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To cite this article: Lora E. Park , Han Young Jung , Kristen Schultz Lee , Deborah E. Ward , Paul K. Piff , Ashley V. Whillans & Kristin Naragon-Gainey (2020): Psychological pathways linking income inequality in adolescence to well-being in adulthood, *Self and Identity*, DOI: [10.1080/15298868.2020.1796777](https://doi.org/10.1080/15298868.2020.1796777)

To link to this article: <https://doi.org/10.1080/15298868.2020.1796777>



Published online: 10 Aug 2020.



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ARTICLE



## Psychological pathways linking income inequality in adolescence to well-being in adulthood

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### ABSTRACT

Does exposure to income inequality in adolescence relate to well-being in adulthood? In Studies 1 and 2 ( $N = 888$ ), individuals who grew up in U.S. counties with higher income inequality expected greater benefits of financial success as adults, were more likely to base their self-worth on money, and felt less happy and satisfied with their lives. Upward social comparisons may play a key role in this process. Participants who made upward (vs. downward) financial comparisons perceived greater economic disadvantage, which predicted greater expected benefits of financial success, basing self-worth on money, and lower well-being (Study 3,  $N=336$ ). Together, these studies suggest that past exposure to income inequality may be linked to lower well-being in adulthood due to financial contingency of self-worth.

### ARTICLE HISTORY

Received 19 November 2019

Accepted 7 July 2020

### KEYWORDS

Financial contingency of self-worth; income inequality; happiness; life satisfaction; well-being; social comparison

Income inequality in the United States has risen dramatically since the early 1970s, with the gap between the rich and the poor increasing by 40% to 50% (McCall & Percheski, 2010). This upward trend has been associated with a range of negative outcomes, such as higher rates of mental and physical illness, morbidity, homicide, and less trust and social cohesion (Kaplan et al., 1996; Kawachi & Kennedy, 1999; Oishi et al., 2011; Piff et al., 2018; Wilkinson & Pickett, 2007; Wilkinson & Pickett, 2009). Amidst mounting inequality, questions about its impact on well-being arise. In particular, how does income inequality at the societal level come to be associated with well-being at the individual level, and via which processes? From a social psychological perspective, “... *understanding how inequality affects individuals and society requires understanding how inequality works psychologically*” (Buttrick et al., 2017, p. 8).

The present research answers this call by examining how income inequality experienced during adolescence relates to well-being in adulthood. Specifically, we test a psychological process model whereby exposure to income inequality while growing up

is associated with expectations of the benefits of financial success and the tendency to base one's self-worth in this domain, with consequences for happiness and life satisfaction. In so doing, this research is among the first to demonstrate that exposure to economic inequality while growing up relates to people's expected benefits of financial success, financial contingency of self-worth, and well-being in adulthood.

### ***Income inequality and well-being***

Life course scholars seek to understand the influence of both past and current social contexts on adult outcomes. In particular, childhood and adolescence are thought to be key developmental periods that shape self-related processes and the internalization of values and norms (Kansky et al., 2016; Wheaton & Clarke, 2003). Indeed, a large body of research has documented the detrimental impact of childhood adversity (e.g., poverty, family conflict, child mistreatment) on later outcomes, such as poor mental and physical health (Hayward & Gorman, 2004; Repetti et al., 2002; Wickrama & Noh, 2010) and less favorable life evaluations (Schafer et al., 2011).

Although much is known about the damaging effects of early adversity, few studies have examined how exposure to *income inequality* while growing up relates to well-being in adulthood. According to theory and research on relative deprivation, it is not just poverty that contributes to poor health, but psychosocial factors that are distributed unevenly across all levels of income that perpetuate disparities in health and well-being (Mullahy et al., 2011). Income inequality is a socioecological variable that represents the degree of income differences across a population and is typically assessed with the GINI coefficient, which reflects the income distribution of a region. The GINI ranges from 0 – reflecting total income equality in which everyone has the same income, to 1 – reflecting total income inequality in which one person has all the income and everyone else has zero income.

