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Income Reliably Predicts Daily Sadness, but Not Happiness: A Replication and Extension of Kushlev, Dunn, and Lucas (2015)

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Abstract

Kushlev, Dunn, and Lucas (2015) found that income predicts less daily sadness—but not greater happiness—among Americans. The present study used longitudinal data from an approximately representative German sample to replicate and extend these findings. Our results largely replicated Kushlev et al.'s results: Income predicted less daily sadness (albeit with a smaller effect size) but was unrelated to happiness. Moreover, the association between income and sadness could not be explained by demographics, stress, or daily time use. Extending Kushlev et al.'s findings, new analyses indicated that only between-persons variance in income (but not within-persons variance) predicted daily sadness—perhaps because there was relatively little within-persons variance in income. Finally, income predicted less daily sadness and worry, but not less anger or frustration—potentially suggesting that income predicts less "internalizing" but not less "externalizing" negative emotions. Together, our study and Kushlev et al.'s study provide evidence that income robustly predicts select daily negative emotions—but not positive ones.

Keywords

well-being, happiness, sadness, emotion, affect, day reconstruction method, income

Does income predict subjective well-being? This is a deceptively complex question—primarily because there is no one single, unified definition of well-being (Lucas & Diener, 2008). Indeed, there are at least two elements of well-being: (1) people's general *cognitive evaluation* that their lives are going well and (2) the extent to which they tend to *experience* positive and negative emotions throughout their days (Diener, 1984). Moreover, these components of well-being only partially overlap (Kim-Prieto, Diener, Tamir, Scollon, & Diener, 2005; Lucas, Diener, & Suh, 1996). Therefore, it is possible that income might have different associations with people's *global evaluative judgments of* well-being (e.g., overall life satisfaction) and their *experiential* well-being (e.g., experienced positive and negative emotions).

Most previous research has tested the associations between affluence and people's global, evaluative well-being. These studies have found that income has positive—albeit generally small to moderate—associations with life satisfaction (Diener & Biswas-Diener, 2002; Diener, Ng, Harter, & Arora, 2010; Kahneman & Deaton, 2010; Sacks, Stevenson, & Wolfers, 2012). Thus, wealthier individuals generally perceive their lives somewhat more positively than do poorer persons. Nevertheless, increasingly greater wealth is associated with diminishing returns in life satisfaction, and consequently, especially for richer individuals, substantial increases in income may be necessary to have an appreciable impact on life satisfaction (Lucas & Diener, 2008; Lucas & Schimmack, 2009).

In contrast to the associations between money and evaluative well-being, research suggests that income has even weaker associations with the extent to which people *experience* positive emotions (Diener et al., 2010; Kahneman & Deaton, 2010; Kahneman, Krueger, Schkade, Schwarz, & Stone, 2006; Kushlev, Dunn, & Lucas, 2015). Thus, despite reporting greater life satisfaction, wealthier individuals may not feel greater amounts of daily happiness, as compared to less affluent people.

But what about negative emotions? Recently, Kushlev, Dunn, and Lucas (2015) argued that income may be associated with lower levels of *sadness*. Specifically, positive and negative emotions are not necessarily polar opposites, and they can consequently vary independently of one another (Watson, Clark, & Tellegen, 1988). Kushlev et al. (2015) proposed that lower income individuals may feel less empowered and able to control their environment, as compared to wealthier persons (Johnson & Krueger, 2006; Kraus, Piff, & Keltner, 2009). This

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lack of perceived efficacy to mold one's circumstances may lead to negative emotions such as helplessness or sadness in the face of challenging life events (Roseman, Antoniou, & Jose, 1996). For example, wealthier individuals have greater capacity to afford unexpected repair or medical bills. In contrast, lower income persons may need to forestall necessary repairs or treatments or may be required to sacrifice in other areas of their lives to pay for them—which may spur negative emotions, such as sadness. Stated more succinctly, wealth may shelter people against the vicissitudes of life.

Supporting this line of reasoning, Kushlev et al. (2015) replicated prior findings that income is unrelated to experiential reports of happiness (e.g., Kahneman et al., 2006) but found that wealth does, in fact, predict lower levels of sadness (though the effect was relatively small in size). The purpose of the present article was to test whether this pattern of findings is replicable. To do so, we directly replicated Kushlev et al.'s statistical analyses as closely as possible and then extended them in several ways using a longitudinal data set of German participants.

