than the SWB of American students (Study 2); and IHS explained the SWB of working adults in the US, Germany, Japan, and Korea (Study 3) and Japanese adults and elders from collectivist regions of the country (Study 4). Cultural and cross-cultural psychological perspectives were incorporated to shed new light on collective happiness

**Keywords** Interdependent happiness · Cultural self · Within-culture variation · Relationship · Subjective well-being

## 1 Introduction

Studies of happiness across cultures (Diener and Tov 2009) point to the entangled nature of cultural values regarding what people mean by “happiness” or “well-being” (Markus and Kitayama 1991; Oishi et al. 1999; Suh and Koo 2007; Uchida and Kitayama 2009; Uchida and Ogihara 2012). Given the fact that cultural values are deeply ingrained, lay people’s conceptions of happiness are best captured by exploring subjective experiences of

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happiness within a specific cultural context (Mesquita 2001). In this study, we investigate a new theoretical concept of happiness, namely, “interdependent happiness.”

### 1.1 Research Background: Increasing Need to Measure Happiness

Recent scientific research on subjective well-being (SWB) has shown that several societies have adopted psychological factors such as happiness as indicators of societal success. This, in part, is due to societal shifts in goals related to economic satisfaction and subjective life satisfaction (Kusumi 2012). Several nations including the UK, France and Japan; and bodies such as the organization for economic co-operation and development (OECD) have attempted to measure SWB and happiness by developing standardized measures of SWB for policy design and evaluation. While some approaches attempt to compare societies in order to investigate which aspects contribute to “happier” groups of people, other approaches attempt to investigate specific factors important for predicting happiness within a particular cultural environment.

As both academic and non-academic interest in happiness has increased, a dialogue about how best to measure happiness has developed. Standardized measurements such as the OECD’s “How’s Life” index or Satisfaction with Life Scale (SWLS; Diener et al. 1985) facilitate broad international comparisons. Such measurements are used not only for comparison, but also for understanding the causes and outcomes associated with well-being in each society.

### 1.2 Research Agenda: The Need for a Concept of Interdependent Happiness

These previous measures have been devised according to European American ideas of happiness that evaluate the happiness of individuals (Uchida and Kitayama 2009). For example, most of the factors of *eudaimonic* well-being previously used to compare the US and Japan (Brim et al. 2004; Ryff and Keyes 1995) focus on aspects of actualization of the independence of the self (Christopher 1999); such as self-acceptance, personal growth, purpose in life, environmental mastery, and autonomy, with the exception of a single subscale of positive relations with others. Given that not all cultures are independent in nature, a measure that acknowledges an interdependent concept of happiness is necessary. Such a measure would need to evaluate not only individual happiness but also happiness based on relationships. This need is especially apparent when measuring well-being across diverse cultures, including East Asian countries.

In this paper, we describe a measure designed to capture happiness earned as a result of participating in and/or adapting to interdependent goals in life. A scale of “interdependent happiness” is both timely and necessary for the development of research in this area. We present four studies that together point to the initial validity of the measure. To establish the measure’s validity, we conducted several cross-cultural studies to show how interdependent happiness correlates with other constructs. We will first explain the main concept of interdependent happiness, and subsequently explain how we validated the measurement of the construct using diverse samples.

### 1.3 Independent Versus Interdependent Modes of Happiness

Individualistic cultural practices that are dominant among North American, middle class, educated people provide members with a shared understanding of the self as independent

and conceptually distinct from others, and the belief that the individual self is the very agent of thought, action, and motivation. A socially shared meaning of happiness in such a cultural context contains the theme of personal achievement (Uchida et al. 2004), free choice (Markus 2010), emotional expression (Matsumoto et al. 2008) and mutual confirmation of inner positive attributes (Kitayama and Markus 2000). For example, Kitayama et al. (2006a, b) showed American students' happiness to be strongly correlated with interpersonally disengaged emotions such as pride, compared to Japanese counterparts whose happiness was more related to interpersonally engaged emotions such as friendly feelings toward others.

Japanese happiness typically implies a bond with others (Uchida and Kitayama 2009). Kitayama et al. (2006a, b) found Japanese students feel interpersonally engaged emotions more strongly than interpersonally disengaged emotions, while the reverse was true for their American counterparts. Oishi et al. (2004) found that Japanese students reported less pleasant affect when alone than did American students, and an everyday situation of being together with others was more strongly related to the experience of pleasant affect among Japanese than among their American counterparts. These results indicate an interaction between individuals and culturally mandated situations with respect to affect. Furthermore, European American students who accomplished high independence goals were more likely to become happier, while Asian American students who accomplished low independence goals were more likely to become happier (Oishi and Diener 2001). These studies suggest that people are sensitive to culturally focused positive emotions (Mesquita 2001), and everyday situations that provide opportunities to feel such emotions promote happiness. The cultural difference in the antecedents of happiness between the East and the West is explained by the divergent understandings of the self (Kwan et al. 1997).

Shared meanings of happiness can have features that are both similar and different between cultures. Uchida and Kitayama (2009) asked both American and Japanese students to produce words related to the word "happiness," and had another group of students from the same culture sort the produced words into meaningful clusters. Multidimensional scaling based on the similarities between the sorted words showed culturally similar categories in the two countries, which were "personal achievement," "social harmony," "transcendental reappraisal," and "social disruption." The number of words included in each category, however, and the relationships among these four categories and the category of words for general positive hedonic experiences were different. While 98 % of the words produced by the American students were socially desirable according to coders, only 70 % of the happiness related words Japanese students produced were categorized as socially desirable. The remaining 30 % of Japanese words of happiness belonged to "transcendental reappraisal," the absence of emotional disturbance, and "social disruption," or the fear of disturbing harmony. Furthermore, positive hedonic experience was closely related to personal achievement in Americans, but it was closely related to social harmony in Japanese.

#### 1.4 Concept of Interdependent Happiness and Its Measurement

Past studies of culture and well-being have found that interdependent goals are more important in East Asian cultural contexts (see Uchida et al. 2004; Uchida and Ogihara 2012 for review) necessitating a standard measure to assess such conceptualizations of happiness. Lyubomirsky and Lepper (1999) defined happiness as "a global, subjective assessment of whether one is a happy or unhappy person." Our proposition, however, is that the assessment of "happiness" may depend on one's goal (Markus and Kitayama 1991;

Uchida and Kitayama 2009). It is necessary, therefore, to expand the conception of happiness to include not only the “individual/subjective” aspect of happiness but also “relationships” based happiness by studying interdependent happiness. Our theoretical definition of interdependent happiness, based on past research on happiness, is the “global, subjective assessment of whether one is interpersonally harmonized with other people, being quiescent, and being ordinary, and connected to the collective way of well-being.” The concept is neither fully emotional nor fully cognitive (Diener and Tov 2007), but reflects an assessment of the self as being a harmonious interdependent agent.

We propose in this paper to measure the concept of “interdependent happiness,” a type of happiness that is experienced by achieving interdependent goals that are more prevalent in the interdependent daily life (Kitayama et al. 2009). The concept of interdependent happiness encompasses the state of being relationally orientated (Kitayama et al. 2009; Kitayama and Uchida 2009), preserving quiescence (see Kan et al. 2009; Tsai et al. 2006), and embedding oneself in the nexus of ordinariness among others.

Interdependent happiness can be described as basically relationship oriented, and as a state of harmony with a certain balance being achieved between the self and significant others. Consequently, if one’s happiness is likely to elicit another’s unhappiness by inducing negative emotions such as envy or jealousy, then one’s own happiness is also discounted to a certain extent (Suh 2007; Uchida and Kitayama 2009). One’s happiness is contingent upon significant others’ happiness, and significant others’ inferred happiness is also an important ingredient of one’s own happiness. Otherwise, one could face a relational threat of being excluded from the group (Kitayama et al. 2004). To measure such well-being, it seems crucial to measure the feeling of personal happiness combined with the inference that significant others are also feeling happy, and that significant others are approving of the self. This would be measured by items such as “I believe that I and those around me are happy,” or “I feel that I am being positively evaluated by others around me.”

