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Effect of Changes in Living Conditions on Well-Being: A Prospective Top–Down Bottom–Up Model

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Abstract Using the German Socio-Economic Panel, we examined life-satisfaction and housing satisfaction before and after moving ($N = 3{,}658$ participants from 2,162 households) with univariate and bivariate two-intercept two-slope latent growth models. The main findings were (a) a strong and persistent increase in average levels of housing satisfaction, (b) no increase in average life-satisfaction, (c) low stability in individuals' level of housing satisfaction, and (d) high stability in individuals' level of life-satisfaction. The results are discussed in the context of top–down and bottom–up models as well as adaptation theories of well-being. We conclude that moving or living in a better home is unrelated to life-satisfaction judgments for two reasons. First, housing makes a small contribution to life-satisfaction judgments. Second, positive effects of better housing are undermined by the greater costs of living in a better home. The results provide no support for the prediction of adaptation theory that shifting aspirations undermine the benefits of living in a better home.

Keywords Well-being · Life-satisfaction · Housing satisfaction · Moving · Prospective study · Adaptation theory

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1 Introduction

Living in a beautiful big house is part of many people's dreams (Cantril 1965). Not surprisingly, citizens of affluent nations have used the increase in wealth over the past decades to buy bigger and better homes. According to standard economic theory, the increase in wealth and the quality of living conditions should produce an increase in well-being. The reason is that individuals are assumed to be rational agents who use their resources to optimize their individual levels of well-being (utility; Diener et al. 2009). However, subjective measures of well-being such as self-reported levels of life-satisfaction have remained constant or increased only slightly over the past decades (Diener and Oishi 2000; Hagerty and Veenhoven 2003; Oswald 1997). This dissociation between predictions by standard economic theory and empirical findings has been called the Easterlin Paradox based on a seminal article by Easterlin (1974) who first drew attention to this phenomenon.

Numerous explanations for the Easterlin paradox have been proposed. For example, individuals may not know what makes them happy (Wilson and Gilbert 2003). Accordingly, individuals may invest a large amount of their resources in their homes because they assume that a better home (e.g., bigger, more beautiful layout and design, better equipped with garden, balcony, etc.) will increase their well-being even though this is not the case. A related explanation is that people falsely assume that well-being increases when they fulfill their own desires, whereas—ironically—their well-being actually increases when they fulfill other people's desires (Dunn et al. 2008; Van Boven and Gilovich 2003). Another explanation has been that people's well-being is strongly influenced by internal, genetic dispositions (Lykken and Tellegen 1996). As a result, improvements in objective living conditions would have negligible effects on well-being. A related explanation is that improvements in objective living conditions produce only short-term increases in well-being, but that individuals quickly adapt to a higher standard of living (Diener et al. 2006). Whereas the aforementioned explanations assume that improved living conditions do not increase well-being, other explanations raise questions about the validity of life-satisfaction judgments as indicators of well-being. As a result, life-satisfaction judgments fail to show actual increases in well-being. For example, life-satisfaction judgments could be based on respondents' current mood or individuals may rely on temporarily accessible information that does not reflect their true level of well-being (Schwarz and Strack 1999). Until recently, it was difficult to test these competing theories because most studies relied on cross-sectional correlations between objective predictor variables and well-being measures (Diener et al. 1999). Another limitation of existing studies was the exclusive reliance on a single well-being measure, which makes it difficult to test competing theories against each other. A major novel contribution of this article was to include ratings of life-satisfaction and domain satisfaction as well-being indicators. As outlined below, the inclusion of a domain satisfaction measure allows us to derive and test competing predictions of different explanations for the Easterlin Paradox.

1.1 Theoretical Explanations

Adaptation theory is often used to explain the weak effects of living conditions on well-being (Brickman and Campbell 1971; Diener et al. 2006). Adaptation theory assumes that people's well-being changes when objective living conditions change, but that these changes are not lasting. After some time, individuals' well-being returns to a stable set-point. For example, adaptation theory predicts that individuals' well-being would increase after moving from a small one-bedroom apartment into a three-bedroom house with a

garden. However, after an adaptation period during which well-being decreases, the long-term level of well-being in the new three-bedroom house would be the same as the level of well-being of individuals who live in a one-bedroom apartment.

The main problem of Brickman and Campbell's (1971) adaptation theory is that it is not a well-organized theory. That is, the term adaptation is merely used to describe a pattern of empirical findings, namely a stable average level of well-being up to a specific event, an increase or decrease in this average immediately after the event (presumably caused by the event), and a gradual return to the initial average over the time following the event. Adaptation theory does not provide an explanation for this pattern of results. Specifically, it does not explain why lasting improvements in objective living conditions do not produce lasting increases in life-satisfaction judgments.

1.1.1 Hedonic Treadmill Theory

The most widely used theory to explain adaptation is hedonic treadmill theory (see Diener et al. 2006, for a review). Hedonic treadmill is a broad term for several theories, namely (a) habituation to repeatedly occurring events, (b) attention neglect of constant stimuli, and (c) sensitivity of the affect system to changes in one's environment while being insensitive to constant stimuli (Diener et al. 2006; Wilson and Gilbert 2008).

It is important to note that hedonic treadmill theory is foremost a theory of affect and not a theory of cognitive evaluations of one's life and life-satisfaction judgments. First of all, habituation may explain why the intensity of affective experiences decreases with repeated presentations of the same stimulus. However, pleasurable experiences (e.g., eating pizza, sex) remain pleasurable and unpleasant experiences (e.g., commuting, changing diapers) remain unpleasant (Kahneman and Krueger 2006), and some stimuli even become more pleasurable after repeated presentations. A more plausible explanation for hedonic adaptation effects is that affective experiences depend on the focus of attention (Schimmack 2001; Schimmack and Colcombe 2007; Wilson and Gilbert 2008). Novel stimuli are more likely to attract attention but with repeated presentations stimuli lose their novelty, attract less attention, and contribute less to individuals' overall hedonic balance. However, this process does not explain adaptation effects in life-satisfaction judgments because respondents are explicitly asked to reflect on important aspects in their lives, even if these are not constantly salient (e.g., health). For example, the widely used Satisfaction With Life Scale uses items such as "So far I have gotten the important things I want in life" and "the conditions of my life are excellent" (Diener et al. 1985). Even if people in favorable life circumstances fail to appreciate their fortune at every moment, they do think about them when answering these questions (Schimmack and Oishi 2005). For example, income tends to be a stronger predictor of life-satisfaction than of momentary affective experiences, presumably because life-satisfaction judgments make people more aware of their fortunate or unfortunate life circumstances (Kahneman et al. 2006).