Overview of Kushlev et al. (2015)

Kushlev et al. (2015) analyzed data from a large sample of Americans who provided reports of their income as well as their experiential happiness and sadness during specific episodes of a single day. In their study, experiential happiness and sadness were measured via the *day reconstruction method* (DRM; Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004). The DRM is a low-cost, easy-to-implement alternative to experience sampling methods (ESM; Shiffman, Stone, & Hufford, 2008). Unlike ESM, which is intrusive and burdensome for participants and can require researchers to purchase costly technologies, DRM can be administered in a standard survey format, and at least some versions of the DRM can be completed in as few as 10–15 min (Anusic, Lucas, & Donnellan, 2016a, 2016b). When completing DRM measures, participants systematically reconstruct their prior day, listing all activities in which they engaged. Subsequently, they rate the extent to which they experienced various emotions during either every activity (Kahneman et al., 2004) or a randomly selected subset of the activities (e.g., Anusic et al., 2016b; Kushlev et al., 2015). Despite the DRM entailing retrospective reporting, participants appear to be able to accurately reconstruct their emotions from the prior day (Kahneman et al., 2004)—something they appear unable to do over longer periods of time (e.g., Robinson & Clore, 2002a, 2002b, 2007). Indeed, the patterns of affect reported across the day in DRM studies appear to closely match those found in typical ESM studies (Anusic et al., 2016b; Kahneman et al., 2004). Moreover, DRM measures of affect exhibit both convergent and predictive validity (Anusic et al., 2016a, 2016b).

Using DRM measures of experiential well-being, Kushlev et al. (2015) found that income was negatively related to daily averages of experiential sadness but was uncorrelated with happiness. Moreover, they found that the association between wealth and sadness could not be explained by controlling demographic variables such as gender, relationship status, and employment status. Similarly, systematic variation in daily stress could not explain the link between income and sadness—suggesting that poorer individuals do not feel greater sadness simply due to greater experienced stress. Finally, although Kushlev et al. (2015) found numerous differences in how people of varying affluence spent their time (e.g., wealthier people spent more time working and commuting)—statistically controlling for these differences did not attenuate the relationship between income and sadness. Thus, wealthier individuals were not less sad simply because they spent greater time engaged in physical exercise, for example.

Overview of the Present Study

The purpose of the present study was to replicate Kushlev et al.'s (2015) findings from an American sample in a different culture. To do so, we used an approximately nationally representative German sample. Participants reported their income and completed DRM measures of experiential affect once annually for up to 3 years. These data were used to directly replicate Kushlev et al.'s (2015) statistical analyses. Specifically, we first examined whether income correlated with daily happiness and sadness. We subsequently tested whether these correlations withstood controlling demographics and daily stress. Finally, we investigated whether individuals with varying levels of wealth differed with respect to daily time usage—and whether these differences in time allocation could explain the links between income and daily affect.

In addition to replicating Kushlev et al.'s (2015) analyses, we expanded upon their findings in two ways. First, we leveraged the repeated-measures nature of our data to examine whether income predicted happiness and sadness both between persons and within persons. Second, because participants rated a wide range of positive and negative emotions in our study (e.g., happiness, enthusiasm, anger, frustration), we examined whether income predicted generalized composites of positive and negative affect.

We expected to replicate Kushlev et al.'s (2015) findings that income would predict sadness, but not happiness. Moreover, we expected this association to emerge even with demographics and daily time usage held constant. In contrast, we did not have strong a priori expectations regarding how income might relate to composites of general positive and negative affect—or the extent to which within-person fluctuations in income might predict changes in emotions.

Method

Preregistration

Prior to conducting any analyses, this project, including our sample, planned analyses, and expected results, was preregistered on Open Science Framework (https://osf.io/d7r8p/).

Participants

We analyzed data from participants in the 2012 through 2014 waves of the innovation sample of the German Socioeconomic Panel (GSOEP; Wagner, Frick, & Schupp, 2007). This sample is an approximately nationally representative subsample of the larger GSOEP study, in which new and innovative questions are administered. Participants completed DRM measures once annually in 2012, 2013, and 2014. Across these 3 years, a total of 2,504 unique participants (52% female; age $M = 51.78$, $SD = 18.00$) provided at least one wave of data. The respective individual sample sizes for 2012, 2013, and 2014 were 2,303, 1,920, and 1,763.

On average, participants provided 2.39 waves of data ($SD = 0.85$)—with 1,898 participants (76%) providing at least two waves of data. Attrition analyses revealed that people tended to provide fewer waves of data if, collapsing across waves, they reported greater levels of daily stress ($r = -.08$, 95% confidence interval [CI] [−.12, −.04]).

