Progressive Taxation, Income Inequality, and Happiness

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Income inequality has become one of the more widely debated social issues today. The current article explores the role of progressive taxation in income inequality and happiness. Using historical data in the United States from 1962 to 2014, we found that income inequality was substantially smaller in years when the income tax was more progressive (i.e., a higher tax rate for higher income brackets), even when controlling for variables like stock market performance and unemployment rate. Time lag analyses further showed that higher progressive taxation predicted increasingly lower income inequality up to 5 years later. Data from the General Social Survey (1972–2014; $N = 59,599$) with U.S. residents (hereafter referred to as "Americans") showed that during years with higher progressive taxation rates, less wealthy Americans—those in the lowest 40% of the income distribution—tended to be happier, whereas the richest 20% were not significantly less happy. Mediational analyses confirmed that the association of progressive taxation with the happiness of less wealthy Americans can be explained by lower income inequality in years with higher progressive taxation. A separate sample of Americans polled online ($N = 373$) correctly predicted the positive association between progressive taxation and the happiness of poorer Americans but incorrectly expected a strong negative association between progressive taxation and the happiness of richer Americans.

Keywords: happiness, progressive taxation, income inequality

Public policy research has long been dominated by economists and political scientists (Dunn, 2012). This is not surprising, because an analysis of costs and benefits, expected utilities, and opportunity costs is indispensable when discussing public policies such as unemployment benefits, job training programs, and the minimum wage. Similarly, a political analysis of policies (i.e., who gets what, when, and how) is vital when evaluating policy implementation and effectiveness.

More recently, however, researchers have begun to recognize the importance of a psychological analysis of public policies. Leading psychology journals such as *American Psychologist* and *Psychological Science in the Public Inter-est* have published numerous policy-relevant articles (e.g., Bushman et al., 2016; Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013; Kiesler, 1982). New journals, such as *Policy Insights From the Behavioral and Social Sciences,* have also emerged as platforms for the psychological analysis of public policy (e.g., Cohen & Garcia, 2014; Swim, Geiger, & Zawadzki, 2014).

Despite the rise in psychological research exploring public policy, the psychological analysis of tax policies has been rare and limited largely to cross-national comparisons (Oishi, Schimmack, & Diener, 2012) and tax morale (i.e., the satisfaction of paying one's taxes; Akay et al., 2012). In the present article, we provide a psychological analysis of taxation policies by exploring the association of progressive taxation (the degree to which the tax rate is higher for the highest income bracket than for the lowest income bracket) with income inequality and happiness in the United States over the last 40 years. The present article thus aims to demonstrate the value of evaluating the psychological in addition to the economic outcomes of public policy.

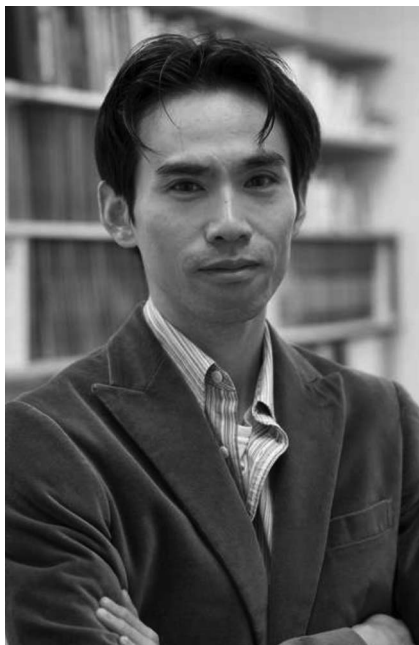## A Policy Analysis of Taxation: Traditional Versus Psychological Approach

Economists have typically examined the role of taxation in the context of its effects on the economy. For instance,

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Rebelo (1991) found that an increase in the income tax rate is associated with a decrease in the rate of economic growth in the long run. Eissa and Liebman (1996) found that the Tax Reform Action of 1986, which included the earned income tax credit, increased single women with children's labor force participation by up to 2.8% (Eissa & Liebman, 1996; see also Meyer & Rosenbaum, 2001). In addition, a large number of studies have examined the role of various tax deductions on economic and noneconomic behaviors such as charitable giving (e.g., Brooks, 2007). A psychological approach to public policies focuses on different kinds of outcomes, such as happiness and a sense of fairness (for reviews see Diener, Lucas, Schimmack, & Helliwell, 2009; Diener, Oishi, & Lucas, 2015; Oishi & Diener, 2014). The psychological approach sheds light on citizens' subjective feelings about their lives as a function of varying policies. In the present article, we focus on the association between progressive taxation and U.S. residents' (hereafter referred to as "Americans") subjective sense of happiness. That is, instead of asking questions such as, "Is progressive taxation harmful for economic growth?" the present article asks, "Do Americans feel happier—and experience a greater sense of fairness—under a more progressive taxation?"

Why Progressive Taxation Now?

Taxation is central to public policy because it is one of the main financial sources to support various policies, such as unemployment benefits and food stamp programs. In addition, taxation pays for public goods that are shared by citizens. In a modern society, residents expect to have personal safety and basic protection (e.g., police, fire de-

partment), access to clean water, clean air, sewer systems, reliable roads, primary education, public transportation, green space, and services such as garbage pickup and recycling. The government, both local and federal, is responsible for the basic infrastructure of a well-functioning society.