The literature is mixed regarding the link between income inequality and well-being. On one hand, a large body of research shows significant inverse relationships between income inequality and well-being (Elgar et al., 2015, 2017; Ferrer-i-Carbonell & Ramos, 2014; Kaplan et al., 1996; Kennedy et al., 1998; Kawachi et al., 1997; Odgers, 2015; Oishi et al., 2011; Subramanian & Kawachi, 2003, 2006; see Kondo et al., 2009; Wilkinson & Pickett, 2007; Pickett & Wilkinson, 2007, for reviews). For example, children and adolescents living in countries with higher (vs. lower) income inequality show more mental and physical health problems (Odgers, 2015; Pabayo et al., 2016; Pickett & Wilkinson, 2007) and lower life satisfaction (Elgar et al., 2015). Adults in the U.S. report lower happiness during years of higher national income inequality (Oishi et al., 2011), and similar associations have been documented in other Western countries, as well (Ferrer-i-Carbonell & Ramos, 2014).

Other studies, however, find no significant relationship between income inequality and well-being (Bjørnskov, Dreher, & Fischer, 2006; Deaton, 2003; Esping-Andersen & Nedoluzhko, 2017; Kelley & Evans, 2016; Kenworthy, 2017; Mellor & Milyo, 2002). For example, a study of 90,000 individuals across 70 countries found no significant link between income inequality and subjective well-being (Bjørnskov et al., 2006), and this finding was replicated among participants in Russia, such that changes in income inequality during the 1990s were unrelated to changes in people's life satisfaction (Senik, 2004).

There are several possible reasons why variations exist in the association between income inequality and well-being. One explanation may be due to the level of the geographic unit being studied (Elgar et al., 2015; Wilkinson & Pickett, 2006; Wilkinson & Pickett, 2009). For example, results and estimated effect sizes seem to be less consistent as the size of the unit of analysis decreases; thus, country-level indices of inequality may show more reliable effects than local levels of inequality (Wilkinson & Pickett, 2006). Differences in the control variables used across studies might also affect the results. For example, in cross-national studies, the link between inequality and well-being varies depending on whether or not gross domestic product is controlled for in the analyses (Zagorski et al., 2014).

The cultural context may also matter. For example, some studies find that Europeans' happiness is more negatively affected by income inequality than Americans' due to lower perceived opportunities for social mobility in Europe than in the U.S. (Alesina et al., 2004). In developing societies, economic inequality may strengthen a belief that the future will be better than the past; for example, income inequality predicts greater hope for the future and life satisfaction among residents of rural (but not urban) China (Cheung, 2016). Subjective perceptions of inequality may also account for the mixed findings. When perceptions of inequality are viewed as a signal that society is rigged or corrupt, higher inequality is related to lower well-being (Grosfeld & Senik, 2010). When inequality remains at a constant level and is viewed as normal and reflective of the status quo, inequality is weakly associated with well-being, whereas when there is a short-term change or disruption to inequality, such that inequality becomes highly salient, the link between inequality and well-being is strengthened (Esping-Andersen & Nedoluzhko, 2017; Schroëder, 2016).

The mixed findings could also be due to the contemporaneous measurement of income inequality and well-being. Only including measures of the context of adulthood may overlook the potential influence of earlier exposure to inequality on well-being in adulthood. Furthermore, whereas a few studies measured psychological pathways linking income inequality to happiness and life satisfaction, such as perceptions of trust (Oishi et al., 2011) and upward social comparisons (Cheung & Lucas, 2016), much of the empirical work on income inequality has not assessed specific pathways indirectly linking inequality to well-being and may therefore have overlooked mechanisms that could account for this relationship. To address this limitation, the present studies examine how people's expectations of the benefits of financial success, and the degree to which they base their self-worth in this domain, account for the proposed link between past exposure to income inequality and current well-being.

### ***Income inequality and pathways to well-being***

Various pathways have been proposed to account for the link between inequality, health, and well-being, such as underinvestment in public goods, erosion of social cohesion and trust, and engaging in social comparisons (e.g., Cheung & Lucas, 2016; Kawachi & Kennedy, 1999; Kawachi et al., 1997; Marmot, 2004; Oishi et al., 2011; Wilkinson & Pickett, 2009). These pathways, however, do not unfold overnight. For example, the tendency to compare one's status with others may occur with greater frequency and magnitude over time. As social epidemiologists note, "... it seems implausible that these mechanisms of action are instantaneous – there should be a lag time during which

income inequality affects these intermediary factors, which in turn, affect health" (Blakely, 2000, p. 318). The importance of a lag time has been demonstrated in research showing, for example, that children who grow up in poverty are more likely to be poor as adults than those who were never poor (Wagmiller & Adelman, 2009). Even brain development is thought to be influenced by early experiences of deprivation and stress (Bradley & Corwyn, 2002; Kim et al., 2013), suggesting that past exposure to environmental conditions plays an important role in current health and well-being.