Measures

Income. At each wave, participants self-reported their monthly household net income in euros.[1]

Daily emotions. At each time point, participants were asked to systematically reconstruct their prior day by reporting all activities that had occurred. Specifically, participants were first asked what time they awoke. Afterward, they were queried, "What did you do next?" Participants selected a general activity from a predetermined list (e.g., personal care, commuting, preparing food, watching television [TV], socializing) and indicated what time the episode began and ended. This procedure was repeated (i.e., participants were asked, "What did you do next?") until participants had accounted for their entire day—ending with either their bedtime or midnight.

After providing a basic account of all of their activities during the previous day, three of the provided episodes were randomly selected for each participant. For each of these three episodes, participants rated the extent to which they felt several emotions *during the episode*: happy, enthusiastic, satisfied, angry, frustrated, sad, worried, and stressed. Each emotion was rated on a scale from 1 (*not at all*) to 7 (*very much*). Having participants rate three randomly selected episodes—rather than every episode (e.g., Kahneman et al., 2004)—dramatically reduces the time required to complete the measure, yet nevertheless it appears to produce similar patterns of findings (Anusic et al., 2016b).

We formed daily composites for each of the eight emotions by averaging the ratings from the three episodes together with equal weighting. For example, we computed a single *daily happiness* composite for each participant at each wave—which was an average of their reported happiness during each of the three episodes they had rated.[2]

To directly replicate Kushlev et al.'s (2015) statistical methods as closely as possible, in our primary analyses, we examined zero-order correlations between income and daily happiness and *daily sadness*. Only when explicitly noted in the Results section, *daily stress* was used as a control variable. For subsequent analyses, we also formed composites at each time point for *daily positive affect* and *daily negative affect*. Daily positive affect was an average of daily happiness, enthusiasm, and satisfaction (2012, $\alpha = .85$). Daily negative affect was an average of daily anger, frustration, sadness, worry, and stress (2012, $\alpha = .87$).[3]

Demographic controls. Only when explicitly noted below, participants' age, gender, relationship status (married/partnered vs. not),[4] number of children, and unemployment/retirement/student status were used as control variables.[5]

Results

Does Income Predict Daily Happiness and Sadness?

Table 1 contains the descriptive statistics and intercorrelations for all variables in 2012. For our first series of analyses, we examined whether income predicted daily happiness and sadness in *each individual wave*. We examined the zero-order associations within each time point separately (rather than the aggregate associations across time) to directly replicate Kushlev et al.'s (2015) statistical methods as closely as possible (and thus, any potential differences between our results and theirs cannot be attributed to different analytic methods).

As seen in the first three rows of Table 2, income predicted lower levels of daily sadness in every wave (correlations ranged from $r = -.05$, 95% CI [−.09, −.01] to $r = -.11$, 95% CI [−.16, −.06]) but was unrelated to daily happiness (all $|r|$s $\leq .02$). Moreover, Steiger's Z tests (see Meng, Rosenthal, & Rubin, 1992) revealed that the associations between income and sadness were statistically significantly greater than the correlations between income and happiness within every wave, Δrs ranged from .06 (95% CI [.01, .12]) to .08 (95% CI [.02, .14]). Thus, we replicated the basic pattern of results report by Kushlev et al. (2015), although our effect size estimates were somewhat smaller than their estimates (see the bottom row of Table 2).[6,7]

Having directly replicated Kushlev et al.'s (2015) analyses as closely as possible, we subsequently used multilevel models (MLMs) to examine the associations between income and daily happiness and sadness across all three waves simultaneously. In these MLMs, we estimated the associations between income and affect both *between persons* (i.e., individuals' mean income across all three waves) and *within persons* (i.e., fluctuations in people's income around their individual means) and included a random intercept to control for within-person dependencies in the data.[8] All variables were standardized across the entire sample before being entered in the model—thus, the resultant parameter estimates are standardized regression coefficients. As seen in the lower half of Table 2, between-persons variance

Table 1. Descriptive Statistics and Intercorrelations for All Study Variables at 2012.