The East Asian notion that fate is unpredictable and in constant flux is in stark contrast with the notion that the future is the past’s direct derivative (Ji et al. 2001). When fate is understood to be unpredictable, happiness may be coupled with the belief that it is merely a temporary state (Miyamoto and Ma 2011), and might easily be lost through often uncontrollable social disruption. Therefore, members of an interdependent culture keep the self away from extreme feelings that would cause exclusion and ostracizing of the self. By being neutral and valuing the middle path, one can guarantee that their current state will be free from any social disturbance or relational concerns. With the belief that happiness and unhappiness are two sides of the same coin, which leads caution in the pursuit of happiness maximization, subtle pleasures or the absence of negative events receive focus as an integral part of happiness. As Tsai et al. (2006) showed, the Eastern conception of wellness is considered to be a state of low activation, best described by words such as “peaceful” or “serene,” whereas the happiness preferred in independent cultures is described as “excited” or “enthusiastic.” Such quiescence is thus a significant aspect of interdependent happiness. This concept would be measured by items such as “I do not have any concerns or anxieties,” or “I can do what I want without causing problems for other people.”

Quiescent harmony is grounded on preserving social norms (Heine et al. 1999; Suh et al. 1998) and being able to live by social norms is crucial to being accepted by others. In such interdependent contexts, one should not fall short of the ordinary level of expected social behaviour. Otherwise, being not “normal” could harm group performance, and lead the person responsible to lose approval from others by letting them down, and eventually become less motivated and socially maladapted (Norasakkunkit and Uchida 2011). Failure

to pursue the “ought” leads one to feel agitation and social anxiety, the opposite emotional state from quiescence (Higgins 1997). Such agitation is detrimental for the members of an interdependent culture (Lee et al. 2000). In fact, Japanese students who were told that their performance was not falling short of the standard level among the same group of people conceived their results as being as “good” as those who performed better than average (Takata 2005). They also made social comparisons to be in accord with others and tried to improve performance after realizing their shortcomings (Takata 1992). Such a social comparison process is less common in the US, where being “normal” implies the absence of the more valued uniqueness (Kim and Markus 1999). Ordinarity becomes crucial when trying to live up to in-group expectations and norms, and in avoiding exclusion by in-group others. Sano and Kuroishi (2009) demonstrated that Japanese students who were forced to perceive the self to be “normal,” as defined by a similar level of accomplishment with those nearby, felt increased “calmness.” The notion of ordinarity is an important aspect of interdependent happiness. This concept would be measured by items such as “I believe I have achieved the same standard of living as those around me,” or “I generally believe that things are going well for me in its own way as they are for others around me.”

### 1.5 Summary of the Construct and Research Question

We argue, based on the well-being and interdependent self-construal (i.e., relational views on the self) literature, that interdependent happiness focuses on the relational nature of human beings, which is basically interdependent and harmony oriented, risk averse and quiescence-based, and preferring ordinarity. Interdependent happiness should be highly correlated with SWB, for they share the concept that a positive assessment of the current general self is important to consider when measuring happiness. At the same time, interdependent happiness and SWB are clearly separate in the respect that interdependent happiness comes from maintaining one’s social standing within the complex of in-group relationships, involving low-arousal positive emotions and being modest and perseverant, while SWB contains personal judgment of one’s own life.

To propose the concept of interdependent happiness and its measurement, we devised four studies that together provide a first step toward evaluating the validity of the Interdependent Happiness Scale (IHS).

### 1.6 Overarching Design

Our general hypotheses are: (1) validity of interdependent happiness will be found across cultures since interdependent and collective concepts of well-being would be stemming from basic aspects of human self-concept (i.e., connectedness and seeking social relationships; Markus and Conner 2013) across cultures and age groups; (2) Correlations between interdependent happiness and SWB will be more marked in regions/countries that are collectively oriented towards interdependence (Kitayama et al. 2006a, b; Kwan et al. 1997). In our analysis we will also control for self-esteem. Past studies of individualism–collectivism show that self-esteem is more strongly related to happiness in individualistic compared to interdependent cultures (Diener and Suh 1999). Previous studies that tapped relational happiness have also controlled for self-esteem in order to examine the effects of relational concepts (Uchida and Kitayama 2009).

### 1.7 Study 1 Hypotheses

In study 1, we generated and prepared the relevant items for interdependent happiness in Japan, a typical interdependent culture (Markus and Kitayama 1991), and tested the correlations with relevant items, namely, positive and negative emotions, life satisfaction, satisfaction with friendship, and interdependence.

Since IHS measures happiness in terms of interdependent existence, we expected the measure to correlate with the overall evaluation of one's life as a whole. Specifically, we expected interdependent happiness to have a positive correlation with 'emotional experiences' (more positive and less negative) and 'satisfaction with life', which measure the emotional and cognitive components of SWB, respectively. Also, since the interpersonal domain of satisfaction is considered to be one of the factors that relate to interdependent happiness, we also predicted a correlation with 'satisfaction of friendship' (positive correlation) and 'interpersonal hopelessness' (negative correlation). We also hypothesized a positive correlation between interdependent happiness and interdependent self-construal.

### 1.8 Study 2 Hypotheses

In study 2, we tested whether IHS would show sufficient internal consistency and a single factor structure in both Japan and the US. Further, we examined whether interdependent happiness was a better predictor of SWB than self-esteem (Uchida et al. 2008a, b) in Japan, as opposed to the US.

We also examined the relationship between interdependent happiness and 'positive relations with others' using the Psychological Well-Being Scale (PWBS; Ryff 1989; Ryff and Keyes 1995) and Minimalist Well-Being Scale (MWS; Kan et al. 2009). PWBS is a specific measurement for *eudaimonic* well-being, and since the subscale measuring 'positive relations with others' is the closest concept to IHS, we examined the discriminant validity of IHS. We predicted a moderate positive correlation, as IHS has the unique component of sharing happiness with others. MWS is a measure that also taps the East Asian concept of well-being. Therefore, we predicted a positive correlation with IHS.

### 1.9 Study 3 Hypotheses

In study 3, we compared interdependent happiness and its correlates among adults in four nations that diverge in their degree of individualism–collectivism. In the four countries, we expected to find the effect of IHS to be stronger in more collectivistic countries (Japan and Korea), and the opposing effect of self-esteem to be stronger in more individualistic countries (USA and Germany).

### 1.10 Study 4 Hypotheses

In study 4, we compared interdependent happiness and its correlates in Japanese adults diverging in the individualism orientation of their original region (Kitayama et al. 2006a, b; Markus and Lachman 2002; Vandello and Cohen 1999). A theory of cultural task analysis (Kitayama et al. 2010) maintains that individual differences in a culture are systematically affected by cultural mandates: the everyday tasks to solve. Focusing on the regional level culture allowed us to compare IHS–SWB relationships that might differ within a country (Hitokoto et al. 2009). Using hierarchical linear modeling (HLM: van de Vijver et al.

2008), we expected to find a larger positive regression coefficient of IHS for SWB in the Japanese from collectivist regions than those from individualistic regions.

## 2 Study 1

### 2.1 Preliminary Development of the Interdependent Happiness Scale in Japan

In Study 1, we prepared items to reliably measure interdependent happiness within the Japanese cultural context. Based on the cultural psychological understanding of Japanese happiness discussed above, items were generated through brainstorming with professional cultural psychologists and through statistical examination of reliability and validity. IHS was expected to be positively correlated with the ‘emotional aspect of well-being’ (Uchida and Kitayama 2009) and ‘satisfaction with life’. However, interdependent happiness differs from life satisfaction in that it is more contextualized to measure collective nature of happiness. ‘Satisfaction of friendship’ was hypothesized to have a positive correlation and ‘interpersonal hopelessness’ was predicted to have a negative correlation with IHS. We also hypothesized a positive correlation between interdependent happiness and interdependent self-construal, since interdependent happiness should involve a certain commitment to interdependent self-construal at the individual level. In order to clarify the relationships between the two, we used partial correlation and controlled for independent self-construal.

We tested the regression model predicting SWB from gender, age, and IHS. We also tested whether IHS had a unique relationship with SWB after controlling for the effects of ‘friendship satisfaction’ and ‘interpersonal hopelessness’. Because the IHS is a culturally nuanced measurement of well-being, and the other two constructs are simply general interpersonal satisfaction or hopelessness measures, devoid of cultural context, there should be a unique correlation between interdependent happiness and SWB. In order to test these hypotheses, we combined ‘satisfaction with life’, positive affect (PA), and negative affect (NA) (Diener and Tov 2007) into a single principal component of SWB.

### 2.2 Method

#### 2.2.1 Participants and Procedures

Two hundred and sixteen Japanese students in private universities in Osaka and Hyogo prefectures (68 males and 159 females, age  $M = 19.53$ ,  $SD = 2.33$ ) participated in the study. All of the participants were born in Japan. They were asked to fill out the questionnaire during a usual university session. Initial item candidates were worded in Japanese. Seventy-four students participated in the second wave for the retest (30 male and 44 female, mean age: 19.05).