The third process assumes that emotions react to changes in life circumstances, but are insensitive to stable environmental conditions. Accordingly, people in poverty can feel happy despite their dire life circumstances as long as their lives are getting better and wealthy individuals can feel unhappy when their life circumstances get worse even when there are wealthy (e.g., after a crash in the stock market). Even if this were true, it would not explain why cognitive evaluations of lives ("so far, I have gotten the important things I want in life") show adaptation effects. These judgments do not ask respondents to report whether life got better or worse; they ask whether life is good or bad (Cantril 1965).

In short, hedonic treadmill theory alone is unable to explain adaptation effects in life satisfaction judgments. Indeed, Diener et al. (2006) wondered whether "cognitive evaluations such as satisfaction adapt more slowly than moods and emotions? These are exciting unanswered questions about adaptation, questions that will need to be answered" (p. 312).

We propose that hedonic treadmill theory can explain adaptation effects in life-satisfaction judgments if it is combined with Schimmack et al.'s (2002a) theory of life-satisfaction judgments. Accordingly, people partially evaluate their lives on the basis of past affective experiences, especially in individualistic cultures (Schimmack et al. 2002b). However, life-satisfaction judgments are also influenced by cognitive evaluations of important life domains (Brief et al. 1993; Schimmack et al. 2002a; Schneider and Schimmack, in press). Thus, the extent of adaptation in life-satisfaction judgments depends on the relative weight of affective experiences and cognitive evaluations of a domain. Past research suggests that affect is a stronger predictor of life-satisfaction than individual life domains such as housing (Schimmack et al. 2002a).

In short, our extended hedonic treadmill theory makes the following predictions. Life-satisfaction and housing satisfaction judgments should increase after moving into a better home. Housing satisfaction judgments should show lasting increases because these judgments are based on cognitive evaluations of one's housing conditions. In contrast, life-satisfaction judgments should show adaptation effects because stable housing conditions have no influence on affective experiences and people rely on affective experiences to judge life-satisfaction.

1.1.2 Aspiration Spiral Theory

An alternative explanation for adaptation effects in life-satisfaction judgments is aspiration spiral theory (Diener et al. 2009; Dolan and White 2007; Stutzer 2004). Accordingly, people's aspirations change in response to changes in their life circumstances. For example, judgments of satisfactory or ideal income are strongly influenced by actual income (Stutzer 2004), so an individual earning $50,000 may consider $100,000 a satisfactory income. When the individual actually earns $100,000, he/she considers $150,000 a satisfactory income. As the discrepancy between actual and ideal is the same, subjective evaluations of actual income do not change despite the increase in actual income. The same process could also explain why moving in a better home could have no lasting effects on life-satisfaction judgments. In other words, life-satisfaction judgments would reflect what people do not have rather than what they actually have, and because people's aspirations are grounded in their actual life circumstances, life-satisfaction judgments are insensitive to actual differences in life circumstances. Aspiration spiral theory differs from hedonic treadmill theory because it assumes that cognitive evaluations change. As a result, even judgments of housing satisfaction should show adaptation effects because the ideal standard increases in lockstep with increases in actual living conditions. Therefore, domain satisfaction judgments are needed to distinguish hedonic treadmill theory and aspiration spiral theory. The two theories make similar predictions except for the long-term effects of moving on housing satisfaction. Hedonic treadmill theory predicts lasting increases in housing satisfaction, whereas aspiration spiral theory predicts adaptation effects in housing satisfaction.[1]

[1] We would like to point out that our aspiration spiral theory differs from Easterlin's (1974) assumption that rising aspirations explain why average life-satisfaction increased little over the past decades. Easterlin actually assumed that individuals' well-being increases with increasing wealth and improving living

1.1.3 Housing Costs Theory

Our final explanation for adaptation effects in life-satisfaction judgments is that improvements in housing are associated with costs (Stokols and Shumaker 1982). Few people are in the fortunate situation to choose between a life in a one-bedroom apartment and a four-bedroom house with a garden. The choice in favor of the better home implies sacrifices in other life domains. For example, affordable better homes may require more commuting, which increases stress and reduces leisure time (Diener et al. 2009). Also, buying a better home in a desirable location may create financial problems and decrease financial satisfaction. Another potential cost of moving could be negative effects on social relationships (Fried 1966; Oishi and Schimmack, in press). Brett (1982) found that employees who relocated more than once were less satisfied with social relationships than employees who did not relocate. Considering that the quality of social relationship contributes to well-being (Diener and Seligman 2002) and that moving is associated with lower levels of relationship satisfaction, moving could have a negative effect on global well-being.

According to classic economic theory, efficient housing markets should produce equilibrium between the benefits of moving into a better home and the costs of doing so. That is, when demand for better homes increases, prices also increase, and when demand for better homes decreases, prices for better homes decrease. The novel prediction of cost theory is that moving in a better home should produce lasting increase in housing satisfaction, while having no effect on overall life satisfaction. However, classic economic theory only assumes equilibrium at the level of markets or populations. At least within real markets, inefficiency is likely to create winners and losers at the individual level. That is, while benefits and costs cancel out at the population level, some individuals will have more benefits than costs and others will have more costs than benefits. Thus, at the individual level moving should produce changes in housing satisfaction that also produce changes in life-satisfaction. In sum, the novel prediction of cost theory is that moving does not even produce temporary increases in life-satisfaction judgments because the improvement in housing satisfaction is accompanied by costs in other life domains.

1.1.4 Top–Down Theory

Diener (1984) introduced the distinction between top–down and bottom–up theories of well-being. Bottom–up theories assume that life-circumstances influence well-being and well-being indicators such as life-satisfaction judgments. The previous theories assume at least a temporary bottom–up influence of housing on life-satisfaction. In contrast, top–down theory assumes no causal effect of housing on life-satisfaction. In addition, it assumes that well-being influences evaluations of specific life domains such as housing. Accordingly, housing satisfaction should be correlated with life-satisfaction because individuals who are generally satisfied are more satisfied with their housing independent of

Footnote 1 continued
conditions for explaining positive correlations between income and life-satisfaction. However, he assumed that affluent individuals raise the aspiration levels of other individuals and as a result undermine their well-being. Over time this leads to an increase in the aspiration level of the population that counteracts positive effects of actual improvements in living conditions at the population level. While both aspiration theories can explain the Easterlin Paradox, our theory can explain why individuals' well-being does not increase over time, whereas Easterlin's aspiration theory assumes that objective living conditions have lasting effects on individuals' well-being.

the actual housing conditions (Schimmack 2008; Schneider and Schimmack, in press). At the same time, housing satisfaction is also influenced by evaluations of the actual housing conditions, just as health satisfaction is influenced by objective health status (Brief et al. 1993). At the population level (i.e., average level), top–down theory makes the same predictions as cost theory, namely moving into a better home leads to lasting increases in housing satisfaction and has no effect on life-satisfaction. However, at the individual level the two theories make different predictions. Cost theory assumes that changes in housing satisfaction (some individuals increase more than others) predict changes in life-satisfaction. In contrast, top–down theory predicts that changes in housing satisfaction have no influence on life-satisfaction because life-satisfaction is not influenced by housing satisfaction.