Variable	*M*	*SD*	Correlations											
			1	2	3	4	5	6	7	8	9	10	11	12
1. Monthly income (euros)	2,737.89	1,684.33	–											
2. Daily happiness	4.00	1.51	−.02	–										
3. Daily sadness	1.30	0.70	**−.11**	−.02	–									
4. Daily stress	1.61	0.98	**.05**	.00	**.41**	–								
5. Daily positive affect	3.82	1.28	.01	**.89**	−.03	.03	–							
6. Daily negative affect	1.52	0.72	−.02	**−.05**	**.76**	**.79**	**−.06**	–						
7. Age	51.79	17.99	**−.16**	−.03	**.06**	**−.22**	−.02	**−.11**	–					
8. Male	0.48	0.50	.04	.00	.00	-.01	.01	.02	−.03	–				
9. Married/partnered	0.61	0.49	**.24**	**.05**	−.02	.00	.03	−.03	**.26**	.03	–			
10. Number of children	0.62	0.97	**.28**	.02	**−.05**	**.16**	.02	**.08**	**−.46**	−.03	.10	–		
11. Unemployed	0.45	0.50	**−.28**	**.04**	.03	**−.20**	.03	**−.10**	**.46**	**−.08**	.00	**−.21**	–	
12. Retired	0.003	0.06	.01	.00	−.02	−.04	.01	−.03	−.03	.01	.03	−.03	**−.05**	–
13. Student	0.02	0.15	−.01	.02	−.05	.00	.02	−.02	**−.26**	.04	**−.16**	**−.12**	**−.14**	−.01

Note. 95% confidence intervals for correlations in boldface do not include zero.

Table 2. Income Predicting DRM Happiness and Sadness.

	Outcome			
	DRM Happiness		DRM Sadness	
		95% CI		95% CI
Measurement Occasion	β	[LB, UB]	β	[LB, UB]
2012	−.02	[−.06, .03]	**−.11**	[−.16, −.06]
2013	.02	[−.04, .04]	**−.05**	[−.09, −.01]
2014	−.01	[−.06, .04]	**−.07**	[−.12, −.02]
All, between persons[a]	−.01	[−.04, .03]	**−.08**	[−.11, −.05]
All, within persons[a]	.04	[−.03, .11]	−.02	[−.10, .06]
Kushlev et al. (2015)	.00	[−.02, .02]	**−.15**	[−.16, −.13]

Note. DRM = day reconstruction method; CI = confidence interval; LB = lower bound; UB = upper bound; 95% CIs for parameter estimates in boldface do not include zero.
[a]These parameters were estimated using multilevel models and represent the between-persons and within-persons effects across all three waves of data.

in income was associated with less daily sadness ($\beta_{between} = -.08$, 95% CI [−.11, −.05]) but was unrelated to daily happiness ($\beta_{within} = -.01$, 95% CI [−.04, .03]). In contrast, *within-persons* variation in income (i.e., year-to-year changes in individual persons' incomes) predicted neither sadness ($\beta_{within} = -.02$, 95% CI [−.10, .06]) nor happiness ($\beta_{within} = .04$, 95% CI [−.03, .11]). As we elaborate in the Discussion section, this may reflect the fact that only a tiny portion of variance in income (9%) was within persons; thus, there may have been too little within-person fluctuations in income to provide a sufficiently powerful test of the within-person associations.[9]

Because our MLMs provide a more powerful test of the between-person associations and use all available data—yet produce comparable results to the zero-order analyses (as used by Kushlev et al., 2015)—we use MLMs and data from all three waves in all subsequent analyses.

Table 3. Income Predicting DRM Happiness and Sadness, With Control Variables.

	Outcome			
	DRM Happiness		DRM Sadness	
		95% CI		95% CI
Predictor	β	[LB, UB]	β	[LB, UB]
Demographics model				
Between-persons income	−.02	[−.07, .02]	**−.07**	[−.11, −.03]
Within-persons income	.05	[−.02, .12]	−.01	[−.09, .07]
Age	**−.07**	[−.12, −.02]	.04	[−.01, .08]
Male	−.01	[−.04, .03]	.00	[−.03, .04]
Married/partnered	**.06**	[.03, .10]	−.02	[−.06, .01]
Number of children	.00	[−.04, .04]	.02	[−.02, .05]
Unemployed	**.06**	[.03, .10]	.02	[−.02, .05]
Retired	−.01	[−.03, .02]	−.01	[−.04, .02]
Student	.01	[−.02, .04]	.00	[−.04, .04]
DRM stress model				
Between-persons income	−.01	[−.03, .04]	**−.10**	[−.12, −.07]
Within-persons income	.03	[−.04, .10]	−.06	[−.13, .01]
DRM stress	−.01	[−.04, .01]	.41	[.38, .44]

Note. DRM = day reconstruction method; CI = confidence interval; LB = lower bound; UB = upper bound; 95% CIs for parameter estimates in boldface do not include zero.

Does the Association Between Income and Sadness Withstand Control Variables?

