Income Robustly Predicts Self-Regard Emotions

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There is robust evidence that higher income makes people evaluate their lives more favorably, but there is no consistent evidence on whether it makes people feel better. Analyzing data from five large surveys spanning 162 countries, we predicted and found the most comprehensive evidence to date that income reliably predicted greater positive self-regard emotions (e.g., pride) and lower negative self-regard emotions (e.g., anxiety). In contrast, its relationships with other-regard emotions (e.g., gratitude, anger) and global emotions (e.g., happiness) were weaker in magnitude and difficult to replicate. In addition, income predicted higher (lower) levels of positive (negative) self-regard emotions about 10 years later, controlling for the same self-regard emotions at baseline. Sense of control mediated the relationships between income and both positive and negative self-regard emotions. Income predicted self-regard emotions as strongly as it has been known to predict life evaluation. Hence, having more money makes people feel more proud, contented, and confident and less sad, afraid, and ashamed, but does not affect whether they feel grateful, caring, and angry.

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Financial wealth predicts better psychological health, but that depends on which component of subjective well-being (SWB) is examined. There is robust evidence that income predicts the cognitive component of SWB concerning life evaluation, albeit at small magnitudes (e.g., Diener et al., 2010; Howell & Howell, 2008; Luhmann et al., 2011; Ng & Diener, 2014). However, associations between income and the affective component of SWB (consisting of positive and negative affect) are inconsistent. Some studies found that income positively predicted positive emotions and negatively predicted negative emotions (e.g., Ng & Diener, 2014), but others found no relationships with negative (Diener et al., 2010; Diener et al., 2013) and positive emotions (e.g., Kushlev

et al., 2014). There is also evidence that income does not predict emotions as strongly as life evaluation (Diener et al., 2010). Hence, while it is clear that income shapes how people think about their life, it is unclear whether it affects how they feel.

Furthermore, there are other limitations in the literature. First, the majority of studies examined global affect and very few compared specific emotions of the same valence. Second, all studies were cross-sectional, providing no evidence of the directionality between income and specific emotions. Third, past studies did not examine mediating mechanisms, making it unclear why income might predict particular emotions.

We advocate taking an emotion-specific approach to resolve the issue of how income matters to emotional well-being. Across multiple large data sets spanning 160 nations, we demonstrated replicable relationships between income and *self-regard* emotions. We showed that income predicts self-regard emotions more strongly (i.e., larger magnitude) and consistently (i.e., higher replicability) than other emotions. Further, we provided the first directional evidence that supports a causal interpretation between income and self-regard emotions, and showed that sense of control mediates this relationship.

Income, Self-Regard Emotions, and Sense of Control

We propose a theoretical framework centered on personal sense of control to explicate why income should predict particular kinds of emotions robustly. There is strong evidence that income correlates positively with sense of control, defined here as the extent to which one feels able to shape events to achieve objectives and

overcome obstacles. Lachman and Weaver (1998) were among the first to find evidence for this relationship. Across three studies, they found that income correlated positively with sense of control. In addition, they found positive associations between sense of control and mental health, indicating that higher income may bring about downstream psychological benefits associated with a greater sense of control. Numerous subsequent studies have replicated these relationships (e.g., Gallo et al., 2005; Johnson & Krueger, 2005; Mejia et al., 2016).

If income predicts enhanced sense of control, it stands to reason that income should reliably predict emotions associated with control. Our framework further draws from two lines of research. First, sense of control is consistently linked to how the self is perceived. There is robust evidence that positive self-evaluation is associated with positive psychological outcomes indicative of a stronger sense of personal control such as better coping and higher mastery, whereas negative self-evaluation is associated with adverse psychological outcomes signifying poorer sense of personal control such as helplessness (e.g., DeLongis et al., 1988; Wallace et al., 2012; Whisman & Kwon, 1993). This suggests that income could have a unique impact on emotions that are linked to how favorably one views the self. Accordingly, we differentiate between two types of emotions: *positive self-regard emotions* and *negative self-regard emotions*. Second, we leverage on appraisal theory research which demonstrates that specific emotions are linked to distinct tendencies of appraising events. For instance, appraising pleasant events as controlled by the self is related to pride, whereas appraising unpleasant events as subjected to uncontrollable situational forces is associated with fear. Using these findings, we could explicate how positive versus negative self-regard emotions might differ in how they relate to sense of control (e.g., Ellsworth & Smith, 1988a, 1988b; Frijda et al., 1989; Roseman et al., 1990; Smith & Ellsworth, 1985, 1987; Tong, 2015).

We defined *self-regard* as the extent to which people feel and think well or poorly of themselves. Hence, *positive self-regard emotions* are emotions associated with favorable views of the self.[1] They may result from circumstances that boost the view one has of oneself, including (but not limited to) achieving an important goal, making good progress toward a goal, or being in a situation one has influence over. Examples include pride, satisfaction, and contentment, which commonly arise from personal accomplishments, and emotions such as determination, confidence, and challenge, which are approach-driven and characterized by positive assessment of one's chances at attaining a goal. Hence, when feeling these emotions, one has a higher tendency to view the self as having positive attributes (e.g., successful, skillful, competent, and so on), contributing to favorable self-views.

There is substantial evidence from appraisal theory research that positive self-regard emotions are associated with greater personal control. Pride is associated with appraising positive events as controlled by the self (e.g., Frijda et al., 1989; Roseman et al., 1990; Smith & Ellsworth, 1985; Tong, 2015); confidence, challenge, and determination are associated with a greater sense of certainty and belief in one's ability to cope (e.g., Ellsworth & Smith, 1988b; Frijda et al., 1989; Smith & Ellsworth, 1987); and contentment is associated with the appraisal that the self is in control of events (e.g., Tong, 2015; Tong & Jia, 2017).

In contrast, *negative self-regard emotions* are associated with unfavorable self-views. These emotions arise from circumstances that put the self in a negative light, making one feel bad about oneself, such as failing to achieve/retain an important goal, being unable to avoid/reduce a threat, and causing a moral blunder. They include sadness, fear, and shame, which are respectively linked to personal losses, overpowering threats, and moral frailty, prompting one to be doubtful or critical of the self. Individuals feeling these emotions may question their ability to achieve, master a situation, or do the right thing, and associate the self with significant shortcomings.

Appraisal theory research has demonstrated that negative self-regard emotions are associated with the theme of reduced personal control. Sadness is associated with perceived loss in control (e.g., Ellsworth & Smith, 1988a; Roseman et al., 1990); fear involves appraisals of unpredictability and a sense of powerlessness (e.g., Ellsworth & Smith, 1988a; Roseman et al., 1990; Smith & Ellsworth, 1985); and shame and guilt are associated with a greater sense of powerlessness and appraisals that one is unable to control the situation (e.g., Roseman et al., 1990; Tong et al., 2007), supporting propositions that these self-conscious emotions signal to oneself personal deficiencies and weakness (e.g., Lewis, 1971; Roseman, 1984).

Hence, our theorizing leads to the following hypotheses:

H1: Income should positively predict positive self-regard emotions.

H2: Income should negatively predict negative self-regard emotions.

H3: Income should positively predict sense of control which in turn should positively predict positive self-regard emotions.

H4: Income should positively predict sense of control which in turn should negatively predict negative self-regard emotions.

Income, Other-Regard Emotions, and Global Emotions

It is important to also test whether income reliably predicts other forms of emotions in both magnitude and replicability. If income is indeed robustly related to self-regard emotions, we expected these relationships to be both *stronger* and *more replicable* than the relationships between income and other emotions. To this end, we compared self-regard emotions with other-regard emotions and global emotions.

We differentiate between *positive other-regard emotions* and *negative other-regard emotions*. By *other-regard*, we refer to how positively or negatively one thinks and feels about others. We use *others* to broadly refer to different kinds of social agents, including a specific person, a group of people, humankind in general, and so forth. It primarily refers to the direct target of the emotion (e.g., the benefactor of the grateful person), but consistent with the fact that emotions exact incidental effects that spill across situations, it may also refer to others beyond the direct targets (e.g., grateful people are prosocial not only to benefactors but also nonbenefactors and people in general; e.g., Bartlett & DeSteno, 2006).

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[1] *Self-view*, consistent with its general usage in the literature, refers to one's conceptualization of the self on attributes such as ability, roles, values, motivation, moral qualities, and so forth. *View of others* refers to one's conceptualization of other people on similar attributes.

Accordingly, positive other-regard emotions are associated with positive views of others. These emotions could result from various positive interpersonal circumstances such as being cared for, feeling loved, witnessing or getting to know about an altruistic act, and learning prosocial values. As a consequence, one sees value and good qualities in others such as viewing them as deserving of good things in life, able to develop and grow, and capable of good deeds. These emotions include gratitude, love, compassion, and any feeling of closeness to others. In contrast, negative other-regard emotions such as anger are associated with negative views of others, arising from negative interpersonal situations including physical or psychological assault, feeling unloved or unappreciated, and absorbing wrong social values. As a result, others are perceived such as having bad qualities, undeserving of good outcomes, or being incapable of growing.[2, 3]

It is unclear whether other-regard emotions and income are related. One perspective states that higher social class promotes independent ideals and lower social class cultivates interdependent attributes (Kraus et al., 2012; Stephens et al., 2013). High social class promotes independence-related ideals because having greater economic capital and more life opportunities encourages pursuit of personal goals and self-expression. This perspective would posit the same prediction we argue for, that is, that income should predict greater positive self-regard emotions. In contrast, restricted by financial concerns and weaker prospects, those lower in socioeconomic status should have less time for personal aspirations and instead have to cope with external, uncontrollable forces to get by in life. It is thus argued that individuals of a lower social class are chronically compelled to adapt to and rely on others, resulting in an interdependent self. Hence, this perspective would predict that lower income should positively (negatively) predict positive (negative) other-regard emotions. There is some evidence to support a link between lower social class and interdependence (e.g., Stephens et al., 2007), but economically disadvantaged contexts do not necessarily cultivate interdependence-related qualities. Chronic adverse experiences under the influence of uncontrollable forces can breed helplessness. It is also plausible in our view that when vulnerabilities are perennially exposed and hopes are repeatedly thwarted, helplessness, disillusionment, and even resignation result rather than interdependence attributes. Indeed, a body of research found that lower income predicted poorer sense of control (e.g., Price et al., 2002), powerlessness (e.g., Mirowsky & Ross, 1986), stress (e.g., Gallo et al., 2005), and so on, all manifestations of having been through prolonged and difficult life challenges.

In addition, appraisal theory research has failed to find a consistent link between other-regard emotions and sense of control. Positive other-regard emotions have been found to be positively associated (Roseman et al., 1990), negatively associated (e.g., Tong, 2015), and also not associated with control (Ellsworth & Smith, 1988b). Negative other-regard emotions have been found to be positively related (e.g., Smith & Ellsworth, 1985, 1987), negatively related (e.g., Tesser, 1990; Tong et al., 2007), and not related to control appraisals (Frijda et al., 1989; Scherer & Ceschi, 1997).