1.2 Prior Evidence

Our study is the first study to test the competing predictions of the reviewed theories in a large, prospective study with a statistical model that examines the effects of moving both at the population level and at the individual level. Nevertheless, prior studies provide some valuable information that helped us to make some a priori predictions. First, numerous studies have reported positive correlations between housing satisfaction and life-satisfaction (e.g., Campbell 1980; Schimmack and Oishi 2005). This finding merely shows that it is meaningful to examine the causal processes underlying this correlation. However, this cross-sectional correlation is unable to elucidate these causal processes.

Regression analyses can be used to distinguish top–down and bottom–up effects because a significant unique contribution of housing satisfaction is more likely to reflect a bottom–up effect. Several studies found that housing satisfaction remained a unique predictor of life-satisfaction, but the relation was weaker than the simple correlation (e.g., Andrews and Withey 1976; Campbell et al. 1976; Peck and Stewart 1985). This finding suggests that top–down and bottom–up effects contribute to the correlation between life-satisfaction and housing satisfaction (Schimmack 2008).

Previous studies also showed that objective housing characteristics predict housing satisfaction (e.g., Campbell et al. 1976; Galster 1987; Galster and Hesser 1981; Peck and Stewart 1985). Campbell et al. (1976) revealed that objective housing characteristics explained 12% of the variance in housing satisfaction, and that rooms per person was the strongest predictor. These findings suggest that judgments of housing satisfaction reflect the objective living conditions, which is inconsistent with aspiration spiral theory.

A few studies have examined the relation between objective living conditions and global well-being measures. In general, these studies report weak positive relations (e.g., Evans et al. 2000; Gove et al. 1979; Inman and Sinn 1987; see Evans et al. 2003 for a review). A recent study analyzed data from the British Household Panel Survey and found that changes (decreased/increased) in housing conditions (e.g., lack of adequate heating facilities; leaky roof; damp walls, floors, foundation etc.) and neighborhood characteristics (e.g., noise from neighbors; vandalism or crime in the area) predicted changes in mental and physical health (Pevalin et al. 2008). These findings further confirm bottom–up effects of objective housing characteristics on life-satisfaction. Once more this finding is inconsistent with aspiration spiral theory.

In sum, prior studies favor a model with top–down and bottom–up effects. In addition, the existing data provide little evidence for an aspiration spiral in housing satisfaction. Thus, we favor a hybrid top–down–bottom–up model that either allows for temporary changes in average levels of life-satisfaction (hedonic treadmill) or no changes in average

levels of life-satisfaction (cost theory). Our empirical study relied on movers in the German Socio-Economic Panel. The dependent variables were ratings of housing satisfaction and life-satisfaction. To examine average trends and variation in these trends at the individual level we used two-intercept two-slope latent growth modeling (Bollen and Curran 2006; Duncan et al. 2006). We first examined each dependent variable individually and then tested a model with both variables to test top–down and bottom–up theories.

Prior studies often used multi-level modeling to test adaptation theory (e.g., Lucas 2005; Lucas et al. 2003). These methods are similar, but growth modeling has several advantages for the purpose of our study. Most important, multi-level modeling assumes that one variable is the dependent variable. In contrast, a hybrid top–down–bottom–up model assumes that a variable is both independent and dependent. Our model also differed from previous models in that we included two intercepts whereas prior models often used a single intercept. A single intercept model is unable to distinguish short-term and long-term effects of moving. In contrast, our model used a slope to model short-term effects and a second intercept to model long-term effects. Further, our model also allows for estimating the stability and change of satisfaction judgments before and after a life event in both average and individual levels. The covariation between the variances of two intercepts reveals stability and change in the rank order of satisfaction judgments. In the previous research, only average trajectories of satisfaction judgments have been estimated. Therefore, we for the first time examined whether individuals' satisfaction judgments in years after events are related to their baseline levels at the same time of examining the average trends. Finally, multi-level models allow for variation across individuals, but they do not allow researchers to use this variation in tests of causal models. In contrast, we used latent factors to model variation across individuals and to test causal relationships between these latent variables.

Our statistical approach is also similar to previous attempts to test top–down and bottom–up effects using longitudinal data (Headey et al. 1991). The main advantage of our study is that we used moving as an objective event that was likely to produce changes in domain satisfaction. The problem of studies that merely follow individuals over time is that most people's lives do not change much from year to year, which makes it difficult to find bottom–up effects (Schimmack et al. 2010). In sum, our study is the first study that tests competing theories of adaptation effects on well-being measures, specifically life-satisfaction judgments. Our novel statistical approach allows us to simultaneously examine effects at the average level and at the individual level and to test bottom–up and top–down effects.

2 Method

2.1 Data Set

Our analysis is based on the German Socio Economic Panel (SOEP) survey that has been conducted annually since 1984 (Frick 2006; Wagner et al. 2007). In SOEP, the data have been collected from nationally representative households. Each year of the SOEP consists of household and individual questionnaires. Only the head of each household responds to the household questionnaire, and every member of the household responds to the individual questionnaire. Detailed information can be obtained from the DIW website (SOEP info[2]). The data used in this paper was extracted using the Add-On

[2] http://panel.gsoep.de/soepinfo2008/.

package PanelWhiz for Stata®. PanelWhiz (http://www.PanelWhiz.eu) was written by Dr. John P. Haisken-DeNew (john@PanelWhiz.eu). See Haisken-DeNew and Hahn (2006) for details. The PanelWhiz generated DO file to retrieve the data used here is available from the first author upon request. Any data or computational errors in this paper are our own.