#### 2.2.2 Measures

We first prepared 29 initial item candidates for the IHS that included 11 items for the relationship orientation domain, 12 items for the quiescence domain, and six items for the ordinariness domain, respectively. We generated and arranged items in accordance with the theory of interdependent happiness by brainstorming with two graduate students and a

professional cultural psychologist. Final items for the IHS were selected after statistical examination of the internal consistency and factor loadings presented below.

We used the affect scale from Brim et al. (2004), which measures PA with nine items (e.g. happy, calm, joy, satisfied), and NA with 12 items (e.g. depressed, bored, sad, nervous). The scale was previously used in the MIDUS study (Mid Life in United States; Ryff 2008), and the Japanese version was used in the Japanese counterpart of that study, MIDJA (Kitayama et al. 2010). Participants reported how frequently they had experienced each of these affective states within the past 2 weeks (1 = *not at all*, to 5 = *very frequently*). In the current sample, internal consistency was  $\alpha = .89$  for PA, and  $\alpha = .80$  for NA. Correlation between PA and NA in the current sample was  $-.44$  ( $p < .001$ ) (Appendix 1).

Secondly, we used the SWLS, which consists of five items of cognitive well-being. Participants rated their subjective assessment of their life (1 = *not satisfied*, 5 = *very satisfied*). Internal consistency was  $\alpha = .86$ .

Thirdly, we used the Interpersonal Hopelessness Questionnaire (Takahira 2000). This measures the feeling of hopelessness about expected interpersonal relationships. An example of the items it includes is “My relationships with my friends will not go as I wanted.” Participants answered whether they felt hopeless (1 = *No*, 2 = *Yes*) to each statement. We used this scale to measure the expected lack of well-being in one’s interpersonal domain, and hypothesized that it would have a negative correlation with the IHS. Internal consistency was  $\alpha = .83$ .

Fourthly, we used the Friendship Satisfaction Scale (Kato 2001), which measures how satisfied one is with one’s friendships. An example of the items it includes is “I have someone whom I can call my best friend.” The scale measures one’s general friendship under the instruction to answer without explicitly referring to a specific relationship, which might have given participants too much freedom to articulate their responses. Yet, we believe that students were still able to conceptualize their satisfaction with their friendships in general, as such assessment is known to reflect their style of coping with interpersonal stress (Kato 2001). Participants rated their subjective assessment of their agreement with each item (1 = *completely disagree*, 5 = *completely agree*) and its internal consistency was  $\alpha = .81$ .

Finally, we used the independent and interdependent self-construal scale (modified version of Singelis 1994 and Takata 2000; Kitayama and Uskul 2011 for a review). An example of one of the items is as follows “I am concerned about what people think of me.” Participants rated their agreement with each item (1 = *completely disagree*, 7 = *completely agree*). The internal consistency for interdependent self-construal was  $\alpha = .66$ , and that of independent self-construal was  $\alpha = .75$ .

### 2.3 Results and Discussion

We first examined the patterns of distribution for each item in the IHS. Four items were dropped from further analysis because of a floor effect (defined as the mean score  $+1SD$  or  $-1SD$  exceeding the item range). Another item was dropped due to its low correlation with all other items (mean  $r < .30$ ).

Exploratory factor analysis was administered to the remaining items using principal factor extraction with promax rotation. Three factors larger than eigen value 1 were extracted, and those items with lower than .40 loading to any of the factors or showing ambiguous loadings were dropped. The factors seemed to show clusters of items pertaining to either relational orientation, quiescence, or ordinariness, the types of items we theoretically prepared for measuring interdependent happiness. Since between factor



correlations were very high (mean  $r = .58, p < .001$ ), which makes a reasonable case for their theoretical cohesiveness, we chose the most typical as well as highly loaded items to form a single factor scale for interdependent happiness. Factor loadings and item statistics of the final nine items are presented in Table 1. All items loaded on a single factor, and together they explained 37.19 % of the total variance. The 2 week test–retest reliability was  $r = .76 (p < .001)$ .

Exploratory examination of the nine items showed gender differences, with females scoring higher than their male counterparts [ $t(223) = 2.37, p < .05$ ]. Supporting our hypothesis, IHS was positively correlated with PA ( $r = .67, p < .001$ ), life satisfaction ( $r = .61, p < .001$ ), and friendship satisfaction ( $r = .64, p < .001$ ). IHS was negatively correlated with NA ( $r = -.60, p < .001$ ), and interpersonal hopelessness ( $r = -.43, p < .001$ ). In addition, IHS correlated weakly with interdependent self-construal when controlling for independent self-construal ( $r = .14, p < .05$ ). Despite its significance, correlation was low between the two scales. This may relate to the fact that having a self-construal as an interdependent agent does not directly imply success with the interdependent cultural mandate. Achieving happiness in that context may involve not only self-construal, but also an array of spontaneous behaviors that work to actually accomplish the cultural tasks that might be needed (Kitayama et al. 2009).

When the principal component score of SWB was regressed against gender, age, and IHS, IHS showed a significant effect ( $\beta = .77, p < .001$ ) as predicted. Further, when SWB was regressed against IHS, friendship satisfaction and interpersonal hopelessness together, IHS still showed the largest significant effect (IHS:  $\beta = .70, p < .001$ ; friendship satisfaction:  $\beta = .07, p = ns$ ; interpersonal hopelessness:  $\beta = -.11, p < .05$ ). These results supported our hypothesis.

As a first step to measure interdependent happiness, we arranged theoretically relevant items, and subsequently chose items that captured the individual difference of interdependent happiness. Correlations with other measures further showed that those who felt interdependent happiness also felt more positive emotion and less negative emotion, were satisfied with their life and friendship, and did not feel hopeless about expected future interpersonal relationships. Also, interdependent happiness had unique correlations with interdependent self-construal and SWB.

This investigation established initial reliability and validity of the IHS with Japanese students.

## 3 Study 2

### 3.1 East–West Comparison of the Interdependent Happiness Scale

To demonstrate the potential cultural underpinnings of the IHS, we tested similarities and differences in the correlation patterns between Japanese and American students, theoretically, the prototypical interdependent and independent cultural members (Kitayama and Markus 2000). In study 2, we examined whether interdependent happiness could explain SWB better than self-esteem (Uchida et al. 2008a, b) in Japan, as opposed to in the US, and whether it could be applied to explain SWB across interdependent and independent cultures.

Specifically, we tested whether IHS would show sufficient internal consistency and a single factor structure with both Japanese and the American participants. We examined Tucker's congruence coefficient of factor loadings to establish the similarity of item

**Table 1** Factor loadings and item statistics of the IHS (from the studies that used full items)

English items	Study 1						Study 2						Study 4			
	Japanese students 1			Japanese students 2			American students			Japanese adults						
	Factor loadings	M	SD	Factor loadings	M	SD	Factor loadings	M	SD	Factor loadings	M	SD	Factor loadings	M	SD	
I believe that I and those around me are happy.	.43	3.56	0.79	.42	3.30	0.84	.62	3.69	0.81	4.01	***	.59	3.45	0.77		
I feel that I am being positively evaluated by others around me.	.54	3.30	0.98	.60	3.26	0.91	.55	3.55	0.93	2.76	**	.69	3.61	0.80		
I make significant others happy.	.52	3.20	1.00	.44	3.20	1.03	.37	4.12	0.69	8.32	***	.69	3.74	0.88		
Although it is quite average, I live a stable life.	.67	3.84	0.99	.63	3.78	1.04	.55	3.87	0.89	0.76		.73	3.99	0.86		
I do not have any major concerns or anxieties.	.43	2.78	1.22	.57	2.60	1.19	.43	2.69	1.31	0.62		.65	3.35	1.11		
I can do what I want without causing problems for other people.	.48	3.12	1.02	.49	3.01	1.00	.43	3.67	0.99	5.74	***	.67	3.70	0.93		
I believe that my life is just as happy as that of others around me.	.79	3.46	1.00	.72	3.46	0.94	.82	3.50	1.02	0.39		.84	3.81	0.84		
I believe I have achieved the same standard of living as those around me.	.70	3.68	0.97	.61	3.72	0.91	.70	3.46	1.02	2.45	*	.81	3.83	0.89		
I generally believe that things are going well for me in its own way as they are for others around me.	.80	3.44	0.95	.78	3.48	0.92	.57	3.79	0.78	3.04	**	.79	3.85	0.77		
Average													3.38	3.31	3.59	3.70
Variance explained (%)													37.19	35.46	32.92	52.38
Chronbach's $\alpha$													.83	.82	.79	.91
Tucker's congruence coefficient ( $\phi$ )															.98*	

Note <sup>a</sup>ROH relationship oriented happiness, <sup>b</sup>QH quiescent Happiness, <sup>c</sup>OH ordinary Happiness

<sup>b</sup> Test of the difference between Japanese student 2 and American students

<sup>c</sup> Congruence between Japanese student 2 and American students

\*  $p < .1$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

structure in comparing cultural groups (see Haven and ten Berge 1977, Lorenzo-Seva and ten Berge 2006, Zegers and ten Berge 1985).