Despite the fundamental role that taxation plays in society, however, most Americans seem to have a negative attitude toward taxes. For instance, among 31,677 respondents of the General Social Surveys (GSS; 1972–2014[1]) who paid federal taxes, 62.57% said that the tax was too high, 36.40% said that it was about right, and only 1% said that it was too low. This negative attitude toward taxes could be explained in part by loss aversion (Kahneman & Tversky, 1984). If income is a gain, income tax is a loss. In addition, the negative attitude toward taxes could be driven by the fact that—unlike the beneficial outcomes of taxation (e.g., infrastructure, public education)—paying taxes is a direct, conscious experience for most citizens.

Despite this generally negative attitude toward paying taxes, tax policy is an essential tool for dealing with issues such as income inequality, which has become an important concern for many Americans in recent years. The general public's dissatisfaction with widening social inequality between the haves and the have-nots is reflected in both recent political phenomena and recent trends in book sales. For example, *Capital in the Twenty-First Century*—an academic book by the economist Thomas Piketty (2014)—became one of *The New York Times* bestsellers. Beyond such observational evidence, research has also documented the public's dissatisfaction with income inequality. Norton and Ariely (2011), for example, found that 92% of American respondents preferred Swedish, more even, distribution of wealth over American, very uneven, distribution of wealth. Similarly, American respondents perceived the ideal wage ratio between CEOs and unskilled laborers to be 7:1, in stark contrast to the actual wage ratio of 354:1 (Kiatpongsan & Norton, 2014). In nationally representative surveys, almost two thirds of Americans say that the current system favors the rich and that the gap between rich and poor is growing (Desilver, 2013).

Of course, some degree of inequality is inevitable, given individual differences in abilities, motivation, and opportunities. And to the extent that people who are born in the bottom end of the economic ladder could eventually move up the ladder, some income inequality can be seen as a necessary condition to inspire people to work harder (Davidai & Gilovich, 2015; Shariff, Wiwad, & Aknin, 2016; see also Jost, Gaucher, & Stern, 2015). Nevertheless, from the social movements, the trends in book sales, and the survey

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[1] The GSS data we used can be downloaded from http://gss.norc.org/get-the-data/spss. We analyzed the data that do not include the participants who were assessed repeatedly.

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data, it is evident that the majority of Americans desire a more even society than the United States has today.

Existing psychological analyses of income inequality have suggested that Americans might be right to desire a more even distribution of wealth. Research has shown that Americans on average report being happier[2] in years of less income inequality than in years of more income inequality (e.g., Napier & Jost, 2008; Oishi, Kesebir, & Diener, 2011; see Alesina, Di Tella, & MacCulloch, 2004, for European countries). Oishi et al. (2011) also found that the negative association between income inequality and happiness remained significant, controlling for various respondent-level variables such as age, gender, race, marital status, and household income. Furthermore, Oishi et al. found that, in years of greater income inequality, Americans felt less fairness and trusted others less, which in turn was associated with lower levels of happiness.

If income inequality is a widely recognized societal problem, the next question is what can be done. One approach is to reduce the wage gap between highly skilled workers and less skilled workers by implementing a salary cap (e.g., CEO salary cannot be more than 100 times the average wage of the entry-level jobs in that organization). However, this approach is unlikely to be taken up by companies, because in a competitive market a salary cap can make it more difficult for them to attract capable CEOs.

A second approach is to raise the minimum wage. This could be done at the level of local, state, or federal government. Whereas states such as Pennsylvania and North Carolina have a minimum wage of $7.25 per hour, Massachusetts and Washington have implemented policies to increase the minimum wage to $11 per hour. At the city level, New York City has taken measures to increase the minimum wage to $15 per hour by the end of 2018. However, such measures alone—especially at the local and state level—are likely to be insufficient to address national income inequality.

A third approach is to use taxation. For example, the city council in Portland, Oregon, passed the corporate income tax law, in which the company whose CEO's salary is more than 100 times that of the average worker's must pay 10% more in taxes (Woolf, 2016). This tax law could put a constraint on CEOs' salary, which could reduce wealth disparity among Portland residents. Progressive income taxation at the level of the federal government is another tool. Even if the wage gap remains large, progressive taxation, in which higher earners are taxed at a much higher rate than are lower earners (e.g., 50% vs. 0%), should reduce the wealth gap over time. In the current article, we focus on federal progressive taxation because it affects households across the United States, having the potential to reduce income inequality across the nation.

Is Progressive Taxation Associated With Lower Levels of Income Inequality?

The basic thesis here is that progressive taxation might be associated with citizens' happiness in part because progressive taxation would reduce income inequality (Moyes, 1988), which is known to be inversely associated with citizens' happiness (e.g., Alesina et al., 2004; Napier & Jost, 2008; Oishi et al., 2011).