For the current study, we used data regarding participants who moved into a new house only once in the waves from 1991 to 2007 for house-related reasons (e.g., too small; high housing cost; poor location). We excluded participants who moved for other reasons than house-related reasons (e.g., family-related reasons; job-related reasons) to make sure that our analyses would test the effect of an improvement in housing on well-being. We also excluded participants who (a) moved into a house whose size is less than thirty square meters and group houses (e.g., student dormitory; residence for employees; housing for the elderly), (b) moved out of a household during the years used for our study (e.g., went away for college, divorce), and (c) were more than 70 years old at the time of the move. We excluded these cases for increasing generality of research findings, but the number of excluded participants was small and exclusion of these participants did not affect the pattern of our results. The final sample consisted of 2,162 households and 3,658 participants. 1,799 were male (49.2%) and 1,859 were female (50.8%). The average age in the year of moving was 39.46 (Range = 17–70; SD = 12.54). The types of houses that participants moved into were (a) detached or semi-detached homes ($N = 1{,}814$), (b) apartment complexes with 3–8 flats ($N = 1{,}191$), (c) apartment buildings with 9 or more flats ($N = 557$), and (d) others or no response ($N = 96$). Participants self-reported how their new houses changed from their previous ones in seven areas, using *better*, *about the same*, and *worse*. We allocated 3–1 to those responses. Movers generally reported that their new houses became better except financial aspect (financial aspect: $M = 1.74$, SD = 0.81; size of the house: $M = 2.68$, SD = 0.62; design and equipment: $M = 2.70$, SD = 0.52; conditions around the house: $M = 2.55$, SD = 0.59; neighborhood: $M = 2.46$, SD = 0.63; access to public transportation: $M = 2.08$, SD = 0.63; relations to neighbors: $M = 2.17$, SD = 0.57).

2.2 Procedure and Measures

Participants are interviewed annually. Participants rate their satisfaction with various life domains at the beginning of the survey and life-satisfaction at the end of the survey, using the same 11-point rating scales ranging from 0 (*totally dissatisfied*) to 10 (*totally satisfied*). Responses to these items show satisfactory reliabilities for single-item indicators of about .6 (Schimmack et al. 2010). For this study, we used the ratings of housing satisfaction and life-satisfaction. The SOEP surveys did not include items measuring positive affect until 2007.

2.3 Data Analysis

To analyze the data, we used growth modeling (see Bollen and Curran 2006; Duncan et al. 2006 for more detail). The advantages of this method is that it is possible to model trajectories of average changes in outcome variables over time and to include participants with missing values on some occasions. Another advantage is the ability to study individual differences in the effects of moving on well-being. To examine stability and change of individual differences in well-being, we used a two-intercept two-slope model (Fig. 1; Duncan et al. 2006). Our two-intercept two-slope model estimated separate intercepts

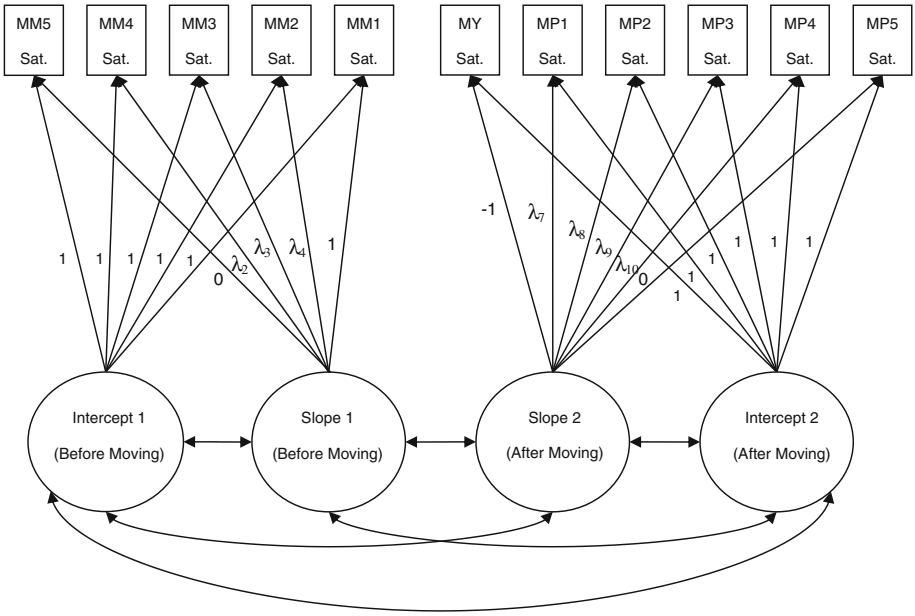

Fig. 1 A two-intercept two-slope latent growth curve model. MY means the moving year. MM1 to MM5 indicate moving year minus 1–5, respectively. MP1 to MP5 illustrate moving year plus 1–5, respectively. "Sat." shows satisfaction. λ_2 to λ_4 of factor loadings on the slope factor before moving and λ_7 to λ_{10} of factor loadings on the slope factor after moving illustrate the values of identifying passage of time

before moving and after moving. The covariation between the variances of these two parameters reveals stability and change in the rank order of satisfaction judgments.

Our model was limited to the period ranging from 5 years before moving to 5 years after moving because there were too few participants who provided data for longer time periods to obtain stable parameter estimates.

We used free loadings for the slopes before and after moving because we had no a priori predictions about the function of these slopes, and because we were primarily interested in the intercepts of the model that reveal long-term effects and stable individual differences in satisfaction before and after moving. Our model included a slope before moving to allow for the possibility that satisfaction decreases over time before people move because preferences change or a house loses its value. Moreover, decreasing housing satisfaction might be a reason to initiate moving (Morris and Winter 1975). We included a slope after moving to allow for satisfaction to decrease after a move due to shifting aspirations or other processes. We chose the first year (i.e., 5 years before moving) to estimate the intercept before moving. Accordingly, we fixed the factor loading of that first year on the slope before moving to zero. We chose the last year (i.e., 5 years after moving) to estimate the intercept after moving. Accordingly, we fixed the factor loading of the last year on the slope factor after moving to zero. As a result, the difference between the two intercepts reflects the long-term effects of moving independently of the short-term changes in the year right before and after moving. Further, we set the factor loadings of the year before moving to 1 and of the moving year to -1 because we used freed loading approach. Other factor loadings on the slope factor before moving (λ_2 to λ_4 in Fig. 1) are estimated between 0 and 1, and other factor loadings on the slope factor after moving (λ_7 to λ_{10} in Fig. 1) are

estimated between 0 and -1 based on the actual data. Accordingly, the values of slope factors represent the maximum change during the period, and estimated factor loadings reflect the proportion of the maximum change.