Kushlev et al. (2015) found that controlling basic demographics and daily stress did not eliminate the association between income and daily sadness. As seen in Table 3, we replicated this finding. Specifically, even holding constant age, gender, relationship status, number of children, and unemployment/retired/student status, between-persons variation in income continued to predict daily sadness ($\beta_{between} = -.07$,

Table 4. Income Predicting Daily Time Usage.

	Between Persons		Within Persons		Kushlev et al. (2015)	
		95% CI		95% CI		95% CI
Outcome activity	β	[LB, UB]	β	[LB, UB]	β	[LB, UB]
Working	**.23**	[.20, .26]	**.12**	[.06, .19]	**.15**	[.13, .17]
Childcare	**.06**	[.03, .10]	**−.10**	[−.16, −.03]	**.12**	[.10, .13]
Commuting	**.04**	[.01, .07]	−.04	[−.12, .04]	**.17**	[.15, .18]
Playing sports[a]	**.04**	[.01, .08]	−.05	[−.12, .03]	**.09**	[.07, .10]
Sexual activity	.01	[−.02, .04]	−.03	[−.11, .05]	–	[−, −]
Phone conversations	−.01	[−.04, .03]	.03	[−.05, .11]	**−.04**	[−.06, −.02]
Personal care	−.02	[−.05, .01]	.08	[−.00, .16]	–	[−, −]
Socializing	−.02	[−.05, .01]	.02	[−.06, .10]	**.03**	[.01, .04]
Computer activities	−.02	[−.05, .02]	−.02	[−.09, .05]	–	[−, −]
Reading	−.03	[−.06, .01]	.00	[−.08, .07]	–	[−, −]
Health care	−.03	[−.05, .00]	.01	[−.08, .10]	–	[−, −]
Housework	**−.04**	[−.08, −.01]	−.05	[−.12, .02]	.00	[−.02, .02]
Spirituality	**−.04**	[−.07, −.00]	.03	[−.05, .11]	**−.07**	[−.09, −.06]
Pet care	**−.04**	[−.07, −.01]	−.01	[−.07, .06]	–	[−, −]
Shopping	**−.05**	[−.08, −.02]	.05	[−.04, .13]	**.09**	[.08, .11]
Preparing food	**−.05**	[−.09, −.02]	**−.05**	[−.11, .02]	**−.04**	[−.05, −.02]
Gardening	**−.05**	[−.08, −.02]	−.01	[−.10, .07]	–	[−, −]
Eating	**−.07**	[−.09, −.03]	−.01	[−.09, .06]	**.08**	[.06, .10]
Rest/relaxation	**−.10**	[−.13, −.07]	.04	[−.04, .12]	**−.02**	[−.04, −.01]
Watching TV	**−.20**	[−.24, −.17]	−.05	[−.12, .02]	**−.10**	[−.12, −.08]

Note. CI = confidence interval; LB = lower bound; UB = upper bound; 95% CIs for parameter estimates in boldface do not include zero.
[a]This category was "playing sports" in our study and "exercising/recreation" in Kushlev et al.'s (2015) study.

95% CI [−.11, −.03]).[10,11] Similarly, controlling participants' daily stress did not significantly reduce the association between income and daily sadness ($\beta_{between} = -.10$, 95% CI [−.12, −.07]). Thus, we replicated Kushlev et al.'s (2015) findings that the links between income and daily sadness cannot be explained by covariation between income and demographics or stress.

Does Income Predict Daily Time Usage?

Kushlev et al. (2015) found that income predicted differences in the amount of time that people allocated to various activities. For example, in their study, income was positively related to time spent commuting (correlation from Kushlev et al. [r_K] = .17) and negatively correlated with TV viewing ($r_K = -.10$). Nevertheless, they found that controlling the total time people allotted to each of the various activities could not explain the links between income and sadness.