We first tested the assumption that greater progressiveness of income taxation is associated with lower levels of income inequality. As in Oishi et al. (2012), the degree of progressive taxation was defined as the difference between the tax rate for the highest income bracket and the tax rate for the lowest income bracket. We obtained the historical tax rate data from Tax Foundation. (n.d.). The tax rate varied considerably over time in the United States, allowing us to examine the association between progressive taxation and self-reported happiness. For example, the tax rate for the highest income bracket was as high as 70% in the early 1970s and as low as 28% in the late 1980s. Consequently, the rate of progressive taxation also varied dramatically, from as high as 70% in the late 1970s to as low as 13% in the late 1980s.

We examined the association between progressive taxation and income inequality across 42 years (1972–2014), the period from which the GSS's self-reported happiness data are available. As predicted, the degree of progressive taxation is strongly inversely associated with income inequality

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[2] The happiness data came from the GSS: The happiness item was "Taken all together, how would you say things are these days—would you say that you are very happy, pretty happy, or not too happy?" (recoded as 1 = *not too happy*, 2 = *pretty happy*, 3 = *very happy*).

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Table 1

*Time-Lag Correlations Between Progressive Taxation and
Income Inequality: Prior Progressive Taxation Predicts Later
Income Inequality Than the Other Way Around*

Progressive tax year	Income inequality (year Y)	Income inequality year	Progressive taxation (year Y)
Y	−.756	Y	−.756
Y-minus-1	−.782	Y-minus-1	−.751
Y-minus-2	−.806	Y-minus-2	−.743
Y-minus-3	−.822	Y-minus-3	−.735
Y-minus-4	−.840	Y-minus-4	−.720
Y-minus-5	−.855	Y-minus-5	−.701
Y-minus-6	−.853	Y-minus-6	−.668
Y-minus-7	−.833	Y-minus-7	−.628
Y-minus-8	−.818	Y-minus-8	−.585
Y-minus-9	−.817	Y-minus-9	−.558
Y-minus-10	−.818	Y-minus-10	−.529

Note. Degree of freedom is 41 for the correlations between progressive taxation of prior years and income inequality. Degrees of freedom range from 36 to 41 for the correlations between income inequality of prior years and progressive taxation. Correlations are all significant at $p < .001$.

measured by the Gini coefficient, $r(41) = −.756$, $p < .001$.[3] The more progressive the tax system, the less income inequality there was in the United States. Specifically, a 10% increase in progressiveness of taxation (e.g., 20% to 30%) was associated with a 1.2 decrease in Gini coefficient (which ranges from 0 to 100).

To explore the temporal sequences further, we next examined the associations between income inequality in year Y and progressive taxation in preceding years, from year Y-minus-1 to year Y-minus-10. To accomplish these time-lag analyses, we used the progressive taxation from 1962 on (e.g., predicting the income inequality in 1972 from the progressive taxation in year 1962). As seen in Table 1, the negative correlation between progressive taxation and income inequality increased with a time-lag up to 5 years, $r(41) = −.855$, $p < .001$. From this point on, the correlation between progressive taxation and income inequality became slightly smaller up to 10 years, $r(41) = −.818$, $p < .001$. These time-lag analyses show that greater progressive taxation in earlier years—particularly around 5 years earlier—was strongly associated with lower income inequality later.

It is also possible that when income inequality becomes larger, taxation becomes more progressive over time. Thus, we next tested the reverse sequence in time-lag analyses. Unlike the correlations between prior progressive taxation and later income inequality, the correlations between prior income inequality and later progressive taxation became increasingly smaller as the time lag increased (see Table 1), $r(41) = −.701$, $p < .001$, for 5 years' lag and $r(36) = −.529$, $p < .001$, for 10 years' lag. These two types of time-lag analyses suggest that progressive taxation is a precursor of lower income inequality rather than an outcome of higher income inequality.

In addition to exploring the temporal sequence, we examined whether the observed association between progressive taxation and income inequality is robust against third variables. Indeed, the association could be driven by third variables such as inflation, unemployment, stock market performance, and the political party currently in power. For instance, high stock market performance and high unemployment could simultaneously increase income inequality and possibly provide a fertile political ground for progressive taxation. A simultaneous multiple regression analysis, however, showed that the progressiveness of taxation remained a significant predictor of income inequality ($b = −7.71$, $SE = 1.911$; $β = −.488$), $t(37) = −4.037$, $p < .001$, even when controlling for unemployment rate, inflation rate, return on stock market Standard & Poor 500 per year, and the party of the president (Republican = 0; Democrat = 1). We repeated this analysis using the progressive taxation 5 years earlier as a predictor. Again, earlier progressiveness

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[3] The Gini coefficient is one of the more widely used measures of income inequality, whereby 0 indicates no income inequality (e.g., everyone's income is the same) and higher values indicate increasingly higher income inequality. Data on the Gini coefficient of households in the United States was taken from United States Census Bureau (n.d.). The Gini coefficients were available from 1967 to 2015. Because error terms of the Gini coefficients and progressive taxation had autocorrelations (Durbin-Watson = .219, $p < .01$), we tested the association using the Newey-West standard errors as well. A simple time series regression analysis with Newey-West standard errors with 1-year autocorrelations, using STATA14 (StataCorp, 2015), showed a significant association between progressive taxation and Gini coefficients ($b = −.119$, Newey-West $SE = .02137$), $t(41) = −5.59$, $p < .001$. Even when we included autocorrelations up to 10-year lag (i.e., 1-year lag, 2-year lag, 3-year lag, . . . 10-year lag simultaneously) in a time series regression, the association was still significant ($b = −.119$, Newey-West $SE = .03235$), $t(41) = −3.69$, $p = .001$.

of taxation remained a strong predictor of later income inequality ($b = -10.225$, $SE = 1.602$; $\beta = -.673$), $t(37) = -6.384$, $p < .001$. The progressiveness of taxation seems to be a robust predictor of income inequality.