Secondly, we examined the relationship between interdependent happiness and SWB. As previously used by Uchida et al. (2008a, b), we measured self-esteem using Rosenberg's SES in this study.

Thirdly, we examined the relationship between interdependent happiness and the "positive relations with others" subscale in the PWBS (Ryff 1989). It is reasonable to expect a positive correlation between interdependent happiness and 'positive relations with others'. We also predicted that the correlation would be moderate, however, because while IHS measures how each person has collective happiness, such as through sharing happiness with others, positive relations with others measures the extent to which they are in control of good relationships.

Fourthly, we examined the relationship between interdependent happiness and the MWS (Kan et al. 2009). The MWS consists of two factors, 'gratitude' and 'peaceful disengagement.' The former refers to the feeling of gratitude toward one's surrounding environment, and the latter refers to the disengagement of the self from reality. The MWS was constructed to measure the concept of well-being from an Eastern cultural point of view (Kan et al. 2009), and the emotion of gratitude facilitates pro-social behavior toward others regardless of culture (Otake et al. 2006). As a result of theoretical similarities between the MWS and IHS, we expected positive correlations between the factors of the MWS and IHS.

## 3.2 Method

### 3.2.1 Participants and Procedures

Two hundred and eighty-seven native Japanese students attending psychology classes at Japanese private universities in Osaka and Hyogo prefecture (88 males and 199 females) and 102 American students (30 males, 72 females; 83 % European American; 2 % Asian American; 1 % African American; 3 % Latin American; 8 % multiple ethnic identity; 5 % unidentified; (all lived in US since birth) in Minnesota state participated in the survey. The mean age of the participants was 19.27 ( $SD = 1.59$ ) in Japan, and 20.60 ( $SD = 3.77$ ) in the US. Gender had no correspondence with nationality [ $\chi^2(1) = .08, p = ns$ ]. Participants were asked to fill out a questionnaire individually by using either a paper format or a web-based questionnaire.

### 3.2.2 Measures

We back-translated the IHS by (a) using two bilinguals who had studied abroad for more than a year and were blind to our hypotheses, and (b) received professional comments from a cultural psychologist who knew our research perspectives well, and (c) discussed it with an American graduate student who had worked in Japan as an English-Japanese translator for a year. After receiving the professional comments, we collaboratively arranged the wording and created the initial English version of the IHS using translator suggestions. Finally, ten psychology major students in Japan, and five psychology major students in the US checked the naturalness of the wording, and they agreed that all of the wording was as easy to understand as everyday expressions.

For SWLS, PA and NA, we used the same scales as in Study 1 (Appendix 1). SWLS showed internal consistency across cultures (Japan:  $\alpha = .84$ ; US:  $\alpha = .85$ ). Tucker's congruence coefficient is interpreted as fairly similar when a value is in the range .85–.94, while higher than .95 implies equality (Lorenzo-Seva and ten Berge 2006). Tucker's congruence coefficient between cultures was  $\varphi = 1.0$ . PA showed internal consistency

across cultures (Japan:  $\alpha = .83$ ; US:  $\alpha = .83$ ). Tucker's congruence coefficient between cultures was  $\phi = 1.0$ . Also, NA showed internal consistency across cultures (Japan:  $\alpha = .76$ ; US:  $\alpha = .89$ ). Tucker's congruence coefficient between cultures was  $\phi = 1.0$ . As for our dependent variable, a principal component analysis was administered to the total scores for SWLS, PA, and NA to form a single aggregate score of SWB, as in the regression analysis in Study 1.

We used the short indicators of "positive relations with others" in the PWBS from the MIDJA study (Kitayama et al. 2010), which was measured by three items asking participants how much they agreed with statements about the self on a 7-point Likert-type scale (1 = *not at all applicable*, 7 = *very much applicable*). Internal consistency was  $\alpha = .53$  in Japan and  $\alpha = .58$  in the US. Tucker's congruence coefficient between cultures was  $\phi = .83$ . The low reliabilities were possibly due to the small number of items. Congruence coefficients lower than .85 are conventionally regarded as a sign of incongruence between groups, and cautioned against assuming cross-cultural equivalence. Relying on the preceding study that compared Japan and the US using PWBS (Kitayama et al. 2010), we report on positive relations with others with the caution noted above.

The MWS included items such as "I feel grateful that I am alive" or "I am satisfied with the time to laze away," estimated on a 7-point Likert-type scale (1 = *strongly disagree*, 7 = *strongly agree*). For the "gratitude" factor, internal consistency for the current sample was  $\alpha = .82$  in Japan and  $\alpha = .86$  in the US. For the "peaceful disengagement" factor,  $\alpha = .65$  in Japan and  $\alpha = .81$  in the US. Tucker's congruence coefficients were  $\phi = .92$  for "gratitude," and  $\phi = .84$  for "peaceful disengagement."

The Self-Esteem Scale (Rosenberg's SES; Rosenberg 1965) measured an individual's self-esteem. Internal consistency for the current sample was  $\alpha = .85$  in Japan, and  $\alpha = .90$  in the US. Tucker's congruence coefficient was  $\phi = .98$  between Japan and the US.

### 3.3 Results and Discussion

The internal consistency of IHS was  $\alpha = .82$  in Japanese students, and  $\alpha = .79$  for American students. A single factor solution was applicable to both cultural groups [ $\chi^2(54) = 128.22$ ,  $GFI = .93$ ,  $AGFI = .88$ ,  $CFI = .92$ ,  $RMSEA = .06$ , also see Table 1]. The descriptive statistics of the key variables are presented in Table 2. Tucker's congruence coefficient was  $\phi = .98$ , indicating factorial similarity between the two cultural groups. IHS was correlated with SWLS, PA, and NA as in Study 1, and with "positive relations with others" of the PWBS, 'gratitude' and 'peaceful disengagement' of the MWS (see Table 3). These consistent correlations across cultures support our hypotheses, and demonstrate the construct validity of interdependent happiness between Japan and the US. The relatively small correlation with the peaceful disengagement factor may be attributable to the low internal consistency of the scale in Japan, or to the difference between quiescence obtained from interpersonal relationships and the peaceful emotion gained through being able to avoid conflict and simply detaching the self from social relationships.

We regressed SWB against gender, age, IHS and SES, in each country. SES and IHS independently predicted SWB, regardless of culture (Japan: SES:  $\beta = .37$ ,  $p < .001$ , IHS:  $\beta = .57$ ,  $p < .001$ ; US: SES:  $\beta = .52$ ,  $p < .001$ , IHS:  $\beta = .40$ ,  $p < .001$ , see also Fig. 1). Total variance explained was  $R^2 = .66$  in Japan and  $R^2 = .71$  in the US. As predicted, IHS showed a significantly larger effect size than SES on SWB for Japanese students ( $z = 2.08$ ,  $p < .05$ ). The results were not significantly different for American students, even though the effect size of SES exceeded that of IHS. This result indicates that even though the cultural task of independence is common in American culture and SES has a stronger effect

**Table 2** Descriptive statistics of the SWLS, SES, and IHS in Japanese and US students

Country	Gender	N	SWLS		SES		IHS	
			M	SD	M	SD	M	SD
US	Male	30	23.59	5.21	30.55	5.77	32.21	6.00
	Female	72	25.19	5.50	29.72	4.69	32.38	4.92
Japan	Male	88	17.51	5.73	25.51	5.44	28.36	5.71
	Female	199	19.81	5.40	25.61	4.63	30.51	5.47