As seen in Table 4, we largely replicated Kushlev et al.'s (2015) findings. Specifically, in both our study and theirs, as compared to their less affluent peers, wealthier individuals spent more time working ($\beta_{between} = .23$, 95% CI [.20, .26]; $r_K = .15$), caring for children ($\beta_{between} = .06$, 95% CI [.03, .10]; $r_K = .12$), commuting ($\beta_{between} = .04$, 95% CI [.01, .07]; $r_K = .17$), and playing sports ($\beta_{between} = .04$, 95% CI [.01, .08]; $r_K = .09$) and less time engaging in spiritual activities ($\beta_{between} = -.04$, 95% CI [−.08, −.01]; $r_K = -.07$), preparing food ($\beta_{between} = -.05$, 95% CI [−.09, −.03]; $r_K = -.04$), resting/relaxing ($\beta_{between} = -.10$, 95% CI [−.13, −.07]; $r_K = -.02$), and watching TV ($\beta_{between} = -.20$, 95% CI [−.24, −.17]; $r_K = -.10$). There were, however, a few differences between our findings and Kushlev et al.'s (2015). Specifically, Kushlev et al. (2015) found that income predicted time spent socializing ($r_K = .03$), talking via phone ($r_K = -.04$), shopping ($r_K = .09$), and eating ($r_K = .08$), but not doing housework ($r_K = .00$)—whereas we found that income was unrelated to time spent socializing ($\beta_{between} = -.02$, 95% CI [−.05, .01]) and talking via phone ($\beta_{between} = -.01$, 95% CI [−.04, .03]), and it *negatively* predicted time spent shopping ($\beta_{between} = -.05$, 95% CI [−.08, −.02]), eating ($\beta_{between} = -.07$, 95% CI [−.09, −.03]), and performing housework ($\beta_{between} = -.04$, 95% CI [−.08, −.01]). Thus, we replicated a total of 8 of the 13 income/time usage associations found by Kushlev et al. (2015).

Our participants also provided data on several activities that were not included in Kushlev et al.'s (2015) study. In our study, income predicted less time engaged in gardening ($\beta_{between} = -.05$, 95% CI [−.08, −.02]) and pet care ($\beta_{between} = -.04$, 95% CI [−.07, −.01]) but was unrelated to time allocated to sexual activity, personal care, computer usage, reading, and health care (all $|\beta_{between}|$s ≤ .03).

Despite the slight differences between our study and Kushlev et al.'s (2015) with respect to correlations between income and time usage, we replicated their core finding that income continued to predict daily sadness while including all 20 time

Table 5. Income Predicting DRM Positive Affect and Negative Affect Composites.

	Outcome			
	DRM Positive Affect		DRM Negative Affect	
		95% CI		95% CI
Measurement Occasion	β	[LB, UB]	β	[LB, UB]
2012	.02	[−.03, .06]	−.02	[−.08, .02]
2013	.02	[−.02, .06]	.01	[−.03, .05]
2014	.04	[−.01, .09]	.04	[−.01, .09]
All, between persons[a]	.02	[−.02, .05]	−.02	[−.04, .03]
All, within persons[a]	.05	[−.02, .11]	.05	[−.02, .12]

Note: DRM = day reconstruction method; CI = confidence interval; LB = lower bound; UB = upper bound.
[a]These parameters were estimated using multilevel models and represent the between-persons and within-persons effects across all three waves of data.

usage variables in the model ($\beta_{between} = -.06$, 95% CI [−.09, −.03]). Thus, the links between income and sadness cannot be explained by systematic differences in how people of varying affluence spend their time.

Does Income Predict Positive and Negative Affect More Generally?

For our final series of analyses, we extended beyond the scope of Kushlev et al.'s (2015) findings by examining whether income might predict composites of daily positive affect (an average of happiness, enthusiasm, and satisfaction) and daily negative affect (an average of anger, frustration, sadness, worry, and stress). As seen in Table 5, income predicted neither daily positive affect ($\beta_{between} = .02$, 95% CI [−.02, .05]) nor negative affect ($\beta_{between} = -.02$, 95% CI [−.04, .03]).

Post hoc analyses revealed that the lack of association between income and daily negative affect was driven by stress, anger, and frustration. Income was, in fact, negatively related to daily sadness ($\beta_{between} = -.08$, 95% CI [−.11, −.05]) and worry ($\beta_{between} = -.04$, 95% CI [−.07, −.01]). It was, however, unrelated to daily anger ($\beta_{between} = .03$, 95% CI [−.01, .06]) or frustration ($\beta_{between} = .01$, 95% CI [−.02, .05])—and it was *positively* related to daily stress ($\beta_{between} = .04$, 95% CI [.01, .07]). This latter association, however, was likely explained by other factors. Specifically, in exploratory analyses, holding constant employment status and total time working/commuting eliminated—and bordered upon *reversing*—the link between income and stress ($\beta_{between} = -.02$, 95% CI [−.05, .02]). Thus, it does not appear that income per se increases stress. Rather, it appears that any positive link between income and stress is spurious, resulting from their shared covariance with time spent working/commuting.[12]