The Relation Between Progressive Taxation and Self-Reported Happiness

Having found evidence suggesting that greater progressive taxation gives rise to smaller income inequality over time, we then explored whether greater progressive taxation would be associated with greater self-reported happiness. We used happiness data from the General Social Surveys (GSSs). The GSS provides the best available estimation of mean happiness from a representative sample of U.S. residents from 1972 onward. Since 1972, the GSS has been conducted almost every year until 1994 and every other year since then. The available GSS data thus included 59,599 respondents from 30 out of the 42 years that spanned the period from 1972 to 2014 (roughly 2,000 respondents per year).

Overall, the correlation between progressive taxation and mean happiness was positive, though nonsignificant, $r(28) = .199$, $p = .290$. Earlier Oishi et al. (2011) found that the association between income inequality and happiness was stronger among lower income groups than among high income groups. Thus, we next computed the correlation between progressive taxation and happiness for each of the five income quintiles, separately. As seen in Figure 1, the poorest 20% of Americans were happier when the income taxation was more progressive, $r(28) = .430$, $p = .018$. Specifically, a 10% increase in progressiveness of income

taxation was on average associated with a .012 increase in the 3-point scale's self-reported happiness, or an increase of .24 of the standard deviation.

Similarly, Americans in the 20th–40th percentiles of the income distribution were happier in years with more progressive taxation, $r(28) = .373$, $p = .042$. The correlation between progressive taxation and the happiness of the 40th–60th percentiles was positive but nonsignificant; the correlation was virtually zero for the 60th–80th percentiles group (see Table 2). Finally, the correlation was negative but nonsignificant among the richest 20% of Americans, $r(28) = -.191$, $p = .312$. Notably, the correlation coefficient among the richest 20% of Americans ($r = -.191$) was significantly different from the correlation among the poorest 20% ($r = .430$; $z = 2.40$, $p = .016$; see Figure 1).

Next, a time-lag analysis showed that greater progressive taxation strongly predicted higher mean happiness in the poorest 20% 5 years later, $r(28) = .606$, $p < .001$. In contrast, the correlation between progressive taxation and earlier happiness among the poorest 20% was substantially smaller and nonsignificant $r(25) = .342$, $p = .081$, suggesting that the reverse temporal sequence is unlikely. Similarly, a time-lag analysis showed that progressive taxation predicted the happiness of the second poorest group 5 years later quite well, $r(28) = .500$, $p = .005$. In contrast, the mean happiness of the second poorest group did not predict the progressiveness of taxation 5 years later, $r(25) = .283$, $p = .153$. Thus, like the association between progressive taxation and income inequality, the temporal sequence seems to flow from progressive taxation to happiness—at
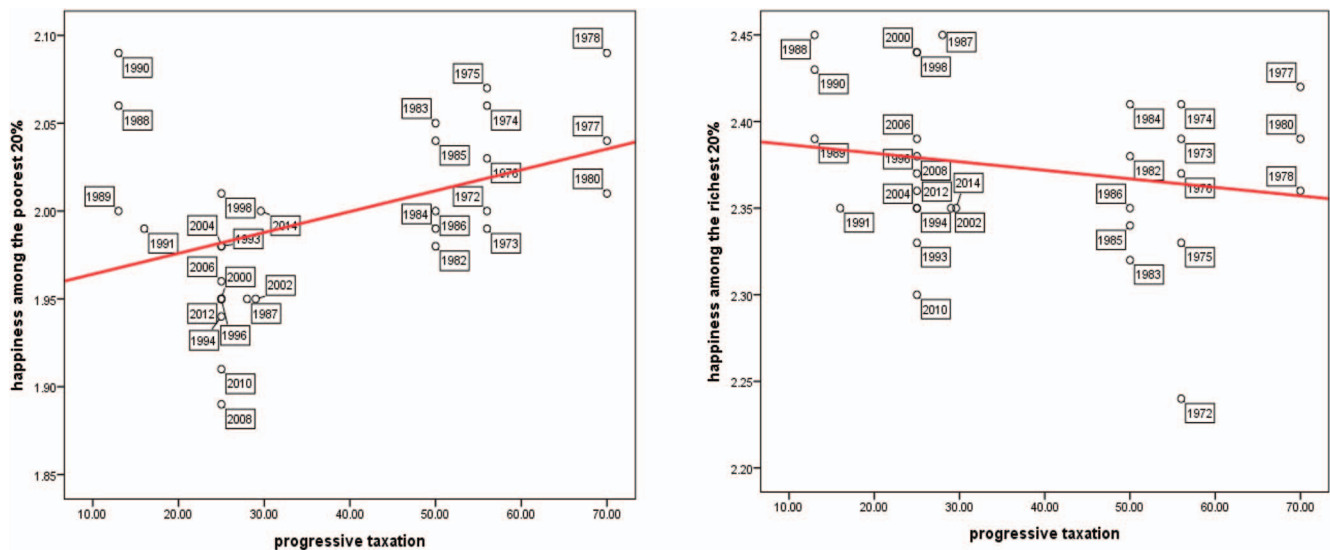

Figure 1. The association between the degree of progressive taxation and mean happiness for the poorest 20% (left) and the richest 20% (right) in the United States during the years 1972 to 2014. The diagonal lines indicate regression lines in the OLS regressions. See online article for the color version of this figure.