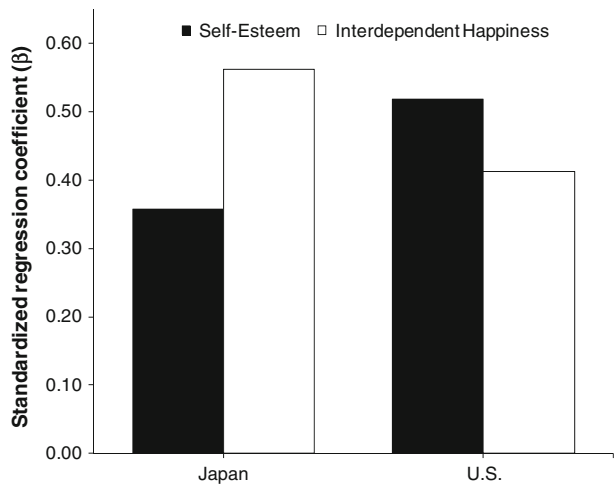
Score range for each scale were, SWLS: 5–35; SES: 10–40; IHS: 9–45

**Table 3** Correlations between IHS and validity criteria in Japan and the U.S

Validity criteria	Measures	Japan	US
Subjective well-being	Satisfaction with life	.61***	.62***
	Positive affect	.61***	.61***
	Negative affect	-.52***	-.64***
Psychological well-being	Positive relations with others	.52***	.40***
Minimalist well-being	Gratitude	.51***	.59***
	Peaceful disengagement	.29***	.37***

All pairs of correlation are not significantly different between countries. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

**Fig. 1** Standardized regression coefficient of self-esteem and interdependent happiness predicting SWB among Japanese and American students



on happiness than IHS, the interdependent concept of happiness could also be an important concept for American students.

To further explore the incremental validity of IHS, we controlled for the effects of “positive relations with others” in the PWBS and two factors of the MWS. Controlling for these measures did not alter the pattern of results above (Japan: SES:  $\beta = .31, p < .001$ , IHS:  $\beta = .45, p < .001$ ; US: SES:  $\beta = .39, p < .001$ , IHS:  $\beta = .34, p < .001$ ), with added measures showing marginal to significant effects, namely positive relations with others (Japan:  $\beta = .04, p = ns$ , US:  $\beta = .12, p < 1$ ), Gratitude (Japan:  $\beta = .20, p < .001$ , US:

$\beta = .24, p < .01$ ), and peaceful disengagement (Japan:  $\beta = .06, p < 1$ , US:  $\beta = -.10, p = ns$ ). Total variance explained was  $R^2 = .70$  in Japan and  $R^2 = .75$  in the US

In summary, the results showed that IHS can be utilized with both Japanese and American participants and that its effect is larger than that of self-esteem on SWB among Japanese students.

## 4 Study 3

### 4.1 Cultural Comparison of the Interdependent Happiness Scale

In Study 3, we tested the hypotheses using data from two Western countries (the US and Germany), and two Eastern countries (Japan and Korea) and expected to find the effect of IHS on SWB to be stronger in more collectivist countries, while the opposing effect of self-esteem was expected to be stronger in more individualistic countries.

According to Kitayama et al. (2009), Germany lies in between the US and Japan in terms of dispositional bias in attribution (i.e., inclination to over attribute someone's behavior to his/her internal attributes), tendency to experience disengaging versus engaging emotions (i.e., experience "pride" more strongly than "respect"), tendency to experience personal versus social happiness (i.e., general happiness correlates more strongly with individual achievement than interpersonal harmony), and the size of symbolic self-inflation (i.e., drawing the size of "self" larger than related others). These culturally sensitive implicit measures of self-construal point to the coordinate of Germany (with an IDV score: national individualism orientation score of 67 by Hofstede 2001) lying in between the US (91) and Japan (46). Further, Korea has been measured as one of the most collectivist countries in the world (18), and the data show that the members of that country share an interdependent view of the self (Suh 2007). In addition to replication samples from both the US and Japan, we used samples from Germany and Korea to complete our study.

We modeled satisfaction with life as the explained variable, and gender, age, interdependent happiness and self-esteem as explanatory variables.

### 4.2 Method

#### 4.2.1 Participants and Procedures

One thousand and seventy-eight working adults from four countries participated in this study as part of a larger survey study by Koyasu et al. (2012). Specifically, 453 Japanese (266 male, 187 female, age  $M = 50.04, SD = 9.39$ , mean years of education = 14.82,  $SD = 2.59$ ), 199 Americans (105 male, 94 female, age  $M = 50.84, SD = 9.72$ , Caucasian: 77.4 %; European: 1.5 %; Latino: 4.5 %; Asian: 5.0 %; African: 9.1 %; Native: 0.5 %; Unknown or N/A: 2.0 %, mean years of education = 14.63,  $SD = 4.12$ ), 194 Germans (107 male, 87 female, age  $M = 48.54, SD = 8.36$  Caucasian: 53.1 %; European: 4.6 %; Asian: 0.5 %; Unknown or N/A: 36.3 %, mean years of education = 6.78,  $SD = 5.33$ ), and 231 Koreans (138 male, 93 female, age  $M = 47.4, SD = 7.88$ , mean years of education = 17.64,  $SD = 9.50$ ) adults were included in the analysis. There were no significant differences in gender between countries [ $\chi^2(3) = 3.17, p = ns$ ]. German participants reported fewer years in education than expected from their mandatory education system. The German sample should, therefore be interpreted with caution since the sample might have been biased towards the lower end of educational variability. The Japanese and American samples were older than their German and Korean

counterparts [ $F(3,1071) = 6.78, p < .001$ ]. Due to the categorical sampling described below, we divided age into distinct groups for descriptive analysis (Middle aged <50 years old, Elder >50 years old).

The survey was conducted as part of a joint program for comparing happiness across countries (Koyasu et al. 2012). Participants were recruited from the respondent pools of a private internet survey company in Japan and its collaborative companies in the other respective countries. Since we focused on non-student adults in each country, we used those participants who stated that they had either a full-time or part-time job during the survey. Analysis was therefore conducted on working adults of age 40–49 and 60 years old or older in each country.

#### 4.2.2 Measures

We used the three items of IHS that were used in Study 1 and Study 2 (“I make significant others happy”; “Although it is quite average, I live a stable life”; “I believe that my life is just as happy as that of others around me”), since we had to limit the number of items in this joint survey. The above three were chosen for their similar item properties across cultures, such as the ease of translation, size of factor loadings, and/or average ratings found in our preceding studies. IHS showed acceptable internal consistency across cultures while having only three items (Japan:  $\alpha = .78$ ; US:  $\alpha = .61$ ; Germany:  $\alpha = .60$ ; Korea:  $\alpha = .78$ ). Tucker’s congruence coefficient between cultures was  $\varphi = .98$  on average, ranging from .96 to 1.0, indicating factorial similarities.

Five items from the SWLS and ten items from Rosenberg’s SES were also included in the survey. Hence, the findings in Study 3 are restricted to the cognitive component of well-being. For other research purposes, the survey included additional scales or open-ended questions, intended to ask about happiness or emotions in daily life.

All items were translated into separate languages based on the Japanese version, which initially had its content validity and wording examined thoroughly by a group of professional psychologists who have extensive experience in cross-cultural survey research. Translations were conducted by native speakers of each target language who were also skilled in Japanese and had been working in the domain of psychology and/or education. The survey was conducted in 2010 and 2011; the data from Germany to Japan were collected during 2010, while those for the US and Korea were collected during 2011. All participants responded to the survey online.

### 4.3 Results and Discussion

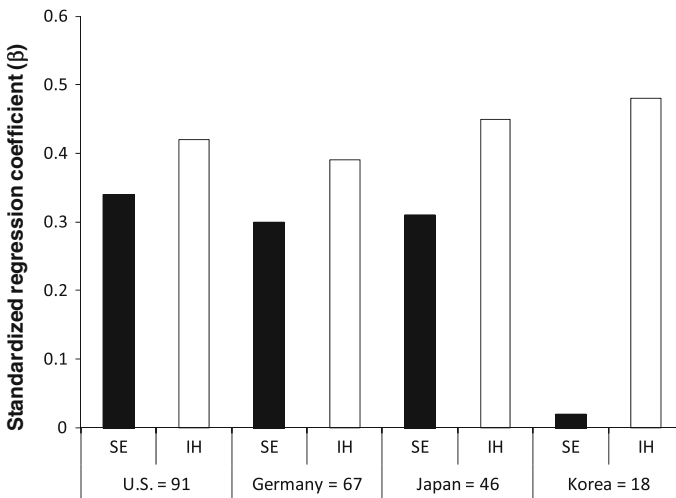
Descriptive statistics for each scale are presented in Table 4, with the data categorized by country, gender, and age groups.