We used Mplus 5 (Muthén and Muthén 2007) for our analyses. We first examined housing satisfaction and life-satisfaction separately and then tested a model with both variables to examine top–down and bottom–up theories. Mplus automatically excluded cases with too many missing values from those analyses. To take the multi-level structure of the data (participants nested in households) into account, we used the cluster command in Mplus. As a result, standard errors are adjusted according to the dependency in ratings of respondents from the same household.

3 Results

3.1 Latent Growth Curve Model of Housing Satisfaction

We first tested the change and stability of housing satisfaction, using Mplus (see Fig. 1 for the model). Model fit was evaluated using standard criteria of model fit (Schermelleh-Engel et al. 2003). Criteria for acceptable fit are a Comparative Fit Index (CFI) greater than .95, a Root Mean Square Error of Approximation (RMSEA) smaller than .06, and a Standard Root Mean Residual (SRMR) smaller than .08. For our analysis of housing satisfaction, the model fit indexes showed good fit, χ^2 (45, N = 3,609) = 77.54, $p < .002$; CFI = .994; RMSEA = .014; SRMR = .026. The parameter estimates are shown in Table 1. The average trajectory is shown in Fig. 2.

Housing satisfaction decreases significantly in the years before moving (slope 1: $M = -1.03$; Confidence Interval: CI = −1.20|−0.87, please see the mean value of slope 1 and slope 1 factor loadings in Table 1). Housing satisfaction increased immediately after moving (MM1 in Fig. 2 [i.e., 1 year before moving]: $M = 5.84$; MY in Fig. 2 [i.e., moving year]: $M = 8.40$). Housing satisfaction decreased again in the years after moving (slope 2: $M = -0.61$; CI = −0.74|−0.48). Nevertheless, the intercept after moving (i.e., housing satisfaction status in the year 5 years after moving) was significantly higher than the intercept before moving (i.e., housing satisfaction status in the year 5 years before moving). The increase had a moderate to large effect size, before $M = 6.87$; CI = 6.72|7.03, after $M = 7.79$; CI = 7.65|7.92; effect size $d = .57$. Together, these two findings show that moving increases housing satisfaction and that some of this increase is lasting.

Table 1 also reports the latent correlation between intercept 1 and intercept 2. This correlation was relatively small ($r = .25$; CI = .16|.35), indicating that moving produces lasting changes in the rank order of individuals' housing satisfaction. Table 1 reports all other parameters of the model that are not central to our hypotheses. The correlations between intercepts and slopes have to be interpreted with caution because floor and ceiling effects in ratings contribute to these correlations.

3.2 Latent Growth Curve Model of Life-Satisfaction

The next analysis examined the change and stability of life-satisfaction. The model fit was acceptable, χ^2 (45, N = 3,612) = 71.95, $p < .01$; CFI = .995; RMSEA = .013; SRMR = .025. The parameter estimates are shown in Table 2. The average trajectory shows that moving did not produce lasting increases in life-satisfaction (Fig. 3).

Table 1 Estimates and 99% confidence intervals of the latent growth curve model of housing satisfaction

Parameter estimate	Estimate (99% CI)	Variance (99% CI)
5-year-before moving status (intercept 1)	6.87 (6.72|7.03)	3.01 (2.64|3.39)
5-year-after moving status (intercept 2)	7.79 (7.65|7.92)	2.25 (1.89|2.62)
Mean difference between intercept 1 and 2	0.91 (0.72|1.11)	
Slope before moving (slope 1)	−1.03 (−1.20|−0.87)	2.37 (1.43|3.32)
Slope after moving (slope 2)	−0.61 (−0.74|−0.48)	0.85 (0.33|1.37)
Slope parameters before moving		
MM5 (λ_1)	0	
MM4 (λ_2)	0.02	
MM3 (λ_3)	0.20	
MM2 (λ_4)	0.47	
MM1 (λ_5)	1	
Slope parameters after moving		
MY (λ_6)	−1	
MP1 (λ_7)	−0.58	
MP2 (λ_8)	−0.44	
MP3 (λ_9)	−0.20	
MP4 (λ_{10})	−0.09	
MP5 (λ_{11})	0	
Correlations		
Intercept 1 and Intercept 2	.25 (.16|.35)	
Slope 1 and Slope 2	.31 (.08|.53)	
Intercept 1 and Slope 1	−.18 (−.30|−.06)	
Intercept 2 and Slope 2	.55 (.42|.69)	
Intercept 1 and Slope 2	.04 (−.12|.21, *n.s.*)	
Intercept 2 and Slope 1	.15 (.02|.28)	

MY shows the moving year. MM1 to MM5 indicate moving year minus 1–5, respectively. MP1 to MP5 illustrate moving year plus 1–5, respectively. λ_1 to λ_5 of factor loadings on the slope factor before moving and λ_6 to λ_{11} of factor loadings on the slope factor after moving illustrate the values of identifying passage of time

Life-satisfaction decreased significantly in the years before moving, but the decrease was small (slope before moving: $M = -0.11$; CI $= -0.23|0.00$). To test the short-term effect of moving, we compared life-satisfaction in the year before moving to the year of the move. Life-satisfaction increased somewhat in the year of the move (MM1 in Fig. 3 [i.e., 1 year before moving]: $M = 6.95$; MY in Fig. 3 [i.e., moving year]: $M = 7.09$), but the effect was small. Life-satisfaction decreased again in the years after moving (slope after moving: $M = -0.27$; CI $= -0.39|-0.15$). To test the long-term effect of moving, we compared the intercepts before and after moving. The intercept after moving (i.e., life-satisfaction status in the year 5 years after moving) was *lower* than the intercept before moving (i.e., life-satisfaction status in the year 5 years before moving). The effect size of this difference was small, before $M = 7.06$; CI $= 6.96|7.16$, after $M = 6.82$; CI $= 6.71|6.94$, effect size $d = .18$. This finding indicates that moving does not produce lasting changes in average levels of life-satisfaction.