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regression analysis, we predicted mean happiness from progressive taxation rate and Gini coefficients; whereas the effect of income inequality on happiness remained significant ($b = -.935$, $SE = .301$, $\beta = -.747$), $t(27) = -3.110$, $p = .004$, the effect of progressive taxation became nonsignificant ($b = -.068$, $SE = .046$, $\beta = -.353$), $t(27) = -1.469$, $p = .153$. The association between progressive taxation and happiness even shifted from positive to negative once income inequality was taken into account. This suggests that progressive taxation is positively associated with the happiness of average Americans only to the extent that it is associated with less income inequality. Indeed, a bias-corrected mediation analysis with 10,000 bootstraps using Mplus 4.21 (Muthén & Muthén, 2007) showed a significant indirect effect of more progressive taxation on more happiness through reduced income inequality (indirect effect = .107, $SE = .036$, 95% confidence interval [CI: .047, .186], $z = 2.966$, $p = .003$).

Although we earlier found evidence that progressive taxation is a precursor more than an outcome of income equality, we still tested the reverse mediational path (income inequality → progressive taxation → happiness). Consistent with the findings described earlier, the reverse path was not significant (indirect effect = .326, $SE = .235$, 95% CI [−.258, .683], $z = 1.389$, $p = .165$). Thus, although causality cannot be ascertained in this correlational data, the sequence depicted in Figure 2 fit the data better than did the alternative sequence.

Because the link between progressive taxation and happiness was particularly strong for the lowest two income quintiles, we next ran the mediation analysis depicted in Figure 2 separately for these two groups. The results were very similar to those in the original analysis. The direct positive association between progressive taxation and the happiness of the poorest 20% was mediated by income inequality (indirect effect = .162, $SE = .055$, 95% CI [.070, .289], $z = 2.973$, $p = .003$). Likewise, the direct positive association between progressive taxation and the happiness of the second income quintile (20th–40th percentiles) was also mediated by income inequality (indirect effect = .195, $SE = .058$, 95% CI [.103, .310], $z = 3.385$, $p < .001$). Together, these findings suggest that income inequality is a more proximal predictor of American (un)happiness than is progressive taxation per se.
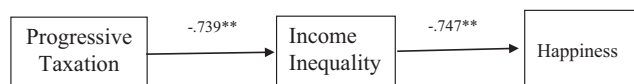

Figure 2. Between 1972 and 2014, progressive taxation was associated with less income inequality, and less income inequality was associated with higher levels of mean happiness of Americans. The effect of progressive taxation on happiness is mediated through income inequality. The coefficients are standardized path coefficients. ** $p < .001$.

Psychological Mechanisms: Trust and Fairness?

The top 1% of income earners in 2013 earned 20% of the income in the United States—more than double the income share they earned in the early 1970s (Alvaredo, Atkinson, Piketty, & Saez, 2013). Whereas the richest 20% of Americans own more than 80% of the total wealth in the United States, the bottom 40% own more debts than assets (Wolff, 2012). This rising disparity in wealth may lead to perceiving the world and others as less fair (Desilver, 2013), while also disjointing communities (Putnam, 2000), potentially resulting in trusting others less (Ichida et al., 2009). Income inequality could thus reduce perceived fairness and general trust, which could, in turn, reduce the happiness of average Americans. Indeed, Oishi et al. (2011) showed that the association between income inequality and unhappiness in the United States over time was explained in part by lower levels of perceived fairness and general trust.[4]

Using these same items, we replicated the just-mentioned findings with data from more years (1972–2014 vs. 1972–2008 in Oishi et al., 2011). Specifically, we found that during years with lower income inequality, people trusted others substantially more, $r(24) = -.838$, $p < .001$, and perceived others to be considerably fairer, $r(24) = -.843$, $p < .001$. Extending past research (Oishi et al., 2011), we also found that during years of more progressive taxation, both perceived fairness, $r(24) = .625$, $p < .001$, and general trust, $r(24) = .584$, $p < .001$, were higher. We built, based on these findings, a psychological process model of the link between progressive taxation and happiness as follows: progressive taxation → less income inequality → more perceived fairness and general trust → greater happiness.