Given the opposing theoretical arguments and mixed empirical findings, we are unable to make a priori hypotheses concerning income and other-regard emotions. We could at the minimal expect that compared with relationships between income and self-

regard emotions, these relationships should be weaker and harder to replicate across studies:

H5: The relationship between income and positive self-regard emotions should be larger and more replicable than any relationship between income and positive other-regard emotions.

H6: The relationship between income and negative self-regard emotions should be larger and more replicable than any relationship between income and negative other-regard emotions.

The other set of emotions we propose to compare self-regard emotions with are *positive global emotions* and *negative global emotions*, which are broad positive and negative affect without a clear regard focus (e.g., someone who is "happy" could be feeling pride or gratitude). Given the ambiguity, it is unclear whether income is linked to these emotions and as mentioned earlier, findings on income and global emotions are inconsistent. Like the other-regard emotions, we hypothesized the following:

H7: The relationship between income and positive self-regard emotions should be larger and more replicable than any relationship between income and positive global emotions.

H8: The relationship between income and negative self-regard emotions should be larger and more replicable than any relationship between income and negative global emotions.

Current Research

We tested these hypotheses using the most comprehensive and largest data to date. We focused on personal income, given that our theory describes processes concerning the self; if unavailable, we examined household income as a proxy. The challenge was locating data sets with the emotions of interest. Numerous income studies measured emotions, but very few assessed distinct positive emotions. We located five large data sets and grouped them into three studies. Four of these data sets contain specific positive emotions and are the only studies that measured specific positive emotions that we are aware of. Study 1 comprised three cross-sectional East Asian samples, two in Singapore (Studies 1a and 1b) and one in Japan (Study 1c). Study 2 examined a two-phase American dataset that spanned about 10 years. Study 3 analyzed data from the Gallup World Poll (GWP) which included 162 nations. Studies 1 and 2 contained all or most of the emotions of both valence. Study 3 contained only negative emotions, but given the huge *N* across many countries, it would give highly reliable estimates of the relationships between income and negative emo-

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[2] In the online supplementary materials, we report evidence validating the differences in regard between the four positive and negative self- and other-regard emotions.

[3] Our model differentiates positive and negative emotions according to regard. Imada and Ellsworth (2011) and Kitayama et al. (2000) separately proposed similar models that differentiate emotions according to agency and social-engagingness respectively. The third models overlap considerably with largely similar emotions in the different categories except that different aspects of emotional experiences (agency, social-engagingness, regard) are emphasized. Our model is derived from our theory concerning how income might affect particular emotions via control and is hence applied in this research.

tions. The use of multiple data sets is obviously important for ascertaining the robustness of the relationships.

In addition, Study 2 tested for long-term, directional relationships between income and the self-regard emotions. If income is uniquely related to self-regard emotions, it should also be predictive of the same emotions in the future. This study also addressed gaps in the literature as to whether income predicts future well-being. First, there is evidence from longitudinal studies (e.g., Soto & Luhmann, 2013, which analyzed three studies spanning about 9 years) that life satisfaction can change in tandem with income. These findings implied stable relationships between income and well-being but no directional relationships were demonstrated. Second, Diener et al. (2013) found that income predicted life satisfaction the following year, repeatedly, over 7 years. However, each year comprised different participants, making it unclear whether income can predict future well-being within the same individuals. Third, providing some evidence suggestive of causality, Gardner and Oswald (2007) found that individuals who won larger lottery prices (above £1000) reported greater improvements in mental health 2 years later than those who did not win or who won a smaller prize. However, the study spanned only 2 years. Further, no past studies examined specific emotions. Despite their weaknesses, these past studies suggest that current income might predict future well-being over a prolonged period. Study 2 tests this idea by analyzing whether income reported at the first phase predicted higher (lower) levels of positive (negative) self-regard emotions reported at the second phase within the same sample, controlling for the same emotions reported at the first phase. Hence, we followed the participants over about 10 years and examined whether income could predict future self-regard emotions even after accounting for preexisting tendencies to experience the same emotions.

If income can predict future self-regard emotions, and if sense of control does mediate these relationships, it stands to reason that sense of control should mediate the directional relationships from income to self-regard emotions. The mediating role of sense of control would first be tested in Study 1c, but because Study 1c was a cross-sectional study, it could only reveal statistical mediation. Study 2 would provide the critical test on whether sense of control could mediate the relationships between income and future self-agency emotions in a way that would suggest a directional mediation relationship.

Analytical Considerations (Including Power)

We tested all income-emotion relationships with and without controlling for two key covariates (sex, age). Large general-public samples are inherently heterogeneous which may introduce data noises that obfuscate actual relationships. Covariates factor out these unwanted variances but may distort estimations. We tested whether the income-emotion relationships remained robust with and without the covariates and restricted our analyses to just two key covariates. Further, large sample sizes (particularly Study 3) could make many relationships significant. Thus, we examined both significance levels and effect sizes.

Past studies on the relationship between income and life satisfaction found small but robust effect sizes (e.g., averaged $r = .13$, Diener & Oishi, 2000). Hence, we expected small relationships between income and both self-regard emotions. A highly conser-

vative power analysis based on a low effect size estimate of $r = .10$ with an alpha of .05 and conventional power of .80 indicated a minimum N of 616 participants. All studies meet this requirement, and Studies 2 and 3 would still provide high power if power was increased to .99.

Study 1

Study 1 comprises three similar cross-sectional studies (labeled as 1a, 1b, 1c) conducted on East-Asian samples that collectively provide replicative evidence concerning the relationships between income and self-regard emotions. Because their purpose and results are similar, we describe them together. Study 1c additionally provides evidence of statistical mediation of sense of control on the relationships between income and self-regard emotions.

Method

Participants and Procedure

All studies reported in this article have obtained IRB approval from our university. Data for Study 1a were from a three-wave study on religion in Singapore. Income data were collected in Wave 1. Wave 3 contained the most complete set of emotion items for the current study (data for all waves are uploaded at https:// osf.io/zcxy/?view_only=9e6b241622474ef4bdfdaf5ee53e69af). Data for Study 1b were from a single-session well-being survey in Singapore (data in https://osf.io/zcxy/?view_only=9e6b241622474 ef4bdfdaf5ee53e69af). Both studies contained all emotions of interest except negative global emotions. Participants in both studies were randomly selected from Qualtrics' panel database, contacted by emails, and completed surveys online with different incentives (e.g., gift cards, redeemable points). Study 1a comprised 674 participants (50.45% male; $M_{age} = 41.35$, $SD = 12.44$). Study 1b comprised 1,273 participants (44.9% male; $M_{age} = 36.09$, $SD = 9.11$).

Study 1c examined data from Phase 2 of the Midlife in Japan (MIDJA2) survey. Only Phase 2 contained income and all six targeted emotions. Participants were residents in Tokyo who previously participated in the first phase. An interviewer delivered a questionnaire package to their home and collected it from them a week later. There were 657 participants (47.0% males; $M_{age} = 59.25$, $SD = 13.54$) and were each awarded 3,000 yen.

Materials

Like past research, most of the current income data in the five studies were skewed to the right. For Studies 1a to 1c, log-transformation was applied. Skewness and kurtosis values for raw and transformed scores are presented in the online supplementary materials (Table S2).

Study 1a

Income

Monthly household income (in Singapore Dollars) was measured over 31 income brackets that ranged between 1 (*less than*

$1,000) and 31 (*more than $30,000*) in intervals of $1,000 (i.e., 2 = *$1,000 to $1,999,* and so on).

Emotions

Participants rated their feelings over the past 2 months on these items (in randomized order) on scales from 1 (*not at all*) to 5 (*a great deal*): *proud, satisfied,* and *contented* (positive self-regard emotions; α = .74); *sad, scared, afraid, guilty,* and *ashamed* (negative self-regard emotions; α = .89); *grateful, appreciative, thankful, love* and *caring* (positive other-regard emotions; α = .89); *angry* and *annoyed* (negative other-regard emotions; α = .78); *happy, joyful,* and *glad* (positive global emotions; α = .94).[4] Items signifying emotions with no clear focus on self or other regard and/or that denote different emotions were examined as global emotions. For instance, *happy* was examined as a positive global emotion, and in Studies 1c and 2, *restless* and *upset* were examined as negative global emotions. *Restless* commonly means an inability to relax or unpleasant high arousal; *upset* can mean many forms of negative emotions including anger, worry, sad, and general unpleasantness (see https://en.oxforddictionaries.com/).

Study 1b

Income

Participants rated their monthly income after tax deduction and national mandatory saving contribution on the same 31 income brackets used in Study 1a.

Emotions

Participants rated how often they felt several emotions over the past 7 days on 7-point scales that ranged from 1 (*never at all*), 2 (*just once*), 3 (*a few times but not a lot*), 4 (*some of the time*), 5 (*quite a number of times*), 6 (*many times*), to 7 (*Most of the time [every day/almost every day]*): *proud, accomplished, productive, confident, encouraged, challenged to achieve something, determined, motivated, resolute, unwavering, courageous, brave, bold, contented, satisfied, pleased,* and *gratified* (positive self-regard emotions; α = .95); *sad, depressed, gloomy, worried, nervous, anxious, afraid, guilty, remorseful, regretful, ashamed, embarrassed,* and *timid* (negative self-regard emotions; α = .94); *grateful, thankful, appreciative, love, fond of someone, affectionate, caring, compassionate, sympathetic, concerned for someone, close to someone,* and *connected to someone* (positive other-regard emotions; α = .94); *angry, annoyed* and *infuriated* (negative other-regard emotions; α = .80); *joyful, glad, happy, delighted, elated, ecstatic, euphoric, overjoyed, amused, funny,* and *humorous* (positive global emotions; α = .94).

Study 1c

Income

Participants reported their personal income for the past 12 months on a 5-point scale as follows: 1 (*less than 80,000¥*), 2

(*80,000¥ to 210,000¥*), 3 (*210,000¥ to 420,000¥*), 4 (*420,000¥ to 830,000¥*), and 5 (*830,000¥ or more*).

Emotions

Participants rated the extent to which they felt the following emotions over the past 30 days on scales that ranged from 1 (*not at all*) to 5 (*all the time*): *satisfied, proud,* and *confident* (positive self-regard emotions; α = .82); *so sad no one could cheer me up, nervous, hopeless, worthless, afraid, jittery,* and *ashamed* (negative self-regard emotions; α = .85); *close to others* and *belong* (positive other-regard emotions; α = .84); *angry* and *irritable* (negative other-regard emotions; α = .72); *cheerful, good spirits, extremely happy, calm and peaceful, full of life, enthusiastic,* and *active* (positive global emotions; α = .91); *restless* and *upset* (negative global emotions; α = .66).