We conducted a multiple regression analysis predicting SWLS from gender, age, IHS and self-esteem. As in Fig. 2, interdependent happiness had a significantly larger effect than self-esteem in all cultures ( $z > 3.73, p < .01$ ). Spearman’s correlation between Hofstede (2001)’s IDV score for each country and the unique effect of interdependent happiness was  $\rho = -.80$ , and that of self-esteem was  $\rho = .95$ , both in the expected directions. Even though there was a trend toward a larger relative effect of interdependent happiness in collectivist countries, differences of the effect of interdependent happiness between countries were not significant, while the difference of the effect of self-esteem was significant between the US and Korea ( $z = 3.82, p < .01$ ). These results partially support

**Table 4** Descriptive statistics of the SWLS, SES, and IHS in adults from four countries

Country	Gender	Age group	N	SWLS		SES		IHS	
				M	SD	M	SD	M	SD
US	Male	Middle aged	72	14.40	4.46	33.75	5.63	10.79	2.00
		Elder	33	14.82	4.53	35.30	5.94	10.85	1.79
	Female	Middle aged	65	15.97	3.91	36.92	6.14	11.37	1.57
		Elder	29	16.93	4.58	36.41	6.04	11.38	2.58
Germany	Male	Middle aged	83	15.35	4.20	38.22	6.66	10.58	1.83
		Elder	24	15.92	3.72	40.13	5.71	10.92	1.61
	Female	Middle aged	69	15.33	4.02	38.71	6.78	10.80	1.83
		Elder	18	16.06	4.08	41.50	4.96	11.00	1.91
Japan	Male	Middle aged	183	12.71	3.47	29.20	5.56	9.77	2.43
		Elder	83	13.25	3.78	30.71	5.51	10.27	1.98
	Female	Middle aged	138	13.00	3.49	29.49	5.95	9.86	2.28
		Elder	49	13.67	3.20	30.20	4.56	10.20	2.29
Korea	Male	Middle aged	112	13.58	2.49	32.04	4.95	10.60	2.04
		Elder	26	14.08	2.53	32.27	4.85	11.00	1.50
	Female	Middle aged	76	13.20	3.16	30.83	5.53	10.68	2.31
		Elder	17	15.47	2.90	29.65	3.84	10.24	1.68

Score range for each scale were, SWLS: 5–25; SES: 10–50; IHS: 3–15



**Fig. 2** Standardized regression coefficient of self-esteem (SE) and interdependent happiness (IH) predicting SWB among American, German, Japanese, and Korean adults. *Note* numbers adjacent to countries are the Individualism Score by Hofstede (2001)

our hypothesis. The variance explained by these models was  $R^2 = .43$  in the US,  $R^2 = .36$  in Germany,  $R^2 = .45$  in Japan, and  $R^2 = .25$  in Korea.

In contrast to Study 2, we found a stronger effect of IHS than self-esteem even among the members of the individualistic countries. Because of the shortened version of the scale, however, the results need to be understood as tentative.



In all measures including life satisfaction, IHS, and self-esteem, elders scored higher than the middle aged in every country, indicating cultural similarity in increased well-being among elders.

## 5 Study 4

### 5.1 Cross-Regional Comparison of the Interdependent Happiness Scale

In Study 4, we compared interdependent happiness and its correlates in Japanese adults who were from regions differ in levels of individualistic orientation (Kitayama et al. 2006a, b; Markus and Lachman 2002; Vandello and Cohen 1999). Hitokoto et al. (2010) showed how prefectures ( $N = 47$ ) in Japan vary along the individualism–collectivism (I–C) dimension.<sup>1</sup> This regional I–C continuum can serve as a meaningful dimension for demonstrating the effects of cultural practice on the relationships between interdependent happiness and life satisfaction, holding factors such as language, formal education, political administration and national geographic settings that are equally shared across the regional groups constant.

We assume, that the correlate of interdependent happiness is a synthesis of cultural task solution (Kitayama et al. 2009) and sensitivity to cultural learning (Cheung et al. 2011). Individuals being differentially accustomed to cultural tasks in the early stages of their life (Nisbett and Cohen 2003). This led us to hypothesize that there could be regional variation in the interdependent happiness—life satisfaction relationship within a nation.

Because we focused on the cultural practices of participants in early stage, we grouped them according to their local prefecture of origin within Japan (Cheung et al. 2011; Minoura 1990; Nisbett and Cohen 2003; Kitayama et al. 2006a, b). We asked participants to name the prefecture in which they spent the largest part of their life before the age of fifteen (Cheung et al. 2011; Minoura 1990). Using hierarchical linear modeling (HLM: van de Vijver et al. 2008), we expected to find the largest positive regression coefficient of IHS for SWB among Japanese from collectivist regions.

### 5.2 Method

#### 5.2.1 Participants and Procedures

Three thousand and fifty-eight Japanese adults participated in the survey. Participants were graduates of a private university in Hyogo prefecture, which according to the regional I–C, is

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<sup>1</sup> Hitokoto et al. (2009) defined Japanese regional I–C by factor analyzing prefecture-level variables ( $N = 47$ ) agreed on by professionals of cultural and cross-cultural psychology (Appendix 2). Variables included average number of family members, divorce rate, people working in tertiary industry, households living with elders, high school graduates choosing to work, two-income households. The regional difference was stable for a quarter century ( $r > .92$ ). Regional I–C correlated with prefectural domestic product, dominance of agriculture, average number of voluntary associations, friends, attitudes toward strangers, attendance at local events, general trust, opinions about one's work role, annual number of people moving in and out (Oishi and Kisling 2009), and reported social skills initiating new relationships in meaningful directions. Importantly, the regional I–C correlated with the regional variability in the regression coefficients of one's satisfaction with interpersonal relationship and life satisfaction, after controlling for the effect of self-esteem (Naoui et al. 2003). However, the result was provided by a small number of areas ( $N = 11$ ), with items measuring each construct being single items.

one of the most individualistic and urban prefectures in Japan.<sup>2</sup> We used stratified two-stage sampling to select 7,651 graduates representing every major and graduation year from the graduates' list and sent each survey to their latest annually updated residences. The mean age was 51.1 ( $SD = 17.68$ , range 23–97), and 30 % were female. Participants represented the student distribution of the majors in this university (school of theology: 0.4 %; literature: 19.8 %; sociology: 14.4 %; law: 19.6 %; economics: 20.7 %; commercial science: 19.6 %; engineering: 3.6 %; policy: 2.3 %). The occupation they had held for the longest time during their life varied (labor job: 0.5 %; skilled worker: 7.5 %; sales person: 9.6 %; security staff: 0.4 %; office worker: 13.3 %; management and administration: 19.8 %; self-employed worker: 6.7 %; free-lance profession: 2.2 %; farmer: 0.1 %; part-time worker: 5.0 %; student: 1.3 %; housewife: 6.6 %; not employed: 13.0 %; other: 3.7 %; N/A: 10.4 %). Those who had lived abroad were not included in the analysis. All participants were born in Japan. The response rate for the survey was 47.2 %, and we were able to retain 42 prefectures of origin in the response. Out of 42, eight prefectures were omitted due to a small number of participants ( $n < 3$ ), leaving 34 prefectures to be analyzed.

### 5.2.2 Measures

We used IHS, SWLS, and two items for measuring self-esteem (Fujishima et al. 2003; Tafarodi and Swann 1995). Because the survey was conducted as a part of a larger faculty development program containing scales for other research purposes, our number of scales was limited, hindering us from including the measurement of the affective component of SWB in this study. Hence, the findings in Study 4 are restricted to the cognitive component of well-being. Internal consistency of the scales was  $\alpha = .90$  for SWLS. Two items for self-esteem correlated  $r = .53$  ( $p < .001$ ) with each other.