To test this psychological process model, we used the multilevel function of Mplus Version 7.31 (Muthén & Muthén, 2015). Specifically, individual respondents' happiness was predicted by a latent factor indicating fairness and trust (i.e., the fairness item and the trust item were used as two indicators of the latent factor) at Level 1. At Level 2, income inequality was predicted by progressive taxation. Finally, the cross-level mediation was also modeled ($N = 36,216$ for Level 1; $N = 26$ for Level 2). This analysis used a maximum likelihood estimator with robust standard errors. The model depicted in Figure 3 fit the data well (comparative fit index = .998, Tucker–Lewis index = .996, root-mean-square error of approximation = .007). As can be seen in Figure 3, we found the expected chain of associations: Progressive taxation was associated with less income inequality, less income inequality was associated with more fairness and trust, and more fairness and trust were

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[4] Oishi, Kesebir, and Diener (2011) operationalized perceived fairness using a general question about how fair other people are (1 = *take advantage*, 2 = *depends*, 3 = *fair*); trust was similarly operationalized with a question about how much others can be trusted (1 = *cannot trust*, 2 = *depends*, 3 = *can trust*).
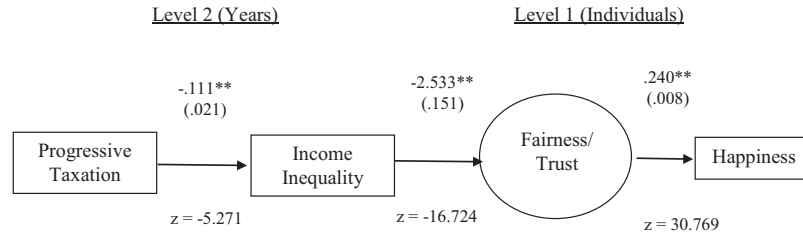
Level 2 (Years)   Level 1 (Individuals)

Figure 3. Multilevel mediation analysis. The degree of progressive taxation was inversely associated with income inequality (the more progressive, the lower income inequality). The lower the income inequality, the higher perceived fairness and general trust (here two items formed a latent construct). The more fairness and trust, the greater happiness Americans reported. Coefficients are unstandardized coefficients (with standard errors in parentheses), and corresponding *z* values appear below the arrows. ** $p < .001$. The boxes indicate observed variables, and the oval indicates a latent variable.

associated with higher levels of happiness (indirect effect = .067, SE = .013, 95% CI [.041, .089], z = 5.081, $p < .001$).

Affective Forecasting of Different Taxation Systems

From our historical analyses, progressive taxation was in general positively associated with many desirable outcomes such as happiness, perceived fairness, and trust, in particular among poor Americans. The next question, then, is why so many Americans seem to oppose progressive taxation. It could be that, besides loss aversion and the difficulty of recognizing the beneficial outcomes of tax, Americans overestimate the negative effect of progressive taxation on happiness among the rich. To explore this issue, we analyzed data from 373 Americans recruited through Mechanical Turk[5] (53% women; M_{age} = 36.79, SD = 13.16; median household income = \$35,000–\$39,999[6]) who were asked to estimate how happy people from the highest and lowest income quintiles would feel under different progressive taxation rates. We asked participants, based on the real historical variation in progressive taxation from 1972 to the present (used in the GSS analyses earlier), about four progressive taxation rates: 13%–16%, 25%–29%, 50%–55%, and 70%. Participants were further informed that these progressive taxation rates are based on real historical variation in the United States. To make their predictions of happiness, participants used the same 3-point happiness question used in the GSS (1 = *not too happy,* 2 = *pretty happy,* 3 = *very happy*).

As shown in Figure 4, people correctly expected that the poorest 20% of Americans would feel happier under higher progressive taxation rates, $F(3, 1086)$ = 187.06, $p < .001$, η^2 = .34, r = .58 (all pairwise comparisons were also significant; $ps < .001$). This effect of progressive taxation on perceived happiness was not statistically different (z = .98, p = .32) from the effect on actual happiness obtained through the actual historical analyses earlier: $r(28)$ = .43. When predicting the happiness of the richest 20% of Amer-

icans (see Figure 5), though, people incorrectly expected that the rich would feel substantially less happy under higher progressive taxation, $F(3, 1074)$ = 365.86, $p < .001$, η^2 = .51, r = −.71 (all pairwise comparisons were significant; $ps < .001$). Indeed, this effect on perceived happiness was significantly larger (z = 3.36, $p < .001$) than the effect on actual happiness reported earlier: $r(28)$ = −.19. Unlike with actual happiness, the predicted negative effect of progressive taxation on happiness of the rich was substantially larger in size than the predicted positive effect on the poor (z = 3.06, p = .002). These effects on the perceived happiness of the lowest and highest quintile as a function of progressive taxation were not moderated by participants' own income ($ps > .250$).

In short, by overestimating the negative effects on the rich, Americans seem to incorrectly expect that higher progressive taxation would have a more negative effect on the happiness of the nation than is actually the case. This disconnect between reality and perception could in part explain why there is so much opposition to progressive taxation in the United States.

Discussion

What is a good society? From the perspective of the science of happiness, a good society is a society that makes its citizens happy. Various policy ideas can be evaluated in

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[5] Participants first read a definition of progressive taxation—taxing higher income earners at a higher rate than for lower income earners. They were then given several examples of how to calculate the progressive taxation rates based on the difference in taxation rates between the lowest and highest income brackets. As a comprehension check, they had to calculate the progressive taxation based on an example where the lowest bracket is taxed at 40% and the highest bracket at 60%; 373 participants correctly selected 20%; an additional 47 participants failed a comprehension check (by choosing one of the other available answers: 10%, 30%, 40%) and were not included in the analyses.