Sense of Control

Participants completed the Perceived Control scale (Lachman & Weaver, 1998) on 7-point scales ranging from 1(*strongly disagree*) to 7 (*strongly agree*). The scale comprised a personal mastery subscale and a perceived constraints subscale. Given that there was no theoretical reason to examine the subscales separately and the 12 items created an internally consistent scale (α = .83), all items were averaged.

Results

Descriptive statistics for all studies are presented in Table 1. To enable comparisons at a glance, all correlations between income and emotions for the five studies are presented in Table 2 (Panel A).[5] Other correlations that are less pertinent for the current research are presented in the online supplementary materials (Tables S3 to S6). Income correlated positively with positive self-

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[4] Past studies indicate that *pride* in self-report measures are dominantly interpreted as self-related pride as opposed to others-related pride (e.g., Kitayama et al., 2000; Tong & Jia, 2017). However, the possibility remains that some participants might be more prone to experience pride towards the achievement or good qualities of others and interpret pride items accordingly. The current studies (due to the items available) are unable to examine this issue. We would classify such forms of pride as a positive other-regard emotion and the same predictions made in the paper for these emotions would apply.

[5] In all studies, confirmatory factor analysis (CFA) that grouped the emotions into the current six categories did not produce optimal fit. We believe this is due to co-occurrences among same-valence emotions. Despite their conceptual uniqueness and having different antecedents and consequences, positive emotions co-occur frequently and to some extent negative emotions as well (Ellsworth & Smith, 1988a, 1988b; Tong & Jia, 2017). Indeed, in the four samples in Studies 1 and 2, positive self-regard and positive other-regard emotions correlated at between $r = .68$ and .79, and negative self-regard and negative other-regard emotions correlated at between $r = .61$ and .72 (see the online supplementary materials). Hence, same-valence emotions may correlate but it does not necessarily imply that they are identical. CFA is ill-suited for distinguishing conceptually different but co-occurring constructs and could run into identification or convergence issues. For Study 1a and 1b, despite these problems, CFA produced acceptable fit: Study 1a, $\chi^2(125) = 686.02$, $p < .001$, CFI = 0.93, RMSEA = 0.089, SRMR = 0.079; Study 1b, $\chi^2(1474) = 9052.24$, $p < .001$, CFI = 0.86, RMSEA = 0.064, SRMR = 0.074. The models in Study 1c and 2 did not converge. Past studies on similar classification models either did not apply grouping analyses or likewise found poor fit (Imada & Ellsworth, 2011; Kitayama et al., 2000).

Table 1

Means and SDs for All Variables Across All Studies

Variable	Study 1a (Singapore study I)		Study 1b (Singapore study II)		Study 1c (MIDJA)		Study 2 (MIDUS2)		Study 2 (MIDUS3)		Study 3 (GWP)	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Income	8.10	5.39	5.02	4.14	2.61	1.14	42124.16	40450.56	56114.89	58402.68	3.98	.70
Positive self-regard emotions	2.87	.78	3.58	1.23	3.06	.77	3.60	.78	3.58	.80		
Positive other-regard emotions	3.34	.78	4.08	1.31	3.29	.80	3.67	.88	2.35	.90		
Negative self-regard emotions	2.42	.84	2.82	1.17	1.67	.60	1.38	.51	1.35	.51	.29	.38
Negative other-regard emotions	2.66	.84	9.24	3.75	2.01	.76	1.92	.70	1.75	.70	.20	.40
Positive global emotions	3.26	.84	3.50	1.32	3.20	.68	3.47	.68	3.47	.69		
Negative global emotions					2.00	.74	1.82	.70	3.27	.82		
Sense of control					4.66	.81	5.52	1.00	5.44	1.02		

Note. In Study 1a, income was reported across 31 monthly income brackets. In Study 1b, income was reported on the same 31 monthly income brackets after tax deduction and contribution to a compulsory saving fund. In Study 1c, income was reported across four annual income brackets. In Study 2, annual income was reported in U.S. dollars. In Study 3, the mean is based on log-transformed income instead of raw income, because given the large sample, there were many participants with very high annual household income (> \$1million to several million) that inflates the mean and *SD*. In Studies 1a, 1c, and 2, emotions were measured on 5-point scales ranging from 1 to 5; in Study 1b, emotions were measured in 7-point scales. In Study 3, emotions were measured on a binary scale (1 = yes, 0 = no). Sense of control was measured in 5-point scales ranging from 1 to 5. See text for point labels.

regard emotions in all three studies. It did not correlate with positive other-regard emotions except in Study 1b where a positive correlation was found. In all three studies, income correlated negatively with negative self-regard emotions and did not correlate with negative other-regard emotions. Income correlated with positive global emotions only in Study 1b. All relationships were small in magnitude; largest $r = .20$. Next, we conducted tests comparing the magnitude of the correlations within each valence, specifically comparing correlations with the self-regard emotions against the correlations with the other-regard emotions and global emotions. As shown in Table 2 (Panel B), the correlations between income and positive self-regard emotions were significantly greater than those between income and positive other-regard emotions in Study 1a, Study 1b, and Study 1c. Income also correlated more strongly with positive self-regard emotions than with positive global emotions in all three studies. The negative associations between income and negative self-regard emotions were significantly larger than those between income and negative other-regard emotions in all three studies. In Study 1c, income showed a stronger negative correlation with negative self-regard emotions than with negative global emotions.

Controlling for sex and age, we found a nearly identical pattern of correlations (see Table 2, Panel A). That is, income tended to correlate significantly with the self-regard emotions in the predicted directions, and not with the other-regard and global emotions except for a small number of exceptions. Differences in magnitude of these associations were similar to those associations without covariates. Income positively predicted positive self-regard emotions more strongly than positive other-regard emotions and positive global emotions across Studies 1a to 1c. Furthermore, in Study 1c income negatively predicted negative self-regard emotions more strongly than negative other-regard emotions across all studies, and more strongly than negative global emotions.

We examined whether sense of control statistically mediated the relationships between income and the self-agency emotions in Study 1c. Two bootstrap analyses with 5,000 resamples (Preacher & Hayes, 2004) were conducted each with a self-regard emotion as outcome. Sense of control mediated the relationship between in-

come and positive self-regard emotions, indirect effect = .21, $SE = .07$, 95% CI [.08, .34]. Income positively predicted sense of control, $b = .59$, $SE = .15$, $p = .001$, 95% CI [.23, .83], which in turn positively predicted positive self-regard emotions, $b = .40$, $SE = .04$, $p < .001$, 95% CI [.33, .47]. The direct relationship between income and positive self-regard emotions was no longer significant, $b = .15$, $SE = .13$, $p = .27$, 95% CI [−.11, .41]. Sense of control also mediated the relationship between income and negative self-regard emotions, indirect effect = −.15, $SE = .05$, 95% CI [−.25, −.06]. Income positively predicted sense of control, $b = .53$, $SE = .15$, $p = .001$, 95% CI [.22, .83], which negatively predicted negative self-regard emotions, $b = −.28$, $SE = .03$, $p < .001$, 95% CI [−.33, −.22]. The direct relationship between income and negative self-regard emotions remained significant, $b = −.22$, $SE = .10$, $p = .04$, 95% CI [−.42, −.03].

Study 2

Study 1 found consistent evidence from three East Asian samples that income was related to self-regard emotions (supporting *H1* and *H2*). In contrast, the relationships with other-regard and global emotions were statistically smaller and more difficult to replicate (supporting *H5* to *H8*). There was also initial evidence that sense of control mediates the relationships between income and self-regard emotions (supporting *H3* and *H4*).

Study 2 extended these findings in three ways. First, we attempted to replicate the findings in a Western economy using the Midlife in the United States (MIDUS) survey, a multiphase longitudinal study. Second, we tested for a directional relationship from income to self-regard emotions. The second and third phases (MIDUS2 and MIDUS3), about 10 years apart, contained income and self-regard emotions. Using cross-lagged panel models (CLPMs), we tested our hypotheses that income at MIDUS2 should predict higher (lower) levels of positive (negative) self-regard emotions in MIDUS3, controlling for baseline positive (negative) self-regard emotions at MIDUS2. Because baseline self-regard emotions were controlled for, the analyses would be a strong test of whether there was a directional relationship from

Table 2
Correlations Between Income and Emotions and Differences in Correlations Across All Studies

Emotion	Study 1a (Singapore study I) N = 674	Study 1b (Singapore study II) N = 1,273	Study 1c (MIDIA) N = 657	Study 2 (MIDUS2) N = 4,010	Study 2 (MIDUS3) N = 2,711	Study 3 (GWP) N = 1,626,360	Averaged r across studies	95% CI of averaged r
			Panel A: Correlations between income and emotions					
Positive self-regard emotions (PSRE)	.13**(.13**)	.20***(.19***)	.09*(.17***)	.10***(.10***)	.12***(.13***)		.12***	[.10, .14]
Positive other-regard emotions (PORE)	.06 (.05)	.09***(.11***)	−.03 (.06)	.01 (.05**)	.04*(.08***)		.03*	[.001, .05]
Negative self-regard emotions (NSRE)	−.09*(−.13**)	−.11**(−.07*)	−.13**(−.11**)	−.14***(−.14***)	−.14***(−.13***)	−.13***(−.08***)	−.13***	[−.13, −.13]
Negative other-regard emotions (NORE)	−.02 (−.04)	−.04 (−.02)	−.04 (−.04)	−.04*(−.09***)	−.04†(−.08***)	−.04***(−.03***)	−.04***	[−.04, −.04]
Positive global emotions (PGE)	.07†(.06)	.15***(.17***)	.01 (.13***)	.07**(.08***)	.08***(.10***)		.08***	[.06, .10]
Negative global emotions (NGE)			−.05 (−.05)	−.06†(−.08***)	−.08***(−.10***)		−.03	[−.05, .00]
			Panel B: Comparison of correlations in Panel A[a]					
PSRE vs. PORE	2.32*(2.51**)	5.27**(5.93**)	4.72**(4.15**)	7.26***(4.48***)	4.90***(3.18***)	99.32***(55.97***)		
PSRE vs. PGE	1.69*(2.04*)	2.40*(1.90*)	3.68*(1.86*)	3.05**(2.13*)	3.41***(2.48**)			
NSRE vs. NORE	2.25**(2.58**)	2.81**(2.38**)	2.79*(2.29*)	7.48***(3.50***)	5.91***(2.84**)			
NSRE vs. NGE			2.73**(2.18*)	5.17***(4.65***)	2.72*(1.69†)			

Note. Panel A: The numbers in Studies 1 and 2 are zero-order correlations between income and emotion. The numbers in Study 3 are sample-weighted averaged zero-order *r*s computed across 162 nations; *r*s for individual nations are in the online supplementary materials. In parenthesis are partial *r*s controlling for gender and age in each study. Each averaged zero-ordered *r* across studies (second last column) was weighted according to sample size.
a Pairs of correlations are compared within valence; figures are *Z* scores.
† *p* < .10. * *p* < .05. ** *p* < .01. *** *p* < .001.

current income to future self-regard emotions. We also explored whether current self-regard emotions at MIDUS2 predicted future income at MIDUS3 controlling for income at MIDUS2 using the same models. Third, we tested whether sense of control, which was measured at both phases, temporally mediated the directional relationships from income to the self-regard emotions.