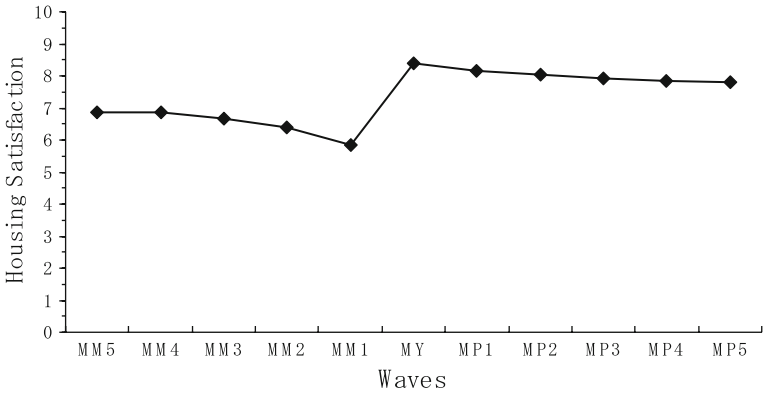

Fig. 2 Predicted average trajectory of housing satisfaction from the year 5 years before moving to the year 5 years after moving. MY means the moving year. MM1 to MM5 indicate moving year minus 1–5, respectively. MP1 to MP5 illustrate moving year plus 1–5, respectively

Table 2 provides information about all parameters of the model. The latent correlation between intercept 1 and intercept 2 was relatively large ($r = .62$; CI = .51l.73), indicating that moving does not produce lasting changes in the rank order of individuals' life-satisfaction. Once again, correlations between slopes and intercepts have to be interpreted with caution due to floor and ceiling effects of satisfaction ratings.

3.3 Combination Model of Housing Satisfaction and Life-Satisfaction

Finally, we tested models with both housing satisfaction and life-satisfaction variables to examine whether top–down and bottom–up effects explain the relationship between them. We combined the two latent growth models for housing satisfaction and life-satisfaction to examine how individual differences in the intercepts of housing satisfaction and life-satisfaction before and after moving are related to each other. The first model allowed the four intercepts to correlate freely with each other. This model had acceptable model fit, χ^2 (195, $N = 3{,}612$) = 472.97, $p = .0000$; CFI = .979; RMSEA = .020; SRMR = .025; BIC = 185,677.149. Table 3 shows the correlations among intercepts.

Next we fitted a bottom–up model, a top–down model, and a hybrid top–down–bottom–up model to the data. The bottom–up model assumed causal effects of housing satisfaction before moving on life-satisfaction before moving as well as housing satisfaction after moving on life-satisfaction after moving. The top–down model reversed these causal paths, and the hybrid model allowed for causal paths in both directions. All models estimated stability of housing satisfaction by regressing housing satisfaction after moving on housing satisfaction before moving because moving produced real changes in the rank order of housing satisfaction. We modeled stability of life-satisfaction with a trait model because moving should not influence people's general disposition to be more or less satisfied and any changes in life-satisfaction should be mediated by changes in housing satisfaction.

We used Bayesian Information Criterion (BIC) as well as other model fit indexes to compare the fit of a bottom–up model, a top–down model, and a top–down–bottom–up model. Models with lower BIC values have relatively better fit (Bollen and Curran 2006). Given the small number of correlations, we also compared the original correlations and the model implied correlations to select the best-fitting model. The hybrid model had the best fit,

Table 2 Estimates and 99% confidence intervals of the latent growth curve model of life-satisfaction

Parameter estimate	Estimate (99% CI)	Variance (99% CI)
5-year-before moving status (intercept 1)	7.06 (6.96|7.16)	1.66 (1.37|1.94)
5-year-after moving status (intercept 2)	6.82 (6.71|6.94)	1.77 (1.48|2.07)
Mean difference between intercept 1 and 2	−0.23 (−0.36|−0.10)	
Slope before moving (slope 1)	−0.11 (−0.23|0.00)	1.36 (0.77|1.94)
Slope after moving (slope 2)	−0.27 (−0.39|−0.15)	1.04 (0.56|1.52)
Slope parameters before moving		
MM5 (λ_1)	0	
MM4 (λ_2)	0.14	
MM3 (λ_3)	0.41	
MM2 (λ_4)	0.61	
MM1 (λ_5)	1	
Slope parameters after moving		
MY (λ_6)	−1	
MP1 (λ_7)	−0.58	
MP2 (λ_8)	−0.32	
MP3 (λ_9)	−0.12	
MP4 (λ_{10})	0.03	
MP5 (λ_{11})	0	
Correlations		
Intercept 1 and Intercept 2	.62 (.51|.73)	
Slope 1 and Slope 2	−.21 (−.46|.05, *n.s.*)	
Intercept 1 and Slope 1	−.29 (−.46|−.13)	
Intercept 2 and Slope 2	.37 (.19|.54)	
Intercept 1 and Slope 2	.03 (−.13|.18, *n.s.*)	
Intercept 2 and Slope 1	.21 (.04|.38)	

MY shows the moving year. MM1 to MM5 indicate moving year minus 1–5, respectively. MP1 to MP5 illustrate moving year plus 1–5, respectively. λ_1 to λ_5 of factor loadings on the slope factor before moving and λ_6 to λ_{11} of factor loadings on the slope factor after moving illustrate the values of identifying passage of time

χ^2 (197, N = 3,612) = 473.25, p = .0000; CFI = .979; RMSEA = .020; SRMR = .025; BIC = 185,662.146. The bottom–up model and the top–down model had a similar fit: the bottom–up model, χ^2 (198, N = 3,612) = 497.17, p = .0000; CFI = .977; RMSEA = .020; SRMR = .033; BIC = 185,690.655, top–down model fit, χ^2 (198, N = 3,612) = 499.94, p = .0000; CFI = .977; RMSEA = .021; SRMR = .030; BIC = 185,689.856. Further, the hybrid model fitted the data better than the model with unconstrained correlations, and it reproduced the observed correlations very well. The reason for the better fit of the hybrid model is that the bottom–up model underestimates the cross-lagged correlations of housing satisfaction and life-satisfaction across time, whereas the top–down model overestimates these correlations (actual life-satisfaction before-housing satisfaction after r = .28; housing satisfaction before-life-satisfaction after r = .24; bottom–up: reproduced r = .17, .15; top–down: reproduced r = .36, .29; hybrid: reproduced r = .31, .22). Thus, bottom–up and top–down effects are needed for optimal prediction of these correlations. Model parameters indicated significant top–down effects (standardized

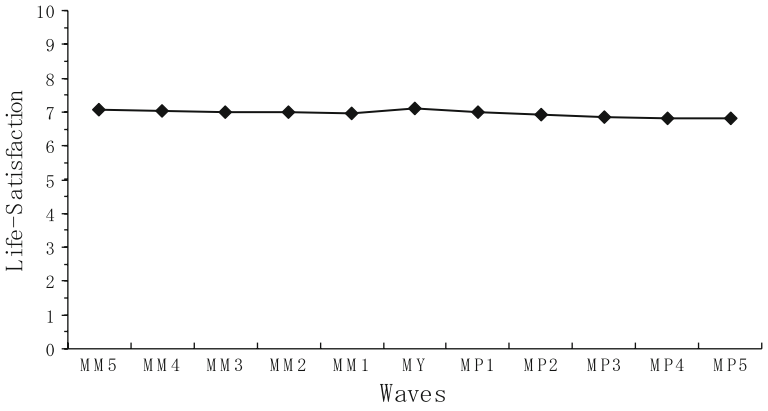

Fig. 3 Predicted average trajectory of life-satisfaction from the year 5 years before moving to the year 5 years after moving. MY means the moving year. MM1 to MM5 indicate moving year minus 1–5, respectively. MP1 to MP5 illustrate moving year plus 1–5, respectively