Discussion

In a national sample of Americans, Kushlev et al. (2015) found that income predicted lower levels of daily sadness but was unrelated to happiness—and the links between income and sadness were robust to controlling demographics, daily stress, and time use. The primary purpose of the present study was to replicate these findings as closely as possible in a national sample drawn from a different country—Germany. We were largely successful. In our study, affluence predicted reduced daily sadness but was unrelated to happiness. Moreover, the links between wealth and sadness were not attenuated by holding constant basic demographics, daily stress, or daily time usage. Thus, taken together, our study and that of Kushlev et al. provide accumulating evidence that income is reliably associated with sadness—but not happiness—and this link cannot be explained by income-based variation in demographics, stress, or time usage. That being said, it is important to note that household income (used in both studies) is only one indicator of wealth and may not fully capture the associations between affluence and affect. Future research should explore whether other indicators of wealth also predict experiential well-being.

Discrepancies Between the Results of the Present Study and Those of Kushlev et al. (2015)

The major divergences between the present findings and those of Kushlev et al. pertained to income-based variation in daily time usage. Specifically, Kushlev et al. examined the extent to which income predicted the amount of time people allotted to 13 broad genres of activities. The results of our study and theirs aligned for eight of these activities: In both studies, wealthier people spent more time working, caring for children, commuting, and playing sports and less time engaging in religious activities, food preparation, resting, and watching TV. In contrast, the two studies produced discrepant findings with respect to the remaining five activities. Kushlev et al. found that more affluent Americans spent *more* time shopping, eating, and socializing and *less* time on the phone—whereas we found that income was *negatively* associated with time spent shopping, eating, and performing housework, and it was *unrelated* to time socializing or talking via phone in Germany.

The source of these differences should be evaluated in future studies. One possibility is that they represent cultural differences in how wealth is related to daily activities. Kushlev et al.'s (2015) sample was from the United States, whereas the present sample was from Germany. Thus, to the extent that the divergence in the studies' results represents real, cultural variation (as opposed to sampling error), it may be the case, for example, that as compared to their poorer peers, more affluent Americans spend greater amounts of time shopping, whereas wealthier Germans spend less time shopping.

However, it is also important to note that the correlations in both studies were relatively small to begin with; and irrespective of the few differences in the income/time use associations found across our study and Kushlev et al.'s (2015), holding

people's daily time usage constant did not mitigate the link between income and daily sadness in either study. Thus, the primary point—that variation in daily time allotment cannot explain the link between income and sadness—robustly replicated across both studies.

Novel Findings

In addition to replicating Kushlev et al.'s (2015) findings, we leveraged several features unique to our data set to extend their analyses in two ways.

Does income predict affect within persons?. Given the repeated-measures available in our data set, we explored the extent to which income might predict daily affect *within persons*. In contrast to the *between-persons* findings that we have summarized thus far—which tap the extent to which wealthier individuals feel different emotions than do poorer people—the within-persons findings capture the extent to which *fluctuations in individual persons' incomes* predict changes in their happiness or sadness. For example, if a person receives a raise, do they subsequently experience less sadness?

Contrasting with the between-persons findings, we found no statistically significant within-person links between income and sadness (or any other emotion). This seems to indicate that within-person increases in individuals' incomes are not generally associated with accompanying reductions in sadness. One limitation of these analyses, however, is that they capture variation over only 3 consecutive years—a small period of time to expect any large changes in income. Indeed, the vast majority of variance in income (91%) was between persons in our data set. Thus, there may have been too few within-person fluctuations in income to obtain an adequately powerful test of the within-person associations. Relatedly, within-person changes in income may have been too small in magnitude to facilitate substantive changes to affect—larger gains in individuals' income may have been necessary to garner an appreciable reduction in sadness (e.g., Lucas & Diener, 2008; Lucas & Schimmack, 2009).

Future research should therefore more thoroughly explore whether within-person gains in income are associated with lessened sadness. Indeed, associations found on one level of analysis (e.g., income predicting less sadness between persons) do not necessarily generalize to other levels of analysis (e.g., income predicting less sadness within persons; Clancy, Berger, & Magliozzi, 2003). For example, it may be the case that income influences well-being via different processes at different levels of analysis (e.g., between persons vs. within persons). Alternatively, it may be the case that income operates upon well-being via similar mechanisms between persons and within persons. Future research should disentangle these possibilities using longer longitudinal designs with greater within-person variation in income.

Does income predict general positive and negative affect?. Finally, given that participants rated multiple positive and negative emotions (e.g., happiness, enthusiasm, anger, frustration) at each time point, we examined whether income predicted variation in composites of positive and negative affect. Our findings indicated that income was unrelated to composites of both positive affect *and* negative affect.