Method

Participants and Procedure

MIDUS2 and MIDUS3 were conducted in 2004–2006 and 2013–2014, respectively, following MIDUS1 in 1995–1996. MIDUS2 comprised 4,010 English-speaking adults (45.0% males; M_{age} = 56.23, *SD* = 12.39) in the United States, sampled at random from telephone banks in five metropolitan areas. They completed questionnaires for a US$60 incentive. In 2013, 2,711 of these participants (55.4% males; M_{age} = 64.49, *SD* = 11.17) completed questionnaires for MIDUS3 for a US$72 incentive. In both phases, the questionnaires were mailed to participants by post, which they mailed back.[6]

Materials

Income. Personal income was the sum of three measures. Participants reported their personal annual earnings (wages and stipends), pension, and social security income. The data were again skewed. Some reported $0 income (7.5% in MIDUS2, 5.4% in MIDUS3), which cannot be log-transformed. We applied the square-root transformation which could be applied on zero scores and normalized the distribution better than log-transformation (see normality statistics in the online supplementary materials, Table S2). Adding a constant of 1 and then log-transforming the distribution worsened the normality (MIDUS2: skewness = −2.61, kurtosis = 5.92; MIDUS3: skewness = −2.94, kurtosis = 8.53).

Emotions. In both waves, participants rated the same emotion items from Study 1c, on 5-point scales ranging from 1 (*all the time*) to 5 (*none of the time*). They also rated a general positive feeling and a general negative feeling item ("Were the positive (negative) feelings you reported over the last 30 days more or less positive (negative) than you usually feel or about the same as usual?") on a 7-point scale that ranged from 1 (*a lot more positive (negative) than usual*) to 7 (*a lot less positive (negative) than usual*). We included these items to measure positive and negative global emotions respectively, by first standardizing both these and the emotion items before averaging them. Internal reliabilities for MIDUS2 and MIDUS3 were: positive self-regard emotions (α_{MIDUS2} = .81, α_{MIDUS3} = .82); negative self-regard emotions (α_{MIDUS2} and α_{MIDUS3} = .86); positive other-regard emotions (α_{MIDUS2} = .84, α_{MIDUS3} = .86); negative other-regard emotions (α_{MIDUS2} = .71, α_{MIDUS3} = .72); positive global emotions (α_{MIDUS2} and α_{MIDUS3} = .89); negative global emotions (α_{MIDUS2} = .53, α_{MIDUS3} = .13). We dropped the general negative

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[6] Study 1a, 1c, and 2 examined data from a later phase of their respective original studies. Attrition from the first phase could be expected. As described in the online supplementary materials, we found no evidence that missing data due to attrition affected the relationships between income and self-regard emotions and also the mediating effect of sense of control.

feeling item and the alpha for negative global emotions in MIDUS3 improved to .63.

Sense of Control. Participants completed the Perceived Control scale (Lachman & Weaver, 1998) on 7-point scales that ranged from 1(*strongly agree*) to 7 (*strongly disagree*). Items at both MIDUS2 (α = .87) and MIDUS3 (α = .87) were averaged.

Results

Within each phase, all available participants for that phase were analyzed; analyses that were conducted across phases employed those who completed both phases.

Concurrent Relationships Between Income and Self-Regard Emotions

We first examined the relationships at each phase. As shown in Table 2 (Panel A), income consistently correlated positively with positive self-regard emotions and negatively with negative self-regard emotions at both MIDUS2 and MIDUS3. The relationships between income and the other-regard emotions were not consistent. Income was positively related to positive other-regard emotions only in MIDUS3. Income was positively (negatively) associated with positive (negative) global emotions in both phases. In both phases, income positively predicted positive self-regard emotions more strongly than positive other-regard emotions and positive global emotions (Table 2, Panel B). Also, in both phases, the correlations between income and negative self-regard emotions were significantly larger than those between income and negative other-regard emotions and those between income and negative global emotions. We found similar patterns of results controlling for the covariates. In both MIDUS2 and MIDUS3, income positively predicted positive self-regard emotions more strongly than positive other-regard emotions and positive global emotions, and predicted negative self-regard emotions more strongly than negative other-regard emotions and negative global emotions. Hence, there was support for *H1*, *H2*, and *H5–H8*.

Temporal Relationships Between Income and Self-Regard Emotions

Our next objective was to test the hypotheses that income at MIDUS2 should predict self-regard emotions at MIDUS3, controlling for the same self-regard emotions at MIDUS2. We also explored whether current self-regard emotions predicted future income controlling for current income. We employed CLPMs using structural equation modeling based on maximum-likelihood estimation in the lavaan package in R (Rosseel, 2012). Ideally, we should be able to test a model that includes all six emotions. However, as noted previously, CFA could not produce an optimal fit for such a model which is attributable to these emotions, especially the positive ones, co-occurring. Furthermore, standard practice in CLPM is to test hypothesized relations. Other-regard and global emotions were examined for secondary purposes with no a priori predictions.

We adopted the following approach: We first conducted several regression analyses separately on each emotion to evaluate whether there was a possibility of income temporally predicting it at all. In each analysis, emotion$_{MIDUS3}$ was regressed onto income$_{MIDUS2}$ (predictor), emotion$_{MIDUS2}$ (controlling for base-

line), and income$_{MIDUS3}$ (controlling for any influence due to income at the same phase). Gender and age were controlled for. Only emotions exhibiting a directional relationship from income were included into the CLPM model. This approach reduces redundancy, avoids nonconvergence due to multicollinearity, and enables a concise model that captures only actual temporal relations.

Summarizing the key results, income$_{MIDUS2}$ predicted only higher levels of future positive self-regard emotions, B = .0004, p = .021, and lower levels of future negative self-regard emotions, B = −.0003, p = .030. Small effect sizes are typical of temporal relationships controlling for baselines (Adachi & Willoughby, 2015). It did not predict future levels of the other emotions, all absolute Bs < .0002, ps > .216. Hence, the pattern of relationships was consistent with predictions and supports a parsimonious CLPM that includes only the hypothesized relationships.

In our CLPM model, income, positive self-regard emotions, and negative self-regard emotions were tested as latent factors with indicator variables; age and gender were controlled for. The latent income factor was represented by the transformed income variable (rescaled by dividing by 100 to reduce variance), with the error variance of observed income fixed to zero. The latent factor of positive self-regard emotions was represented by the three observed indicators (*proud, satisfied, confident*). An initial CFA on the negative self-regard emotions items found a poor fit when all seven items were loaded onto one factor. Additional analyses guided by modification indices recommended that the seven items be grouped into four indicators as follows—*sad; ashamed*; *afraid, jittery,* and *nervous*; *hopeless* and *worthless*—and the last two indicators be allowed to correlate. The fit for this grouping of the negative self-regard items was excellent at both MIDUS2, $\chi^2(1)$ = 4.93, p = .026, CFI = 1.00, RMSEA = 0.03, SRMR = 0.01, and MIDUS3, $\chi^2(1)$ = 10.40, p = .001, CFI = 1.00, RMSEA = 0.06, SRMR = 0.01.

We first evaluated the measurement model, following Hu and Bentler's (1999) recommendations. Latent factors were allowed to correlate within each phase. Error terms for the same indicators were allowed to correlate across time points. The resulting model produced a strong fit, $\chi^2(82)$ = 381.75, p < .001, CFI = 0.98, RMSEA = 0.04, SRMR = 0.04.

Next, we examined the structural models which specify relationships among the latent factors. Two types of paths were specified. The first were autoregressive paths between the same latent factor across time (e.g., the path between positive self-regard emotions at MIDUS2 and MIDUS3), which assessed the temporal stability of the construct. The second were cross-lagged paths between different latent factors (e.g., the paths between income at MIDUS2 and positive self-regard emotions at MIDUS3 and vice versa), which tested temporal relationships between income and emotions. We compared several competing structural models: (a) a model with only autoregressive effects (autoregressive model); (b) a model with autoregressive effects and cross-lagged paths from income at MIDUS2 to both positive and negative self-regard emotions at MIDUS3 (Income → Emotion model); (c) a model with autoregressive effects and cross-lagged paths from positive and negative self-regard emotions at MIDUS2 to income at MIDUS3 (Emotion → Income

model); and (d) a fully cross-lagged model that combined the previous three models, with autoregressive effects and reciprocal effects between income and both self-regard emotions (fully cross-lagged model).

The fit indices for each model are presented in Table 3 (Panel A). The fit of all four models were strong. We compared the models using the χ^2_{diff} test. Both the Income → Emotion model, $\chi^2_{diff}(2) = 17.21$, $p < .001$, and the Emotion → Income model, $\chi^2_{diff}(2) = 10.73$, $p = .005$, fitted the data better than the autoregressive model, implying that there were relationships from income to emotions and from emotions to income than just correlations across time between the same variables. Importantly, the fully cross-lagged model provided a significantly better fit than both the Income → Emotion model, $\chi^2_{diff}(2) = 10.56$, $p = .005$, and the Emotion → Income model, $\chi^2_{diff}(2) = 17.04$, $p < .001$, implying that the best fit to the data is a model that specifies bidirectionality between income and emotion. The reciprocal model is pictorially presented in Figure 1. Income at MIDUS2 significantly predicted greater positive self-regard emotions, $\beta = .08$, $p < .001$, and lower negative self-regard emotions, $\beta = -.07$, $p = .002$, at MIDUS3. However, positive self-regard emotions, $\beta = .01$, $p = .70$, and negative self-regard emotions, $\beta = -.05$, $p = .08$, at MIDUS2 did not predict income at MIDUS3.

Sense of Control as a Mediator of the Temporal Relationships

Next, we examined whether sense of control mediated the temporal relationship between income at MIDUS2 and both self-regard emotions at MIDUS3. We built on the fully cross-lagged model identified above, with sense of control added as a mediator. The latent factor for sense of control was represented by two indicators indexed by personal mastery and perceived constraints (reverse-coded). We followed the recommendations of Maxwell and Cole (2007) to test mediation in a two-wave cross-panel design. Specifically, two paths were required. The first path estimated the regression of sense of control at MIDUS3 onto income at MIDUS2, controlling for sense of control at MIDUS2 (Path a), and the second path estimated the regression of the self-regard emotions at MIDUS3 onto sense of control at MIDUS2, controlling for the respective self-regard emotions at MIDUS2 (Path b). The product of the two lagged effects (ab) would provide an estimate of the mediation effect.