Table 3 Correlations among intercepts of the combination model of housing satisfaction and life-satisfaction

	I 1	I 2	I 3
Housing intercept before moving (I 1)	–		
Housing intercept after moving (I 2)	.25 (.15l.34)	–	
Life intercept before moving (I 3)	.57 (.49l.65)	.28 (.17l.40)	–
Life intercept after moving (I 4)	.24 (.14l.34)	.60 (.53l.67)	.62 (.51l.73)

Coefficients in parentheses show 99% confidence intervals. Housing intercept and life intercept indicate intercept of housing satisfaction and intercept of life-satisfaction, respectively. I 1 to I 4 illustrate intercept 1 to intercept 4, respectively

coefficient before = .27, after = .33) and bottom–up effects (standardized coefficients before = .36, after = .29) as shown in Fig. 4. This finding shows that top–down effects explain the relationship between housing satisfaction and life-satisfaction, producing stability in housing satisfaction even when people move. This finding also indicates that bottom–up effects explain the relationship, producing statistically significant changes in the rank order of life-satisfaction.

The unstandardized bottom–up effect after moving was 0.27, suggesting that a 1-point increase in housing satisfaction produces a 0.27 point increase in the 11-point scale life-satisfaction score. This weak effect partially explains why moving had a noticeable effect on average housing satisfaction without noticeable influence on average life-satisfaction. Accordingly, the observed increase by 0.91 points in housing satisfaction implies only an increase by 0.25 points (0.91 × 0.27) in life-satisfaction. Nevertheless, the model implies that life-satisfaction should have increased slightly, whereas the actual data showed a slight decrease by 0.23 points. Some other factor has to explain this discrepancy of nearly 0.5 points. It is possible that costs associated with a move account for this discrepancy. In additional analyses, we examined trajectories of household income satisfaction, satisfaction with standard of living, leisure satisfaction, and health satisfaction before and after moving as a potential cost factor, but average levels of satisfaction in these domains did not decrease after moving.

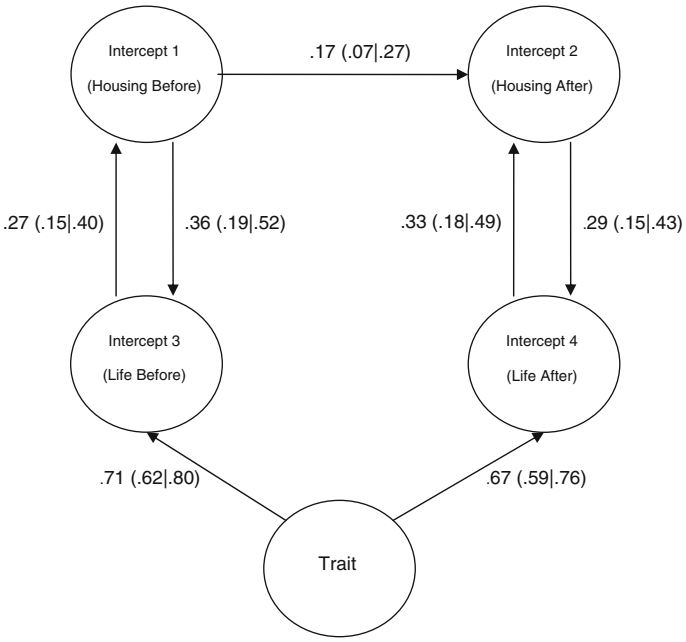

Fig. 4 Hybrid top–down bottom–up model of the correlations among the intercepts of housing satisfaction and life-satisfaction before and after moving. Coefficients in parentheses show 99% confidence intervals. Housing before, housing after, life before, and life after illustrate intercept of housing satisfaction before moving, intercept of housing satisfaction after moving, intercept of life-satisfaction before moving, and intercept of life-satisfaction after moving

4 Discussion

The purpose of this study was to examine the effects of moving on well-being. On average, houses have become bigger and better, but average life-satisfaction ratings have not increased in the past decades. We tested four possible theories to explain this finding: hedonic treadmill theory, aspiration spiral theory, housing costs theory, and top–down theory. Our results are inconsistent with hedonic treadmill theory. According to the hedonic treadmill theory, moving into a better home should produce the short-term increases in life-satisfaction as well as the long-term increases in housing satisfaction. However, we found that life-satisfaction did not increase after moving. Thus, we see no evidence for adaptation effects in life-satisfaction judgments although we do not exclude the possibility that adaptation occurred within the period from moving date to the next survey date. The results are also inconsistent with aspiration spiral theory as prior studies suggested. Contrary to its predictions, we found substantial and lasting increases in housing satisfaction. There was no evidence that people become dissatisfied with their new houses after some time for the reason that they shift their standards for evaluating their homes.

Our results were most consistent with the remaining theories, top–down theory and housing costs theory. We found evidence for top–down effects of life-satisfaction on housing satisfaction. To the extent that correlations between life-satisfaction and housing satisfaction reflect the effects of stable dispositions rather than effects of living circumstances, improvements in living conditions have no effect on life-satisfaction. However, we also found evidence for bottom–up effects in analyses of individual differences. That is,

some individuals who moved actually increased in life-satisfaction as a result of increased housing satisfaction.

Given the average increase in housing satisfaction, this bottom–up effect should have produced a slight increase in life-satisfaction. In contrast, we observed a slight decrease in life-satisfaction. Housing costs theory provides a plausible explanation for this gap. The nature of these costs remains unclear. In additional analyses, we examined satisfaction with household income and other domains as a potential cost factor. However, satisfaction in these domains did not decrease after moving, suggesting that other costs account for the lack of an average increase in life-satisfaction. Identifying the nature of these costs is an important avenue for future research.

In sum, the correlation between housing satisfaction and life-satisfaction was revealed to be explained by both top–down and bottom–up effects as we predicted earlier, and we conclude that no moving effect on population level's life-satisfaction is not due to adaptation effects but hidden housing costs.