[6] Participants provided their household income on a 25-point income scale ranging from 1 (*under \$1,000*) to 25 (*\$150,000 or over*).
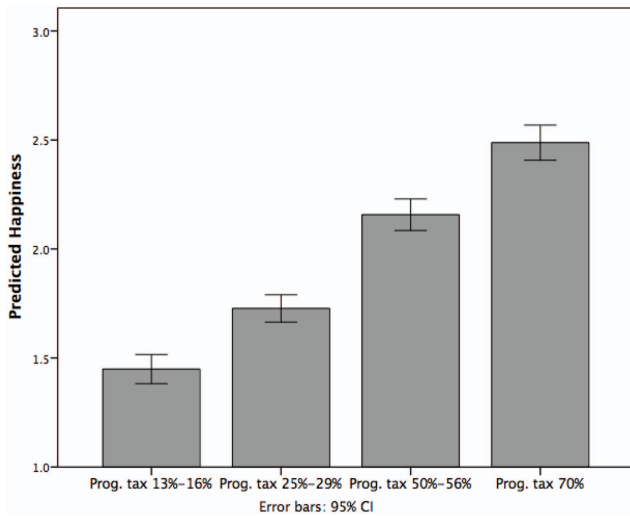
Figure 4. Predicted happiness for the poorest 20% of Americans under different progressive taxation rates. Error bars indicate standard error of the mean. Prog. = progressive; CI = confidence interval.

terms of happiness (e.g., Diener et al., 2015; Oishi & Diener, 2014). Here we focused on income tax policy.

Variations in the degree of progressive taxation in the United States between 1972 and 2014 predicted happiness among the bottom 40% of American income earners. These relatively less affluent Americans felt happier during (and after) years with higher progressive taxation. This association was in part explained by income inequality. That is, years of more progressive taxation tended to be years of less income inequality. And because the poorest 40% of Americans were happier during years with lower income inequality, they were also happier during years of more progressive taxation. In turn, the lower happiness of low-income earners during years of greater income inequality could be explained by lower levels of trust and fairness under higher income inequality. In addition, time-lag analyses provided evidence for the proposed temporal sequence from progressive taxation to income inequality to happiness. Whereas higher progressive taxation was associated with increasingly lower income inequality in subsequent years, income inequality was not associated with increasingly more progressive taxation in subsequent years. Finally, the specific links (between progressive taxation and income inequality, between income inequality and happiness) were robust against third variables such as stock market performance, unemployment rate, and violent crime rate.

Overall, then, our analyses suggest that progressive taxation could be an important policy tool, not only as an antidote to growing income inequality in the United States but also as an instrument in combating the possible negative effects of inequality on perceived fairness, trust, and the happiness of the nation (see Oishi & Kesebir, 2015, for negative correlates of income inequality in other nations).

Although historical data indicated that rich Americans were fairly happy (absolutely and relatively speaking) when they had to pay more, people expected the rich to become very unhappy when they pay a much higher rate of income tax. Thus, people seem to think that regardless of the wealth of the individual, being taxed at a higher rate leads to substantially lower happiness. In contrast, our analyses of actual happiness from 1972 to 2014 suggest that the rich do not feel substantially less happy under more progressive taxation. Rather, under more progressive taxation, income inequality tends to decrease and Americans, particularly the poorest 40%, trust people more; feel that others are fairer; and, ultimately, feel happier.

It is noteworthy that despite the negative attitude toward taxation, empirical research has shown that paying taxes—and more precisely, the behavioral action of actually paying one's taxes—is associated with happiness (Lubian & Zarri, 2011). This could be due to a phenomenon known as tax morale: feeling that one is a good citizen by paying taxes. It is possible that wealthy Americans were not that unhappy in the 1970s, when the rate was very high, because they felt like good citizens by paying their taxes. The participants in our study might have underestimated this role of tax morale in the happiness of the wealthy when imagining the nation with a higher progressive tax rate.

Our findings are consistent with those in past research examining taxation and happiness outside the United States. From 1985 to 2010, for example, Germans were happier on average under higher labor (income plus payroll) tax rates, controlling for net income (Akay et al., 2012). Those for whom taxes reduced disposable income, however, felt less happy. Future research should directly examine the role of disposable income in the effects of progressive taxation
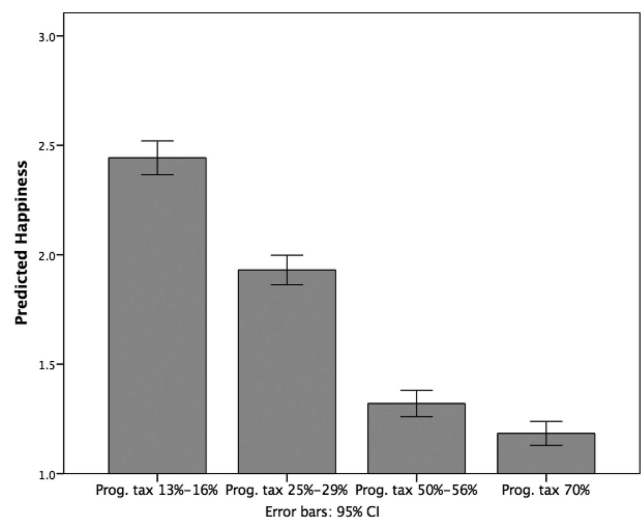