First, we tested the measurement model, allowing for correlations between latent factors within phase and between error terms for the same indicators across phases. The fit was strong, $\chi^2(133) = 563.94$, $p < .001$, CFI = 0.98, RMSEA = 0.04, SRMR = 0.03.

Next, we ran a baseline model with the four autoregressive paths (e.g., MIDUS2 Income → MIDUS3 Income) but without any cross-lagged associations, which fitted the data well (Table 3, Panel B). When the mediation paths (i.e., Paths a and b) and reciprocal paths between income and emotion were added, there was a significant improvement in model fit, $\chi^2_{diff}(7) = 58.44$, $p < .001$. The full mediation model is presented in Figure 2. Income at MIDUS2 significantly predicted higher sense of control at MIDUS3, $\beta = .10$, $p < .001$, and sense of control at MIDUS2 significantly predicted greater positive self-regard

emotions, $\beta = .14$, $p < .001$, and lower negative self-regard emotions, $\beta = -.09$, $p = .01$, at MIDUS3. Sobel tests corrected for error using bootstrap analyses with 5000 resamples showed that control mediated the effect of income on positive self-regard emotions, $Z = 2.82$, $p = .005$, 95% CI [.004, .02], and on negative self-regard emotions, $Z = -2.23$, $p = .03$, 95% CI [−.01, −.001].

As argued by Maxwell and Cole (2007), it is important to also explore mediation paths in the opposite direction. After adding cross-mediational paths from emotion at MIDUS2 to sense of control at MIDUS3 and sense of control at MIDUS2 to income at MIDUS3, as well as reciprocal direct paths between income and emotion, model fit improved significantly relative to the baseline model, $\chi^2_{diff}(7) = 33.11$, $p < .001$. Positive self-regard emotions, $\beta = .02$, $p = .77$, and negative self-regard emotions, $\beta = .01$, $p = .85$, at MIDUS2 did not predict sense of control at MIDUS3, while sense of control at MIDUS2 predicted higher income at MIDUS3, $\beta = .14$, $p < .001$. The mediation pathways of emotion on income via sense of control was nonsignificant for positive self-regard emotions, $Z = 0.28$, $p = .78$, 95% CI [−.03, .03] and negative self-regard emotions, $Z = .19$, $p = .85$ [−.03, .04]. Hence, sense of control mediated the effect of income on positive and negative self-regard emotions (supporting *H3* and *H4*), and not in the opposite direction.[7]

Study 3

In Study 3, the relationships between income and negative self-regard emotions across several nations were tested using the GWP data. There were no data to examine positive self-regard emotions, but there were data from more than 160 nations to provide the strongest test available on the hypotheses that income is negatively related to negative self-regard emotions and that this relationship is stronger than that with negative other-regard emotions.

Method

Participants and Procedure

The Gallup Organization recruited respondents from 166 countries from 2005 to 2016. Each year comprised independent samples of respondents. Sample size for each nation ranged from 468 (Puerto Rico) to 37,878 (China). Very small nations (e.g., Vanuatu) and restricted countries (North Korea) were excluded. In countries with telephone coverage of at least 80% of the population, participants were largely recruited and participated through telephone surveys. In nations with poor tele-

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[7] In Study 2, there were significant relationships between income and other-regard emotions. We ran the same CLPM conducted on the self-regard emotions to test whether sense of control mediated the temporal relationships between income and positive and negative other-regard emotions. Adjusting for baselines, income at MIDUS2 predicted higher positive other-regard emotions at MIDUS3 ($\beta = .06$, $p = .010$). However, sense of control at MIDUS 2 did not predict positive other-regard emotions at MIDUS3 ($\beta = -.01$, $p = .82$). Income at MIDUS2 did not predict negative other-regard emotions at MIDUS3 ($\beta = -.03$, $p = .18$), and sense of control at MIDUS2 also did not predict negative other-regard emotions at MIDUS 3 ($\beta = .04$, $p = .37$). Hence, sense of control did not mediate relationships with other-regard emotions.

Table 3
Cross-Lagged Panel Models (Study 2)

Model	χ^2	*df*	*p*	CFI	RMSEA	SRMR
Panel A: Cross-lagged relationships between income and emotion						
Autoregressive	517.52	109	<.001	0.97	0.04	0.04
Income → Emotion	500.31	107	<.001	0.98	0.04	0.03
Emotion → Income	506.79	107	<.001	0.98	0.04	0.03
Fully cross-lagged	489.75	105	<.001	0.98	0.04	0.03
Panel B: Cross-lagged relationships between income, emotion and sense of control						
Autoregressive	763.24	170	<.001	0.97	0.04	0.04
Income → Control → Emotion	704.80	163	<.001	0.97	0.04	0.03
Emotion → Control → Income	730.13	163	<.001	0.97	0.04	0.03

communication facilities, recruitment was conducted door-to-door and participants completed face-to-face surveys. All participants completed a back-translated questionnaire in their native language. The sample comprised 1,626,360 participants (755,366 males, 870,974 females; $M_{age} = 40.79$, $SD = 17.41$).

Measures

Economic Predictors. Participants reported their annual household income. Income data were not collected for four countries (Cuba, Dijbouti, Guyana, and Trinidad and Tobago), leaving 162 nations for analyses. The income data were converted from local currency to international dollars, based on purchasing power parity. Income was log-transformed.

Emotions. Participants indicated whether or not (1 = *yes*, 0 = *no*) they experienced certain emotions a lot in the previous day, including *worry*, *sadness*, and *anger*. The items *worry* and *sadness* were averaged, providing the scores for negative self-regard emotions; αs ranged from .37 to .84 across nations. Anger served as the measure for negative other-regard emotions.

Results

Using hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002), we specified a Level 1 model that regressed emotion onto income. Income negatively predicted negative self-regard emo-

Figure 1
Fully Cross-Lagged Model of the Relations Between Income and Self-Regard Emotions (Study 2)
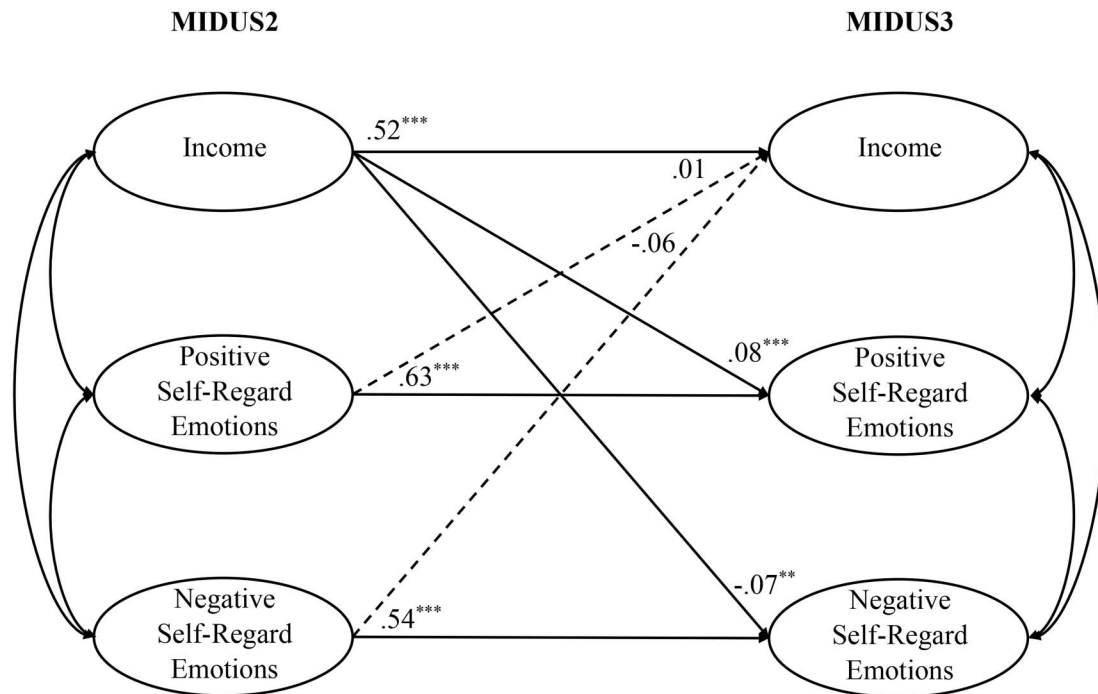
Note. Dashed lines indicate nonsignificant paths. Age and gender were controlled for in all pathways.
** $p < .01$. *** $p < .001$.

Figure 2

Longitudinal Mediation Model of the Relations Between Income, Sense of Control, and Self-Regard Emotions (Study 3)
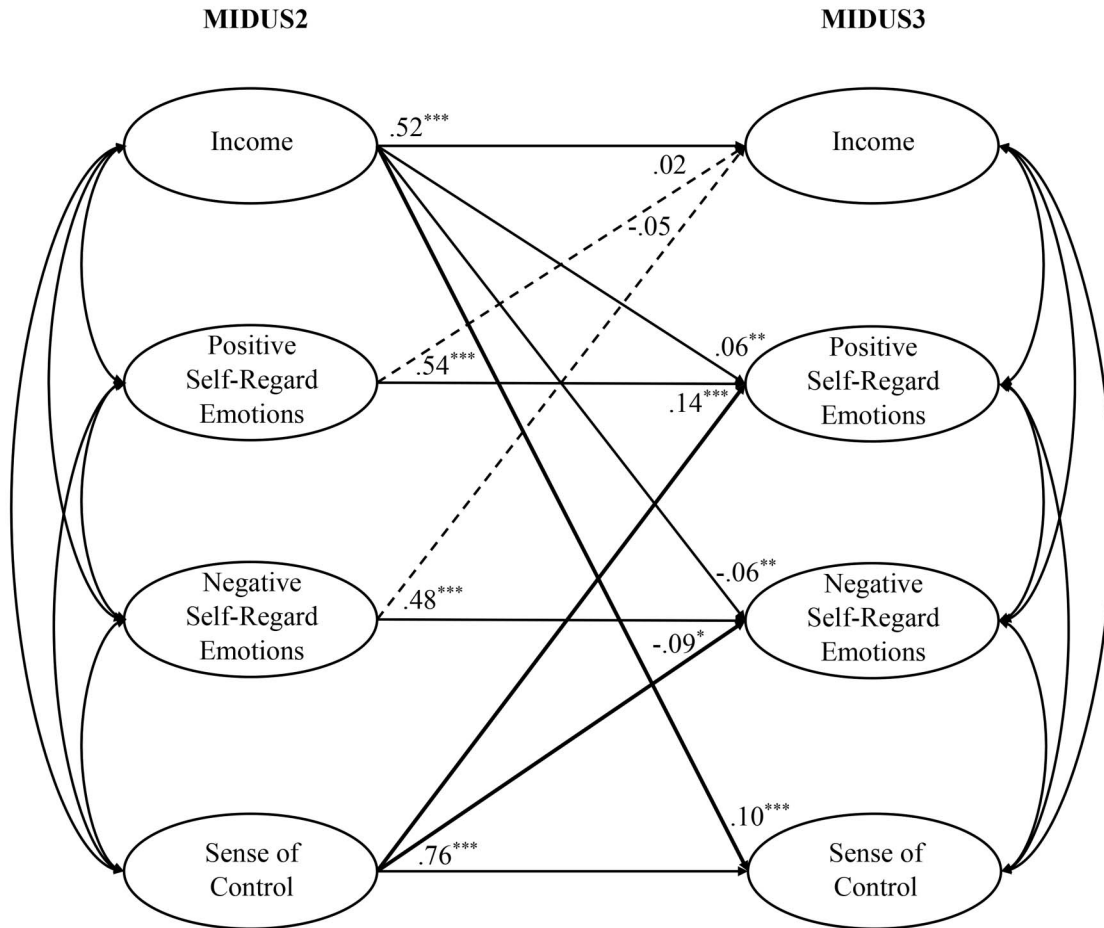

Note. Dashed lines indicate nonsignificant paths and bold lines indicate mediational paths. Age and gender were controlled for in all pathways.