We used HLM 6 to test our hypothesis (Raudenbush and Bryk 2002). At the individual level, we set the multiple regression model by administering SWLS as the dependent variable and gender, age, IHS and self-esteem as the explanatory variables. At the group level, we used the regional I–C calculated from the factor analysis of census archive variables (Hitokoto et al. 2009) as an adjusting variable to explain both the prefecture variation of the regression coefficients from IHS to SWLS, and from self-esteem to SWLS (Heine et al. 1999). The average regional variability was also hypothesized to be explained by the regional I–C, as individualism has been found to be related to the national average SWB in past studies (Diener and Suh 1999). Since the positive value of the regional I–C indicates the collectivism of the region, the regional I–C was expected to significantly predict the regional variability of the effects of IHS on SWLS in a positive direction ( $\gamma_{31}$ ), and regional variability of the effects of self-esteem on SWLS in a negative direction ( $\gamma_{41}$ ). The average difference of SWLS was expected to be predicted by regional I–C in a negative direction ( $\gamma_{01}$ ). Therefore, we used a random intercept and random slope model (Raudenbush and Bryk 2002). Our test model is statistically described as follows:

<sup>2</sup> This university consists of students from variable prefectures in Japan, but 68 % of our sample was originally from Hyogo prefecture and Osaka prefecture, another highly individualistic prefecture in Japan. Students were from families with relatively high social economic status, and the educational level of the university is high according to the public university rankings. Given these conditions, our sample was estimated to be quite an individualistic sample compared to the average Japanese population, and thus results are considered to be systematically biased towards the individualistic end of the regional variability. However, considering that such sampling would only negatively affect our hypotheses, and we cover rarely sampled regionally variable adult participants in measuring IHS, we consider it valuable as an empirical attempt to understand the whole picture in Japan.

Level-1 (individual level) Model; (1)

$$\text{SWLS} = \beta_0 + \beta_1(\text{gender}) + \beta_2(\text{age}) + \beta_3(\text{interdependent happiness}) \\ + \beta_4(\text{self-esteem}) + e$$

Level-2 (group level) Model; (2)

$$\beta_0 = \gamma_{00} + \gamma_{01}(\text{regional I-C}) + u_0$$

$$\beta_1 = \gamma_{10}$$

$$\beta_2 = \gamma_{20}$$

$$\beta_3 = \gamma_{30} + \gamma_{31}(\text{regional I-C}) + u_3$$

$$\beta_4 = \gamma_{40} + \gamma_{41}(\text{regional I-C}) + u_4$$

### 5.3 Results and Discussion

The internal consistency of the IHS was  $\alpha = .93$ , and a single factor structure was replicated [ $\chi^2(27) = 824.45$ ,  $GFI = .94$ ,  $AGFI = .90$ ,  $CFI = .95$ ,  $RMSEA = .10$ ]. Although we did not statistically compare for sample size difference, the average ratings of the IHS by adults were generally higher than both Japanese and American students (Table 1). We found a linear trend of the score towards the older age group ( $r = .15$ ,  $p < .001$ ). Several factors might play a role in this trend, such as life-long living in Japan that gradually nurtured peoples' skills to address the cultural task of interdependence, or the generational effect of this sample. However, this increase showed a plateau at around age 45–54. These age-related results are exploratory in nature and suggest a need for further future examination. Also, exploratory analyses showed that females scored higher than their male counterparts, which reflects the pattern of the student sample [ $t(3056) = 5.27$ ,  $p < .001$ ].

The results of the HLM are summarized in Table 5.<sup>3</sup> The hypothesized group effect ( $\gamma_{31}$ ) describing the regional I–C variability of the path coefficients of IHS on SWLS was significant, indicating that the effect of IHS was larger for those from collectivist prefectures than those from individualistic prefectures (also see Fig. 3). However, the hypothesized group effect ( $\gamma_{41}$ ) describing the regional I–C variability of the path coefficients of self-esteem on SWLS was not significant, even though the direction of the effect was as expected. The result can be interpreted in several ways, one of which would be the small number of items used to measure self-esteem and the resulting lack of reliability. Another explanation is the small simple correlation between self-esteem and life satisfaction (zero order correlation  $r = .30$ ,  $p < .001$ ) and the resulting lack of regional variability in the regression coefficient of self-esteem. Because our participants were graduates from one private university, the results should be understood as tentative findings that pertain to Japanese adults with high socioeconomic status. Sampling bias may exist; caution should be used when generalizing the results to other samples. Also, these results are based on the past choice of participants during their high school years regarding whether to come to this university located in an urban individualistic prefecture. This method could reveal some preference in the participants for an individualistic cultural environment. Since we didn't have another sample that had chosen a university

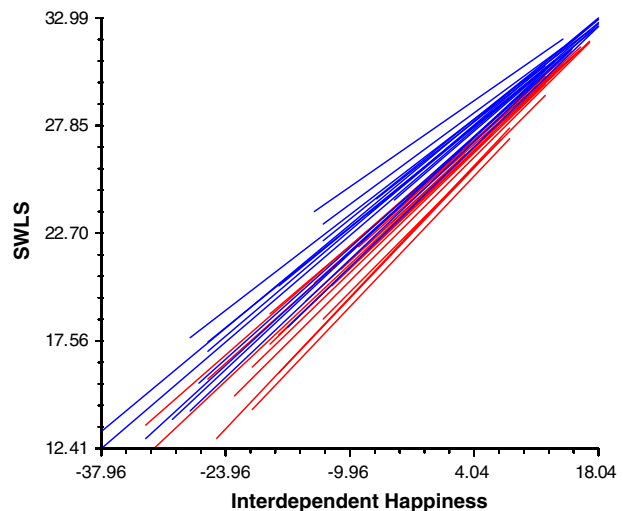
<sup>3</sup> Before conducting the HLM analysis, we tested for intra-class correlation between SWLS and prefecture (van de Vijver et al. 2008). SWLS was significantly explained by prefectures ( $r = .007$ ,  $p < .05$ ). The size of the intra-class correlation is considered small, and points out that the regional variability in average cognitive well-being is quite the same across prefectures in Japan. However, since our main purpose was to test whether the effect of IHS on SWLS differs according to regional I–C, we continued to analyze the hypothesized model.

**Table 5** Fixed effects of the hierarchical linear modeling

			$\beta$	<i>SE</i>	<i>t</i>	<i>P</i>
For	Intercept		$\beta_0$			
		$\gamma_{00}$	22.12	0.19	118.21	***
		$\gamma_{01}$	-0.41	0.18	-2.23	*
For	Gender		$\beta_1$			
		$\gamma_{10}$	-0.44	0.17	-2.56	**
For	Age		$\beta_2$			
		$\gamma_{20}$	-0.01	0.01	-1.13	
For	Interdependent happiness		$\beta_3$			
		$\gamma_{30}$	0.38	0.02	22.23	***
		$\gamma_{31}$	0.03	0.01	2.18	*
For	Self-esteem		$\beta_4$			
		$\gamma_{40}$	0.65	0.09	7.39	***
		$\gamma_{41}$	-0.06	0.06	-0.91	

\*\*\*  $p < .001$ ; \*\*  $p < .01$ ; \*  $p < .05$

**Fig. 3** Unique effects of interdependent happiness on SWLS adjusted by the regional variability of individualism–collectivism. Note blue regression lines are drawn to represent adults from below 50 % collectivistic (=individualistic) prefectures, and red regression lines are drawn to represent adults from above 50 % collectivistic prefectures. (Color figure online)



located in a more collectivist prefecture, we could not conclude which of these factors had affected our results. Although there is the potential for this sample bias, we had a fair amount of variation within our sample that allowed us to estimate the effect of the regional I-C.<sup>4</sup>

In summary, the current data suggests that the role of interdependent happiness in SWB can differ among Japanese adults, varying in terms of familiar cultural practices. Table 6 summarizes all the simple multiple regression effect sizes for gender, age, IHS and self-esteem reported in four studies. The HLM model in Study 4 is shown as a simple

<sup>4</sup> Removing those participants from two highly individualistic prefectures (i.e., Hyogo and Osaka) from the analysis did not alter the main finding. Therefore, variation of regional I-C at level 2 seemed to be related uniquely to the difference in the regression weight of IHS.

regression without group effect. Compared to other studies, the relative effect of IHS on life satisfaction was largest in Japanese adults in Study 3, which could be due to the highest reliability of the scale observed in Study 4 (Table 1).

## 6 General Discussion

This study contributes to past studies of culture and well-being in three specific ways. The first is the empirical extension of the concept of well-being to interdependent life goals that are predicated on harmony and group norms. Success in achieving such goals produces interdependent happiness. The second is the use of non-student samples to examine meaningful correlates of such happiness. The third is the use of cross-national and regional comparisons as a first step toward establishing validity of the IHS scale. This study connected these three goals through the measurement of interdependent happiness.

The results of this study have several implications. First is the finding that interdependent happiness is relevant to SWB not only in Japanese students but also in American students. The incremental validity of the IHS indicates that interdependent happiness can explain SWB more than positive self-regard, positive relations with others, and minimalist well-being. By applying an interdependent perspective on happiness, we were able to develop an overarching construct of collective happiness. The measure can be used to explore how individuals are able to deal with the interdependent relational domain in their lives, based not only on evaluations of their own living environment and well-being, but also from collective perspective on achievements, such as making others happy.