Figure 5. Predicted happiness for the richest 20% of Americans under different progressive taxation rates. Error bars indicate standard error of the mean. Prog. = progressive; CI = confidence interval.

among the rich and the poor. Akay et al. (2012)) also found that the rich were less happy about paying taxes than were the poor, possibly because the poor directly benefit more from public services and welfare. Differences in the level of recognition of the benefits of taxation across different income quintiles, then, may also explain our findings in part.

Tax revenues are in part used to fund welfare programs, which have been associated with citizens' life satisfaction. For instance, Okulicz-Kozaryn, Holmes, and Avery (2014) found that residents of countries with more generous welfare spending reported on average higher levels of life satisfaction than did those living in the countries with less generous welfare spending (see also Flavin, Pacek, & Radcliff, 2011; Helliwell & Huang, 2008; Sage, 2015; Veenhoven, 2000). In contrast, however, government spending per se ("big government") was not associated with citizens' life satisfaction (e.g., Bjørnskov, Dreher, & Fischer, 2007; Oishi et al., 2012).

Although the current research focused on temporal changes in the progressiveness of taxation and self-reported happiness, it is important to explore other aspects of well-being, such as life satisfaction and meaning. Likewise, previous research has shown that respondents' political orientation determines their reactions to inequality and various policies (for a review see Jost et al., 2015). Future research should thus explore whether the progressiveness of taxation is more strongly associated with the happiness of liberals versus conservatives. Likewise, there might be important cross-national variation in the current findings. For instance, higher income inequality is more strongly associated with lower self-reported happiness in Europe than in the United States (Alesina et al., 2004). In equality-sensitive countries, the progressiveness of taxation might be even more strongly associated with citizens' happiness. Still, it is critical to test generalizability of the current findings across diverse countries and cultures. In addition, it is interesting that progressive taxation was most strongly associated with income inequality 5 years later. Similarly, progressive taxation was most strongly associated with the happiness of the poorest 20% of Americans 5 years later. Understanding why and how these time-lagged associations emerge is an important direction for future research. Finally, time-series data are prone to having autocorrelations, which could in turn bias the estimation of standard errors in the ordinary least squares method (Hibbs, 1973). Unlike the association between progressive taxation and income inequality reported earlier (see footnote 3), the association between self-reported happiness and, respectively, progressive taxation and income inequality does not seem to have serious autocorrelations in our data.[7] However, it is important to explore statistical biases inherent in the time series data more thoroughly when discussing the role of progressive taxation and income inequality in citizens' happiness in the future.

Conclusion

Contrary to people's expectations, progressive taxation is not negatively associated with happiness, even for the richest 20% of Americans. In fact, the poorest 40% are significantly happier when taxation is more progressive. Shedding further light on the societal and psychological processes through which progressive taxation is associated with citizens' happiness, our mediation analyses (see Figure 3) showed that more progressive taxation predicted less income inequality, which in turn predicted feeling more trust and fairness, which in turn predicted feeling happier.

Of course, these findings are by no means definitive, because (a) the number of years studied is too short (though the longest available) to be fully confident about the temporal relation between progressive taxation and income inequality, (b) happiness was measured by a single item, and (c) the nonexperimental nature of the study does not warrant strong causal interpretations. It is also too simplistic to promote progressive taxation based solely on these findings, because progressive taxation could have other negative consequences, such as reduced investment spending. Our most important finding, however, is that progressive taxation is not a zero-sum game where a large group of poor people benefit from a big loss of a small group of wealthy citizens. Rather, poorer citizens benefit without a notable loss in happiness among the wealthiest citizens. Reversing the current trend toward less progressive taxation in the United States might be an important tool in reversing the trend toward widening income inequality and declining happiness of poorer Americans.

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[7] Durbin-Watson test for the association between progressive taxation and happiness was 1.22 for the entire sample, 1.45 for the poorest 20%, 1.10 for the poorest 20%–40%, 1.67 for the middle 20%, 1.43 for the richest 20%–40%, and 1.62 for the richest 20%. Durbin-Watson test for the association between income inequality and happiness was 1.56 for the entire sample, 2.09 for the poorest 20%, 1.42 for the poorest 20%–40%, 1.88 for the middle 20%, 1.47 for the richest 20%–40%, and 1.59 for the richest 20%. Durbin-Watson test ranges from 0 to 4, with 2 indicating no autocorrelation, 0 indicating extremely positive autocorrelation, and 4 indicating extremely negative autocorrelation (Savin & White, 1977). The correlation between progressive taxation and the happiness of the poorest 20%–40% was the only Durbin-Watson statistic (1.10) that was smaller than the critical value of 1.12 at $\alpha = .01$ for $N = 29$ with one predictor.

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