$^* p < .05.$ $^{**} p < .01.$ $^{***} p < .001.$

tions, $b = -.13$, $SE = .01$, $p < .001$. The negative relationship between income and negative other-regard emotions was also significant, $b = -.04$, $SE = .004$, $p < .001$, which is unsurprising considering the huge *N*. We meta-analytically calculated *N*-weighted averaged effect sizes (Lipsey & Wilson, 2001) for each relationship to represent the averaged correlation across all 162 nations. As shown in Table 2, the relationship between income and negative self-regard emotions was about three times larger than that between income and negative other-regard emotions. Controlling for gender and age, the partial *r* representing the association between income and negative self-regard emotions was also significantly larger than that between income and negative other-regard emotions. Hence, there was support for *H2* and *H4*.

As shown in Table 4, the vast majority of the 162 nations showed negative and significant relationships between income and negative self-regard emotions. Only one nation showed a positive (nonsignificant) relationship (Namibia). The relationship was not significant in four other nations but it was in the expected negative

direction. The effect sizes ranged from .01 to .29 (absolute values). Many more relationships concerning income and negative other-regard emotions were not significant, several (16 nations) were positive rather than negative in direction, and the effect sizes were smaller ranging from .001 to .14 (absolute values), reinforcing the point that these relationships are less replicable than that between income and self-regard emotions.[8]

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[8] Different items were used to measure different emotions across different studies. To address whether this might have affected the results, we standardized our measurement by using about the same number (two or three) of items for all six emotions across Studies 1b, Study 1c, and both phases of Study 2 with identical or highly similar wording items for each emotion consistently across these studies, and correlated income with the new measures. The items in Study 1a were too different and Study 3 contained too few items to be comparable. The items used for each emotion and the results are reported in the online supplementary materials (Table S7). The income-emotion relationships based on the standardized items are similar to those reported in Table 2.

Table 4

Correlations Between Income and Emotions and Sample Size in Each Nation (Study 3)

Nation	Income and negative self-regard emotions		Income and negative other-regard emotions	
	r	N	r	N
Afghanistan	−0.14***	8,791	−0.06***	8,731
Albania	−0.16***	7,897	−0.08***	7,830
Algeria	−0.15***	5,931	−0.08***	5,905
Angola	−0.07**	1,901	0.10***	1,877
Argentina	−0.09***	7,957	−0.04***	7,934
Armenia	−0.17***	7,797	−0.07***	7,774
Australia	−0.08***	6,975	−0.02	6,970
Austria	−0.18***	7,951	−0.05***	7,937
Azerbaijan	−0.18***	7,825	−0.10***	7,641
Bahrain	−0.16***	10,132	−0.07***	8,928
Bangladesh	−0.18***	9,934	−0.06***	9,870
Belarus	−0.19***	8,141	−0.01	8,032
Belgium	−0.15***	7,007	−0.10***	6,993
Belize	−0.15**	486	−0.03	481
Benin	−0.12***	5,735	−0.07***	5,712
Bhutan	−0.11***	3,039	−0.01	3,034
Bolivia	−0.17***	7,949	−0.11***	7,915
Bosnia and Herzegovina	−0.21***	7,642	−0.04**	7,591
Botswana	−0.15***	6,611	−0.03**	6,597
Brazil	−0.11***	9,094	−0.09***	9,085
Bulgaria	−0.28***	7,897	−0.04**	7,839
Burkina Faso	−0.04*	6,410	0.01	6,400
Burundi	−0.09***	2,720	−0.03	2,715
Cambodia	−0.09***	7,955	−0.01	7,955
Cameroon	−0.05***	7,953	0.00	7,941
Canada	−0.08***	7,849	−0.02*	7,849
Central African Republic	−0.11***	2,840	−0.02	2,826
Chad	−0.18***	7,866	−0.06***	7,843
Chile	−0.13***	7,979	−0.09***	7,955
China	−0.12***	37,878	−0.03***	37,741
Colombia	−0.16***	7,851	−0.05***	7,841
Comoros	−0.03*	5,930	0.02	4,934
Congo (Kinshasa)	−0.12***	6,914	−0.07***	6,904
Congo Brazzaville	−0.06***	5,406	0.02	5,395
Costa Rica	−0.12***	7,605	−0.04**	7,560
Croatia	−0.18***	7,921	−0.06***	7,862
Cyprus	−0.15***	6,445	−0.06***	6,437
Czech Republic	−0.18***	8,043	−0.04**	7,946
Denmark	−0.04***	7,730	−0.01	7,721
Dominican Republic	−0.11***	7,780	0.00	7,761
Ecuador	−0.16***	7,940	−0.06***	7,920
Egypt	−0.08***	16,740	−0.03***	15,694
El Salvador	−0.08***	7,828	−0.02*	7,764
Estonia	−0.22***	6,558	−0.02	6,517
Ethiopia	−0.17***	5,785	−0.1***	5,780
Finland	−0.10***	6,734	−0.04**	6,729
France	−0.14***	8,720	−0.03*	8,716
Gabon	−0.17***	5,603	−0.07***	5,592
Georgia	−0.19***	7,857	−0.12***	7,794
Germany	−0.13***	27,820	−0.03***	27,798
Ghana	−0.06***	6,587	−0.02	6,572
Greece	−0.24***	7,935	−0.13***	7,907
Guatemala	−0.11***	7,664	−0.01	7,595
Guinea	−0.06***	5,873	−0.03*	5,867
Haiti	−0.13***	2,898	−0.01	2,774
Honduras	−0.08***	7,644	0.01	7,554
Hong Kong	−0.12***	2,670	−0.02	2,668
Hungary	−0.20***	7,002	−0.01	6,961
Iceland	−0.09***	2,621	−0.04*	2,619
India	−0.22***	36,826	−0.08***	36,624
Indonesia	−0.12***	10,055	−0.02	10,043
Iran	−0.08***	8,360	−0.09***	8,351
Iraq	−0.12***	10,622	−0.08***	9,441
Ireland	−0.14***	7,433	−0.05***	7,430
Israel	−0.13***	7,955	−0.07***	7,897
Italy	−0.15***	8,811	−0.04***	8,800
Ivory Coast	−0.10***	4,582	−0.02	4,572
Jamaica	−0.04	1,316	0.01	1,316
Japan	−0.06***	8,962	−0.02*	8,954
Jordan	−0.16***	10,990	−0.10***	9,936
Kazakhstan	−0.07***	7,710	−0.01	7,607
Kenya	−0.09***	7,843	−0.04**	7,836
Kosovo	−0.11***	7,808	−0.06***	7,748
Kuwait	−0.14***	8,929	−0.05***	7,940
Kyrgyzstan	−0.06***	7,887	−0.04**	7,818
Laos	−0.08***	1,962	−0.01	1,956
Latvia	−0.19***	6,459	−0.01	6,410
Lebanon	−0.15***	11,010	−0.13***	9,981
Lesotho	−0.06*	1,778	−0.05*	1,777
Liberia	−0.19***	883	−0.02	881
Libya	−0.10***	2,964	−0.07***	2,950
Lithuania	−0.29***	7,322	−0.05***	7,223
Luxembourg	−0.12***	6,432	−0.02	6,427
Macedonia	−0.15***	6,763	−0.07***	6,682
Madagascar	−0.01	5,998	0.03*	5,993
Malawi	−0.11***	6,921	−0.03**	6,920
Malaysia	−0.05***	6,940	−0.01	6,904
Mali	−0.04**	7,453	−0.03*	7,440
Malta	−0.09***	6,513	−0.04**	6,506
Mauritania	−0.08***	9,767	0.00	8,722
Mauritius	−0.22***	2,982	−0.03	2,977
Mexico	−0.13***	8,471	−0.06***	8,373
Moldova	−0.18***	7,845	−0.01	7,751
Mongolia	−0.07***	5,941	0.00	5,916
Montenegro	−0.26***	7,888	−0.07***	7,838
Morocco	−0.13***	5,804	−0.09***	5793
Mozambique	−0.06	728	−0.04	716
Myanmar	−0.07***	5,088	0.03*	5,086
Nagorno-Karabakh Republic	−0.18***	989	0.02	986
Namibia	0.05	780	−0.01	778
Nepal	−0.13***	8,904	−0.05***	8,895
Netherlands	−0.14***	6,673	−0.07***	6,669
New Zealand	−0.10***	6,246	−0.03*	6,248
Nicaragua	−0.11***	7,791	0.01	7,724
Niger	−0.06***	7,885	−0.04**	7,872
Nigeria	−0.08***	8,551	−0.02*	8,508
Northern Cyprus	−0.13***	3,994	−0.06***	3,986
Norway	−0.10***	3,991	−0.02	3,979
Oman	−0.05	977	−0.06	975
Pakistan	−0.17***	11,943	−0.05***	11,898
Palestinian Territories	−0.21***	10,808	−0.10***	9,813
Panama	−0.10***	7,674	−0.02*	7,613
Paraguay	−0.12***	7,913	−0.01	7,882
Peru	−0.16***	7,919	−0.07***	7,862
Philippines	−0.18***	8,953	−0.07***	8,937
Poland	−0.16***	7,945	−0.01	7,880
Portugal	−0.19***	7,970	−0.07***	7,910
Puerto Rico	−0.10*	468	−0.04	465
Qatar	−0.11***	3,945	0.00	3,900
Romania	−0.24***	7,876	−0.05***	7,800
Russia	−0.14***	18,663	0.00	18,468
Rwanda	−0.19***	6,676	−0.09***	6,671
Saudi Arabia	−0.09***	11,096	−0.05***	9,998
Senegal	−0.13***	7,783	−0.07***	7,767