The second contribution is that this study showed that the construct of interdependent happiness can be meaningfully applied to both students and members of the general population. For example, IHS showed relatively high internal consistency among Japanese non-student adults, and they scored higher than Japanese student groups and American students. Since students are the majority of respondents in this area (Oyserman et al. 2002), research should include members of the general population from different countries to compare their results with current data, keeping in mind the potential influences of cultural change or age-related effects. Panel data from different cultures would be ideal.

Thirdly, we also demonstrated the relative contribution of interdependent happiness to self-esteem in countries other than Japan and the US by adding intermediately individualistic, as well as exceptionally collectivistic, cultural nations (Hofstede 2001). Additional studies involving more nations are needed to enrich our understanding of national-level cultural effects (Na et al. 2010).

Fourthly, by pointing out the regional differences of I-C, we utilized within-culture variation as a strategy to demonstrate how interdependent happiness is related to SWB. Existing literature on culture and happiness mainly focuses on cross-national differences (Diener and Diener 1995), yet this study demonstrated the possibility that we can narrow the focus to regions or other contexts that are closer to the individuals living in a culture. When conducting the HLM, the group-level effect became negligible after labeling participants with the regional I-C of their current residence coded from their mailing addresses. This may reflect the role of a developmentally sensitive window in the formation of interdependent happiness as an aspect of one's well-being (Cheung et al. 2011). Considering the fact that IHS had a positive correlation with age, it is possible that the extent to which IHS correlates with well-being is determined early in life. Nevertheless, Study 3 showed that relational components of SWB are important for Japanese non-student adults overall. Specifically, the regression weight predicting SWB from IHS at the individual level was four times larger than that of self-esteem. This result is consistent

**Table 6** Summary of simple effect sizes (standardized regression coefficients) from Study 1 through 4

Explained variable	Study 1		Study 2		Study 3		Study 4									
	Japan students n = 261	SWB	Japan students n = 287	SWB	US students n = 102	SWB	US adults n = 199	Life satisfaction	Germany adults n = 194	Life satisfaction	Japan adults n = 453	Life satisfaction	Korea adults n = 231	Life satisfaction	Japan adults n = 3,058	Life satisfaction
Gender	-.01		.02	.07	.07	.07	.07	.04	-.03		.04	.01	.01		-.03	
Age	-.06		-.01	-.17**	-.17**	.05	.05	.02	-.05		.02	.17**	.17**		-.02	
Interdependent happiness	.77***		.55***	.40***	.40***	.42***	.42***	.45***	.38***		.45***	.48***	.48***		.56***	
Self-esteem	-		.37***	.52***	.52***	.32***	.32***	.31***	.31***		.31***	.04	.04		.17***	

\*\*\*  $p < .001$ ; \*\*  $p < .01$

with past studies of East Asian SWB (Kwan et al. 1997; Uchida et al. 2008a, b), and we supported these findings by controlling for the effect of regional differences in Japan. The effect of regional variations in Japan was not so large as to allow for regions where Japanese adults' SWB was explained mainly by self-esteem (Kitayama et al. 2006a, b). Although our regional sample consisted of small numbers of participants in several regions, equal numbers of participants are needed to draw conclusions regarding true regional differences. Use of the census or some other large database of Japanese adults will help address this issue in future research.

Taken together, the findings from these four studies supported our general hypotheses and provided the first step toward measuring IHS across cultures and ages.

## 7 Limitations of this Study and Suggestions for Future Research

For future research, IHS should be tested with a broader sample of both non-students and students in different counties varying in their age and regional experiences. This type of sample would allow us to learn more about whether interdependent happiness plays a significant role in SWB. Methodologically, the validity of the construct should be further examined using different methods, as well as through using representative samples of various age groups.

While being unique and having choices is encouraged in cultures such as those of North America (Markus 2010), being ordinary may not be socially addressed. In fact, being 'ordinary' can possibly prevent an individual from being excluded (Takata 2005) and being deprived of social support (Jordan et al. 2003), resorting to violence (Baumeister et al. 1996), or simply from encountering interpersonal conflict, such as that caused by the envy of others (Smith 2008). Uniqueness can retain significance in individualistic cultural contexts, but throughout human history, social inclusion is likely to have been the primal capital for human survival (Denissenn et al. 2008). The cultural underpinnings of uniqueness and ordinariness thus deserve further focus, especially with regard to how deeply culture may affect social identity in individuals.

Researchers should also be more precise in locating the cultural dimensions that reliably alter the correlates of IHS. Whereas comparison of four countries (Study 3) did not alter the effect size of IHS significantly, the comparison of multiple regions (Study 4) did show a group effect. This result may indicate the need for more power at the group level. There were sizable sample differences, but we should examine what dimensions or individual factors might either enhance or decrease interdependent happiness.

In conclusion, IHS showed reliable as well as reasonable correlations at the level of individual, regional, and cultural groups, demonstrated additional explanation of SWB across East and West, provided culture and well-being studies with some encouraging steps to examine rich diversity within cultures, and showed how cultural context may make a difference to our happiness.

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## Appendix 1

See Table 7

**Table 7** Examples of scale items in Study 1 and Study 2

Study 1		Study 2	
Measures	Items	Measures	Items
Satisfaction with life	In most ways my life is close to my ideal I am satisfied with life. So far I have gotten the important things I want in life	Satisfaction with life	In most ways my life is close to my ideal I am satisfied with life So far I have gotten the important things I want in life
Positive and negative affect	Happy Calm Depressed Angry Bored	Positive and negative affect	Happy Calm Depressed Angry Bored
Friendship satisfaction	I feel that I am being accepted by my friends I and my friends understand each other's feelings very well I have someone who truly understands me	Minimalist well-being	I feel grateful that I am alive Nature can make me happy It feels great just to be alive I follow what I feel naturally It is comforting to take it easy.
Interpersonal hopelessness	There is no chance for my interpersonal relationship to get better in the future I don't have an interpersonal relationship I want now, and won't be able to have one in the future There is a little hope that I can have a meaningful relationship with others		It feels good to do nothing and relax People would describe me as a giving person, willing to share my times with others Maintaining close relationships has been difficult and frustrating for me
Independent and interdependent self-construal scale	I always try to have my own opinions I am comfortable with being singled out for praise or rewards	Self-esteem	I feel that I am a person of worth, at least on an equal plane with others



**Table 7** continued

Study 1		Study 2	
Measures	Items	Measures	Items
	<p>I think the best decisions are the ones I make by myself</p> <p>I am concerned about what people think of me</p> <p>In my own personal relationships I am concerned about the other person's status compared to me and the nature of our relationship</p> <p>It is important for me to maintain harmony within my group</p>		<p>I feel that I have a number of good qualities</p> <p>I certainly feel useless at times</p>

## Appendix 2

See Table 8.

**Table 8** Regional I–C and participant distribution in Study 3

Prefecture	Regional I–C <sup>a</sup>	<i>n</i>	%
Fukui	2.36	12	0.4
Toyama	1.85	8	0.3
Niigata	1.15	4	0.1
Nagano	0.76	35	1.1
Shimane	0.74	15	0.5
Tottori	0.68	15	0.5
Ishikawa	0.66	22	0.7
Saga	0.64	9	0.3
Shiga	0.57	31	1.0
Gifu	0.53	12	0.4
Tokushima	0.52	29	0.9
Kagawa	0.29	44	1.4
Okayama	0.19	73	2.3
Shizuoka	−0.08	14	0.4
Kumamoto	−0.10	8	0.3
Wakayama	−0.24	66	2.1
Ehime	−0.44	30	0.9
Hiroshima	−0.44	80	2.5
Saitama	−0.66	6	0.2
Oita	−0.68	9	0.3
Hokkaido	−0.73	6	0.2
Aichi	−0.77	64	2.0
Nagasaki	−0.77	6	0.2
Chiba	−0.80	12	0.4
Nara	−0.82	129	4.0
Kagoshima	−0.85	6	0.2
Yamaguchi	−0.85	30	0.9
Hyogo	−1.12	1153	36.2
Kochi	−1.17	17	0.5
Fukuoka	−1.30	47	1.5
Kyoto	−1.47	110	3.4
Kanagawa	−1.49	14	0.4
Osaka	−1.70	1028	32.2
Tokyo	−2.19	34	1.1

<sup>a</sup> Positive end indicates extreme collectivism, and negative end indicates extreme individualism of the region within Japan

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