To explore why wealth predicted sadness, but not negative affect (an average of anger, frustration, sadness, worry, and stress), we examined the separate associations between income and each individual emotion included in the negative affect composite. We found that more affluent people felt less sadness and worry. In contrast, income was unrelated to anger, frustration, and—holding constant time spent working/commuting—stress.

Collectively, this pattern of results may indicate that income is primarily related to lower levels of what researchers have sometimes referred to as *internalizing* negative emotions—feelings, such as sadness, fear, or anxiety, which are directed inward in lieu of impelling external action (e.g., Chaplin & Aldao, 2013). In contrast, low income may not facilitate *externalizing* or *approach-related* negative emotions, such as anger, contempt, or disgust. Stated differently, emotions such as anger and frustration may motivate action, whereas feelings similar to sadness and anxiety do not involve approach tendencies (e.g., Carver & Harmon-Jones, 2009). Feelings of *disenfranchisement* and *powerlessness* associated with lower income (Johnson & Krueger, 2006; Kraus et al., 2009) may contrapose approach-related emotions. Ultimately, however, this explanation is purely speculative. And moreover, it remains possible that the differential associations between income and various negative emotions found in our study are purely attributable to sampling error. To the extent that these associations are robust, future research should explicitly test whether income predicts different *types* of negative emotions (e.g., those that compel action vs. not).

Conclusion

In sum, the present study replicated the basic pattern of results found by Kushlev et al. (2015). Collectively, our study and theirs provide accumulating evidence that income reliably predicts less sadness—despite being unrelated to happiness. Moreover, our study may suggest that income predicts only certain types of negative emotions—potentially internalizing ones, such as sadness and worry, but not externalizing/action-oriented ones, such as anger and frustration. These data reaffirm the idea that subjective well-being is not a single, unitary construct and instead comprises multiple components. Studying these separable components has the potential to further the development of more sophisticated theories about the processes that underlie well-being.

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Supplemental Material

The supplemental analyses are available at http://spps.sagepub.com/supplemental

Notes

1. We used raw income variables in all reported analyses. Using log-transformed income instead produces nearly identical results. As described in the Supplemental Analyses, using various methods to adjust income for household size (e.g., per capita income) also produces similar results.
2. Kushlev, Dunn, and Lucas's (2015) participants also rated emotions from only three randomly selected episodes—and daily emotions were also operationalized in their study as the unweighted averages across the three episodes.
3. We refer to these variables as "daily" emotions because they represent daily composites of the rated emotions. Participants rated only 1 day of emotions at each measurement occasion.
4. The "not married/partnered" category includes separated, widowed, divorced, and dating individuals.
5. The German Socioeconomic Panel (GSOEP) contains many employment status categories. We used dummy codes for individuals who were students, retired, or not working. All other categories—including employment in part-time, temporary, military, community service, or disability workshop jobs—were counted as "employed" and served as the reference group in our analyses.
6. The slightly smaller associations in our study than found by Kushlev et al. (2015) may be attributable to sampling error or may represent cultural differences between Americans and Germans.
7. As in Kushlev et al.'s (2015) study, income generally did not predict happiness or sadness in a quadratic fashion, largest quadratic $\beta = .08$, 95% CI [−.05, .20]. The only exception was that income quadratically predicted sadness only in 2012 ($\beta_{linear} = -.22$, 95% CI [−.32, −.12]; $\beta_{quadratic} = .17$, 95% CI [.04, .31]), but not in 2013 or 2014.
8. Thus, the marginal model was $(affect)_{ij} = \beta_0 + \beta_1(\text{Person mean income})_i + \beta_2(\text{Person centered income})_{ij} + U_j + \varepsilon_{ij}$.
9. There was substantial within-persons variance in daily happiness (intraclass correlation [ICC] = .40) and sadness (ICC = .27).
10. Given the different variables available in the GSOEP versus Kushlev et al.'s (2015) data set, we used a slightly different set of control variables. Irrespective of these minor differences, our basic pattern of results replicates theirs.
11. Previous studies have found links among income, gender, employment status, and well-being that were not found in the present study (e.g., cf. Tables 1 and 3 with Bolitzer & Godtland, 2012; Brody & Hall, 1993; Schimmack, Schupp, & Wagner, 2008).
12. In terms of individual positive emotions, income was also unrelated to daily enthusiasm ($\beta_{between} = .02$, 95% CI [−.01, .06]) and satisfaction ($\beta_{between} = .03$, 95% CI [−.00, .07]).

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