4.1 Implications

The Easterlin Paradox suggests that money and the things that money can buy do not contribute to well-being. In addition, psychologists have often argued that objective life circumstances make only a small contribution to well-being. Consistent with these views, we also found no reliable increase in life-satisfaction after people move into better homes. However, the most common explanation for these findings is inconsistent with our findings. A common assumption is that people simply adapt or habituate to new life circumstances or shift their preferences in accordance with their life circumstances. In contrast, we show for the first time that moving produces lasting improvements in housing satisfaction. Thus, the important question is why lasting improvements in housing satisfaction do not produce lasting improvements in life-satisfaction. This question has rarely been examined because previous studies did not include domain specific well-being indicators.

One explanation is that housing is not an important life domain. As a result, housing satisfaction is a weak predictor of life-satisfaction judgments. Although housing is rated as moderately important, other domains (e.g., family) are rated as more important (e.g., Andrews and Withey 1976; Campbell et al. 1976; Schimmack et al. 2002a). The relatively low importance of housing can also explain the finding that homeless people in Calcutta reported low satisfaction with housing and other material aspects of their lives (e.g., material resources, income) and relatively high life-satisfaction (Biswas-Diener and Diener 2006). The reason is that they reported high satisfaction with non-material life domains (e.g., romantic relations, family, self, intelligence), and that these domains had a stronger influence on life-satisfaction judgments.

A weak effect of housing satisfaction on life-satisfaction might suggest that people make an irrational choice when they move into a better home because they invest a large amount of resources without any notable well-being gains. However, this argument overlooks the fact that it is unclear which alternative allocations of monetary resources would produce bigger gains in well-being. After all, the overall effect of money on well-being is small in terms of the strength of the statistical relation between income and life-satisfaction (Lucas and Schimmack 2009). In addition, people also invest in their home for reasons other than to maximize their current well-being. For many individuals, buying a home is an investment that may increase well-being in the future. As a result, moving into a better home could be a reasonable allocation of monetary resources without actually

increasing well-being. However, the slight average decrease in life-satisfaction suggests that other allocations of monetary resources may enhance well-being more (e.g., Dunn et al. 2008; Van Boven and Gilovich 2003). To examine this question it is necessary to compare individuals who use money to buy homes with individuals who use money for other purposes.

An alternative view of our results is that life-satisfaction judgments are systematically biased and underestimate the contribution of housing to well-being. It is possible that respondents focus on life domains that are chronically accessible and salient (Oishi et al. 2003). One reason why people may ignore housing is that housing is a stable aspect of people's lives. Other domains that change more frequently may be more salient and chronically accessible. More research needs to use other methods to determine the importance of housing for well-being. Furthermore, our data can only show the effects of moving on life-satisfaction in our sample. To the extent that costs lower the benefits of better homes, lowering costs could produce higher increases in well-being at the individual and the average levels. Thus, our results do not imply that housing is irrelevant for well-being.

In sum, the interpretation of our findings and the implications for the Easterlin Paradox depend heavily on the contribution of housing satisfaction and costs to well-being. The weak contribution of housing satisfaction to life-satisfaction judgments explains why better homes have not increased life-satisfaction judgments. Whether this finding implies that better homes have not increased well-being depends on the validity of life-satisfaction judgments as an indicator of well-being (Diener et al. 2009).

4.2 Limitations and Future Directions

Our study has a number of limitations that need to be addressed in future research. First, we did not include objective housing characteristics in our model. Thus, we do not have direct evidence that the objective characteristics of houses improved after moving. However, this is not a serious limitation of our study because the strong increase in housing satisfaction shows that moving typically increased housing conditions. Future research should examine which housing characteristics produce lasting increases in housing satisfaction. These analyses have practical implications for individuals who are planning to move and for architects who design houses.

A second limitation is that we did not examine moderator effects. Moving had different effects on different individuals as indicated by the low rank-order stability of housing satisfaction before and after moving. Future research needs to examine specific predictors of these effects. For example, Oishi and Schimmack (in press) showed that introversion moderates the effect of moving on well-being because introverts have a harder time to establish new social relationships after moving. However, it is unclear whether introversion would moderate the effect of moving on housing satisfaction. Other moderator variables could be the specific reasons for moving and the degree of improvement in housing characteristics. We also excluded individuals who moved repeatedly, and it is possible that moving has different effects on the well-being of individuals who moved frequently (Oishi and Schimmack, in press).

Another limitation of our study is that we examined the effect of moving in a German national representative sample. It is possible that the results would be different in other countries. For example, the effect could be stronger in developing countries with poorer housing conditions and more variability in the quality of housing. In fact, Møller (2001) found that in South Africa seven variables of various living conditions (e.g., housing

satisfaction; no problem with employment; household situation worse than 1 year ago; neighborhood satisfaction) explained 39 percent of the variance in life-satisfaction and that housing satisfaction was the best predictor. Results could also be different in countries where housing is more expensive such as Japan (esp., Tokyo; Shadan-Hojin Nihon Fudosan Kantei Kyokai, 2009) or in countries with higher mobility such as the United States and Canada (Long 1991; Seko and Sumita 2009; US Census Bureau 2010). Future studies should examine whether it is possible to replicate the findings of this study in other countries by using other longitudinal data sets.

Our results are also limited by the assessment of overall well-being with a single life-satisfaction rating. Although this rating has shown some validity (Schimmack et al. 2010), it is possible that these ratings underestimate the importance of housing for well-being. Future studies should use a more comprehensive assessment of well-being. To test adaptation theory further, it would be desirable to include affective indicators of well-being.

A final limitation of our study is the failure to identify potential costs of moving that undermine the positive effects of moving on housing satisfaction. Of course, it is impossible to test all potential third variables, but future studies should examine commuting as a potential factor (Diener et al. 2009).

Despite these limitations, our study does provide clear evidence that moving into a better home can produce lasting improvement in housing satisfaction. Further, our study for the first time examined the contribution of top–down and bottom–up effects to the correlation between life-satisfaction and housing satisfaction using longitudinal data. The results showed top–down and bottom–up effects. The evidence for bottom–up effects suggests that moving into a better home can increase the well-being for some individuals, especially if costs are minimal. This finding makes an important contribution to well-being research and shows the usefulness of measuring domain satisfaction to test theories of the determinants of well-being. In addition, our study illustrates how future researchers can take advantage of the two-intercept two-slope latent growth curve model to examine whether life events have lasting effects on well-being and whether life events produce lasting changes in the rank order of individual differences. Future research can apply this methodology to other life events (e.g., marriage, unemployment).

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