(*table continues*)

Table 4 (*continued*)

Nation	Income and negative self-regard emotions		Income and negative other-regard emotions	
	r	*N*	*r*	*N*
Serbia	−0.25***	7,863	−0.08***	7,830
Sierra Leone	−0.08*	819	−0.10**	817
Singapore	−0.09***	6,540	0.00	6,511
Slovakia	−0.21***	6,984	−0.02	6,924
Slovenia	−0.15***	7,488	−0.02	7,478
Somalia	−0.17***	2,772	−0.04*	2,755
Somaliland region	−0.11***	5,995	−0.09***	4,997
South Africa	−0.11***	8,829	−0.04**	8,818
South Korea	−0.14***	8,641	−0.05***	8,612
South Sudan	−0.07**	2,049	−0.04	2,033
Spain	−0.21***	8,901	−0.08***	8,894
Sri Lanka	−0.16***	8,156	−0.03***	8,125
Sudan	−0.11***	6,500	−0.08***	5,613
Suriname	−0.17***	488	−0.07	488
Swaziland	−0.10**	1,000	−0.02	1,000
Sweden	−0.1***	6,723	−0.01	6,714
Switzerland	−0.1***	4,459	0.00	4,454
Syria	−0.05***	9,025	−0.02	7,774
Taiwan	−0.11***	6,886	−0.05***	6,876
Tajikistan	−0.10***	7,801	−0.04**	7,650
Tanzania	−0.12***	7,729	−0.04**	7,725
Thailand	−0.06***	9,000	0.01	8,979
Togo	−0.10***	3,546	0.00	3,525
Tunisia	−0.22***	9,930	−0.12***	8,850
Turkey	−0.10***	8,826	−0.06***	8,789
Turkmenistan	−0.02	5,949	−0.03*	5,760
Uganda	−0.19***	7,501	−0.08***	7,496
Ukraine	−0.19***	7,936	0.03*	7,819
United Arab Emirates	−0.15***	12,831	−0.05***	11,714
United Kingdom	−0.07***	28,053	−0.01	28,036
United States	−0.10***	7,805	−0.05***	7,800
Uruguay	−0.09***	7,878	−0.03**	7,848
Uzbekistan	−0.11***	7,931	−0.06***	7,897
Venezuela	−0.07***	7,743	−0.04**	7,716
Vietnam	−0.12***	8,715	0.01	8,668
Yemen	−0.16***	10,676	−0.10***	9,658
Zambia	−0.14***	6,821	−0.09***	6,793
Zimbabwe	−0.13***	7,770	−0.04**	7,759

Note. Each *N* is based on the number of data-points available to compute the correlation coefficient.
* $p < .05$.   ** $p < .01$.   *** $p < .001$.

Meta-Analysis Across Studies

We conducted a meta-analysis on all income-emotion relationships across the five studies. The meta-analysis would serve two purposes. First, for relationships that were inconsistently replicated (e.g., positive other-regard emotions), it is of interest to know whether they would be significant when the data are pooled—and statistical power enhanced—across all studies. Second, for relationships that were consistently replicated (i.e., the self-regard emotions), determining their pooled effect size would better inform how strongly income predicts these emotions, considering as well that it is of interest to assess whether income predicts emotional experiences as well as it predicts life evaluation.

Six correlations were pooled across Studies 1a, 1b, 1c, and 2 to compute the average effect size for the relationships between income and positive self-regard emotions, positive other-regard emotions, and positive global emotions. Five correlations were

pooled across Studies 1c and 2 to compute the average effect size for the relationship between income and negative global emotions. A total of 168 correlations were pooled across all studies to compute the average effect size for the relationships with negative self-regard and other-regard emotions. All averaged effect sizes were weighted by sample sizes (Lipsey & Wilson, 2001). Studies 1a to 1c each contributed one *r* to the analysis for each relationship. For Study 2, three separate *r*s were entered: one for participants who completed only MIDUS2 ($N = 1,468$), one for those who completed only MIDUS3 ($N = 196$), and one for those who completed both phases ($N = 2,542$). For Study 3, 162 *r*s were computed from every participating country.

As shown in the final two columns of Table 2, the relationships between income and self-regard emotions were small but reliable. The effect sizes for positive self-regard emotions and negative self-regard emotions were similar in magnitude, at $r = .12$ and $−.13$, respectively. In comparison, the average association between income and life evaluation was similar at $r = .13$ (Diener & Oishi, 2000). There is no support for any relationship between income and negative global emotions. Income was very weakly related to positive and negative other-regard emotions, which could be significant because of the huge sample sizes. The pooled relationship between income and positive global emotions was significant, $r = .08$, but note that across studies, the correlations for positive global emotions were weaker than those for positive self-regard emotions in both magnitude and replicability.

General Discussion

Research has not produced consistent evidence on whether income predicts higher positive emotions and lower negative emotions. Following a theoretically driven, emotion-specific approach, we found evidence across five large data sets from several nations that income positively predicted positive self-regard emotions and negatively predicted negative self-regard emotions more strongly (i.e., larger magnitude) and more consistently (i.e., higher replicability) than the corresponding same-valence other-regard emotions and global emotions. The relationships between income and the other-regard and global emotions were unstable across studies, varying in magnitude and not highly replicable. In addition, we demonstrated a directional relationship in the U.S. sample in Study 2 from income to self-regard emotions (and not the other way around) across a period of close to 10 years, suggesting that income is a relevant factor in predicting future self-regard emotions over the long term. Research has also not produced evidence to explain how income might predict emotions. We found evidence in the U.S. sample in Study 2 that sense of control directionally mediated the temporal relationship from income to self-regard emotions.

The associations between income and self-regard emotions were small but highly reliable. All data sets revealed that income predicted self-regard emotions. In contrast, our multiple attempts at replications showed that the relationship between income and other-regard and global emotions were not robust—they were not only weaker in magnitude but were also difficult to replicate. Importantly, the effect sizes between income and self-regard emotions were comparable to those between income and life satisfaction. Diener and Oishi (2000) found that the relationship between income and life evaluation averaged to $r = .13$ across several

studies (see also Diener & Biswas-Diener, 2002). This matches remarkably well with the average rs = .12 and −.13 we found for positive and negative self-regard emotions. This is the first strong evidence we know of that income predicts emotions as strongly as it has been known to predict life evaluation, but with the qualification that the emotions should be self-regard emotions. However, more studies are needed to provide additional effect sizes to determine more extensively how strongly income predicts emotions and life satisfaction.

Using a U.S. sample, Study 2 shows that current income predicted future self-regard emotions. We do not treat our findings as definitive evidence that income can cause emotions to be felt or to change over a long period of time even though such an interpretation might appear consistent with our findings. There could be omitted variables that would explain these relationships. Furthermore, future studies should attempt to replicate these directional relationships in other nations. However, these findings are the strongest evidence to our knowledge that current income is uniquely predictive of future emotions (albeit only self-regard emotions), because they followed the same individuals across many years and controlled for preexisting tendencies to experience the same emotions. Likewise, we do not treat the findings for sense of control in Study 2 as conclusive evidence that sense of control causally mediated the said relationship. However, the findings are strong evidence of a directional relationship in which income predicted later reports of sense of control, which in turn, predicted subsequent self-regard emotions.

However, sense of control was only a partial mediator (the direct relationship between income and self-regard emotions remained significant for negative self-regard emotions in Study 1c and for both emotions in Study 2) and the magnitude of the mediation effect was small. Hence, future research should identify other mediators. Our theoretical framework implies that higher income is a form of personal achievement that boosts personal sense of efficacy, which in turn, is associated with emotions that reflect self-perceptions. Hence, potential alternative mediators could include fulfilment of personal aspirations (particularly material aspirations) and enhanced self-perception.

We found at best mixed support for the idea that income correlates negatively with positive other-regard emotions (Piff & Moskowitz, 2017). The relationships between income and other-regard emotions were not replicable across our studies and statistically weaker in magnitude than the corresponding same-valence associations between income and self-regard emotions. Hence, while our findings are in line with predictions that higher income should be associated with independence-related emotions, they provide little support for the predictions that lower income might enable interdependence-related emotional tendencies. It is beyond the scope of this research to conclusively resolve this issue and there could be boundary conditions moderating the relationships between income and other-regard emotions. As postulated earlier, weaker economic strengths might also foster hopelessness-related tendencies, including negative self-regard emotions, which is consistent with our findings, other than communal qualities. A key area of research is to delineate the conditions under which lower socioeconomic status predicts despondence versus interdependence.

This research addresses several methodological concerns of past studies. First, studies that measured immediate emotions might reveal only short-term fluctuations, whereas those that retrospectively measured emotions felt over the long term (in months or years) could be subjected to memory influences. We measured emotions felt in the past day as well as in the past month, both of which should be minimally affected by memory biases and the latter should reveal more stable emotional experiences. Second, studies that compared different nations might have been affected by cultural differences in the tendency to avoid extreme scale options. Our studies employed not just continuous scales, but also binary scales which are less susceptible to response set influences. Also, we found similar results that support predictions across a large number of countries, suggesting that the response set was not a problem. The third concern is that if income was completed first, it could prime the self-regard emotions in ways that inflate their correlations. However, in Study 1a, income was measured about 4 months before the emotions. In the rest of the studies, although administered within the same questionnaire, emotion was measured before income. Fourth, some studies used one or only a few items to measure emotions. This procedure invites concerns about not only the internal reliability of the measure but also whether the findings could depend on the number of items used. We measured emotions using multiple items, and importantly, we found similar patterns regardless of how many items represented particular emotions. For instance, income was consistently a reliable predictor of lower negative self-regard emotions regardless of whether it was measured using two emotion items (Study 3), five items (Study 1a), or seven items (Study 1c). Differences in the number of items and internal consistency did not affect the predictive strength of income on different emotions. For instance, in Studies 1c and 2, income consistently predicted positive self-regard emotions more strongly than positive global emotions even though the former was represented by three items whereas the latter was measured by five (see also Footnote 8).

We conclude with thoughts on potential practical implications. The relationships between income and the self-regard emotions are small by conventional standards. However, as argued by Funder and Ozer (2019), some small effects may accumulate into practically significant effects in real-life over time. The findings here may thus have substantial real-world relevance, at both individual and societal levels. Assuming that income has a causal impact on emotions, our findings suggest that at the individual level, earning more means a greater tendency to feel emotions such as pride and satisfaction and earning less means more sadness and shame, but neither would make a difference to one's capacity for gratitude and compassion, as well as anger. At the societal level, a wealthier society can be expected to be more confident and less despondent relative to a poorer society, but societal wealth would not encourage or diminish feelings of social connectedness. In addition, the findings in Study 2 that income can predict self-regard emotions about 10 years later could imply that policies aimed at raising the income of the average person and boosting the economy can contribute to emotional well-being over the long-term. However, the qualification that policymakers should bear in mind is that while greater financial prosperity is predictive of emotional experiences associated with greater self-efficacy, it may not necessarily contribute to emotional experiences important for communal harmony.

References

Adachi, P., & Willoughby, T. (2015). Interpreting effect sizes when controlling for stability effects in longitudinal autoregressive models: Implications for psychological science. *European Journal of Developmental Psychology*, *12*(1), 116–128. https://doi.org/10.1080/17405629.2014.963549

Bartlett, M. Y., & DeSteno, D. (2006). Gratitude and prosocial behavior: Helping when it costs you. *Psychological Science*, *1*(4), 319–325. https://doi.org/10.1111/j.1467-9280.2006.01705.x

DeLongis, A., Folkman, S., & Lazarus, R. S. (1988). The impact of daily stress on health and mood: Psychological and social resources as mediators. *Journal of Personality and Social Psychology*, *54*(3), 486–495. https://doi.org/10.1037/0022-3514.54.3.486

Diener, E., & Biswas-Diener, R. (2002). Will money increase subjective well-being? A literature review and guide to needed research. *Social Indicators Research*, *57*(2), 119–169. https://doi.org/10.1023/A:1014411319119

Diener, E., Ng, W., Harter, J., & Arora, R. (2010). Wealth and happiness across the world: Material prosperity predicts life evaluation, whereas psychosocial prosperity predicts positive feeling. *Journal of Personality and Social Psychology*, *99*(1), 52–61. https://doi.org/10.1037/a0018066

Diener, E., & Oishi, S. (2000). Money and happiness: Income and subjective well-being across nations. In E. Diener & E. M. Suh (Eds.), *Subjective well-being across cultures* (pp. 185–218). MIT Press.

Diener, E., Tay, L., & Oishi, S. (2013). Rising income and the subjective well-being of nations. *Journal of Personality and Social Psychology*, *104*(2), 267–276. https://doi.org/10.1037/a0030487

Ellsworth, P. C., & Smith, C. A. (1988a). From appraisal to emotion: Differences among unpleasant feelings. *Motivation and Emotion*, *12*(3), 271–302. https://doi.org/10.1007/BF00993115

Ellsworth, P. C., & Smith, C. A. (1988b). Shades of joy: Patterns of appraisal differentiating pleasant emotions. *Cognition and Emotion*, *2*(4), 301–331. https://doi.org/10.1080/02699938808412702

Frijda, N. H., Kuipers, P., & ter Schure, E. (1989). Relations among emotion, appraisal, and emotional action readiness. *Journal of Personality and Social Psychology*, *57*(2), 212–228. https://doi.org/10.1037/0022-3514.57.2.212

Funder, D. C., & Ozer, D. J. (2019). Evaluating effect size in psychological research: Sense and nonsense. *Advances in Methods and Practices in Psychological Science*, *2*(2), 156–168. https://doi.org/10.1177/2515245919847202

Gallo, L. C., Bogart, L. M., Vranceanu, A., & Matthews, K. A. (2005). Socioeconomic status, resources, psychological resources, and emotional responses: A test of the reserve capacity model. *Journal of Personality and Social Psychology*, *88*(2), 386–399. https://doi.org/10.1037/0022-3514.88.2.386

Gardner, J., & Oswald, A. J. (2007). Money and mental wellbeing: A longitudinal study of medium-sized lottery wins. *Journal of Health Economics*, *26*(1), 49–60. https://doi.org/10.1016/j.jhealeco.2006.08.004

Howell, R. T., & Howell, C. J. (2008). The relation of economic status to subjective well-being in developing countries: A meta-analysis. *Psychological Bulletin*, *134*(4), 536–560. https://doi.org/10.1037/0033-2909.134.4.536

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indices in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Imada, T., & Ellsworth, P. C. (2011). Proud Americans and lucky Japanese: Cultural differences in appraisal and corresponding emotion. *Emotion*, *11*(2), 329–345. https://doi.org/10.1037/a0022855

Johnson, W., & Krueger, R. F. (2005). Higher perceived life control decreases genetic variance in physical health: Evidence from a national

twin study. *Journal of Personality and Social Psychology*, *88*(1), 165–173. https://doi.org/10.1037/0022-3514.88.1.165

Kitayama, S., Markus, H. R., & Kurokawa, M. (2000). Culture, emotion, and well-being: Good feelings in Japan and the United States. *Cognition and Emotion*, *14*(1), 93–124. https://doi.org/10.1080/026999300379003

Kraus, M. W., Piff, P. K., Mendoza-Denton, R., Rheinschmidt, M. L., & Keltner, D. (2012). Social class, solipsism, and contextualisim: How the rich are different from the poor. *Psychological Review*, *119*(3), 546–572. https://doi.org/10.1037/a0028756

Kushlev, K., Dunn, E. W., & Lucas, R. E. (2014). Higher income is associated with less daily sadness but not more daily happiness. *Social Psychological & Personality Science*, *6*(5), 483–489. https://doi.org/10.1177/1948550614568161

Lachman, M. E., & Weaver, S. L. (1998). The sense of control as a moderator of social class differences in health and well-being. *Journal of Personality and Social Psychology*, *74*(3), 763–773. https://doi.org/10.1037/0022-3514.74.3.763

Lewis, H. B. (1971). *Shame and guilt in neurosis*. International Universities Press.

Lipsey, M., & Wilson, D. (2001). *Practical meta-analysis*. Sage.

Luhmann, M., Schimmack, U., & Eid, M. (2011). Stability and variability in the relationship between subjective well-being and income. *Journal of Research in Personality*, *45*(2), 186–197. https://doi.org/10.1016/j.jrp.2011.01.004

Maxwell, S. E., & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological Methods*, *12*(1), 23–44. https://doi.org/10.1037/1082-989X.12.1.23

Mejía, S. T., Settersten, R. A., Jr., Odden, M. C., & Hooker, K. (2016). Responses to financial loss during the Great Recession: An examination of sense of control in late midlife. *Journals of Gerontology: Series B*, *71*(4), 734–744. https://doi.org/10.1093/geronb/gbv054

Mirowsky, J., & Ross, C. E. (1986). Social patterns of distress. *Annual Review of Sociology*, *12*, 23–45. https://doi.org/10.1146/annurev.so.12.080186.000323

Ng, W., & Diener, E. (2014). What matters to the rich and the poor? Subjective well-being, financial satisfaction, and postmaterialist needs across the world. *Journal of Personality and Social Psychology*, *107*(2), 326–338. https://doi.org/10.1037/a0036856

Piff, P. K., & Moskowitz, J. P. (2017). Wealth, poverty, and happiness: Social class is differentially associated with positive emotions. *Emotion*, *18*(6), 902–905. https://doi.org/10.1037/emo0000387

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, *36*(4), 717–731. https://doi.org/10.3758/BF03206553

Price, R. H., Choi, J. N., & Vinokur, D. A. (2002). Links in the chain of diversity following job loss: How financial strain and loss of personal control lead to depression, impaired functioning, and poor health. *Journal of Occupational Health Psychology*, *7*(4), 302–312. https://doi.org/10.1037/1076-8998.7.4.302

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Sage.

Roseman, I. J. (1984). Cognitive determinants of emotion: A structural theory. In P. Shaver (Ed.), *Review of personality and social psychology: Vol. 5. Emotions, relationships, and health* (pp. 11–36). Sage.

Roseman, I. J., Spindel, M. S., & Jose, P. E. (1990). Appraisals of emotion-eliciting events: Testing a theory of discrete emotions. *Journal of Personality and Social Psychology*, *59*(5), 899–915.

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling and more. Version 0.5–12 (BETA). *Journal of Statistical Software*, *48*(2), 1–36.

Scherer, K. R., & Ceschi, G. (1997). Lost luggage: A field study of emotion-antecedent appraisal. *Motivation and Emotion*, *21*(3), 211–235.

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, *48*(4), 813–838. https://doi.org/10.1037/0022-3514.48.4.813

Smith, C. A., & Ellsworth, P. C. (1987). Patterns of appraisal and emotion related to taking an exam. *Journal of Personality and Social Psychology*, *52*(3), 475–488. https://doi.org/10.1037/0022-3514.52.3.475

Soto, C. J., & Luhmann, M. (2013). Who can buy happiness?: Personality traits moderate the effects of stable income differences and income fluctuations on life satisfaction. *Social Psychological & Personality Science*, *4*(1), 46–53. https://doi.org/10.1177/1948550612444139

Stephens, N. M., Markus, H. R., & Phillips, L. T. (2013). Social class culture cycles: How three gateway contexts shape selves and fuel inequality. *Annual Review of Psychology*, *65*, 611–634. https://doi.org/10.1146/annurev-psych-010213-115143

Stephens, N. M., Markus, H. R., & Townsend, S. S. M. (2007). Choice as an act of meaning: The case of social class. *Journal of Personality and Social Psychology*, *93*(5), 814–830. https://doi.org/10.1037/0022-3514.93.5.814

Tesser, A. (1990). Smith and Ellsworth's appraisal model of emotion: A replication, extension, and test. *Personality and Social Psychology Bulletin*, *16*(2), 210–223. https://doi.org/10.1177/0146167290162003

Tong, E. M. (2015). Differentiation of 13 positive emotions by appraisals. *Cognition and Emotion*, *29*(3), 484–503. https://doi.org/10.1080/02699931.2014.922056

Tong, E. M. W., Bishop, G. D., Enklemann, H. C., Why, Y. P., Diong, S. M., & Khader, M. A. (2007). Emotion and appraisal: A study using ecological momentary assessment. *Cognition and Emotion*, *21*(7), 1361–1381. https://doi.org/10.1080/02699930701202012

Tong, E. M. W., & Jia, L. (2017). Positive emotion, appraisal, and the role of appraisal overlap in positive emotion blend. *Emotion*, *17*(1), 40–54. https://doi.org/10.1037/emo0000203

Wallace, M. T., Barry, C. T., Zeigler-Hill, V., & Green, B. A. (2012). Locus of control as a contributing factor in the relation between self-perception and adolescent aggression. *Aggressive Behavior*, *38*(3), 213–221. https://doi.org/10.1002/ab.21419

Whisman, M. A., & Kwon, P. (1993). Life stress and dysphoria: The role of self-esteem and hopelessness. *Journal of Personality and Social Psychology*, *65*(5), 1054–1060. https://doi.org/10.1037/0022-3514.65.5.1054