Consistent with this idea, Blakely (2000) found that exposure to higher state-level income inequality up to 15 years earlier was more strongly related to adults' current self-reported health than was income inequality measured concurrently. Another study found that men and women in the U.S. who were exposed to greater national income inequality during their first five years of life reported lower quality of health as adults, even after controlling for demographics, current and past economic status, childhood poverty, childhood health, and time trends (Lillard et al., 2015). In another study, higher levels of national income inequality from birth to 4 years of age predicted more psychomatic symptoms and lower life satisfaction in adolescence, even after controlling for variables such as age, family income, and national per capita income (Elgar et al., 2017).

Although these findings suggest a connection between past income inequality and current well-being, no studies to our knowledge have investigated distinct psychological processes underlying this relationship. Indeed, most of the literature examining mechanisms underlying this relationship has been either theoretical in nature (Kawachi & Kennedy, 1999; Marmot, 2004; Schor, 1998) or used concurrent assessments of income inequality and well-being (Cheung & Lucas, 2016; Oishi et al., 2011). In contrast, the present research represents one of the first attempts to examine a process model of how exposure to income inequality during adolescence is related to distinct psychological processes – i.e., upward financial comparisons, expected benefits of financial success, and Financial CSW – that may be associated with people's happiness and life satisfaction in adulthood.

### ***Exposure to income inequality while growing up***

Awareness and experiences of economic inequality are not distributed equally across early life. Most critically for our purposes, exposure to inequality may be particularly salient during adolescence. During early childhood (ages 3–6), children identify social class differences based on external cues, such as clothing and material possessions (Ramsey, 1991); they also understand the concept of fairness in the distribution of resources (LoBue, Nishida, Chiong, DeLoache, & Haidt, 2011). During middle childhood (ages 6–11), children focus more on psychological qualities that distinguish the rich from the poor, such as perceived differences in motivation and personality (Leahy, 1983).

Awareness of inequality is likely to crystallize during early to middle adolescence (ages 12–16), as individuals become increasingly sensitive to disparities in economic resources in the social environment and their relative positioning within this context. Indeed, adolescence is thought to be a critical period in the formation of perceptions of subjective social status (Goodman et al., 2015; Rivenbark et al., 2019). The emerging ability to think abstractly during adolescence also allows for greater understanding of social hierarchies and stratification. Adolescents begin to refer to more abstract, symbolic features of social

class, such as power and prestige, and learn the concept of status within broader systems to detect class differences (Leahy, 1983).

Given that early to middle adolescence is characterized by heightened social awareness, concerns about peer approval, and sensitivity to social comparison information (Somerville, 2013; Steinberg & Morris, 2001), exposure to income inequality during this period may be particularly impactful in its association with psychological processes – i.e., upward financial comparisons, expected benefits of financial success, and basing self-worth in this domain – that connect to later well-being.

In sum, while children are capable of noticing class-based inequalities from an early age, it is not until early to middle adolescence that individuals become acutely aware of their subjective status relative to others and are highly sensitive to status differences (Goodman et al., 2001, 2007, 2015; Somerville, 2013; Steinberg & Morris, 2001). We therefore chose to examine income inequality while growing up – in terms of the average GINI of the county in which participants grew up in at ages 12 and 16 – to correspond to this key developmental period.

### ***Inequality, expected benefits of financial success, and financial CSW in adulthood***

Individuals who grow up in areas with high income inequality may come to expect benefits of being financially successful and to base their self-esteem in this domain as adults. That is, they may adopt the expectation that *if* they were financially successful, *then* they would be happy and fulfill basic psychological needs for autonomy, competence, and relatedness (Ryan & Deci, 2000). In turn, people may tie their self-worth to financial success, irrespective of their current financial standing.

According to Contingencies of Self-Worth Theory (Crocker & Wolfe, 2001), individuals differ in the degree to which they base their self-worth in various domains. Whereas some people base their self-worth on academic competence, others may base their self-worth on having others' approval, their physical appearance, or adhering to moral or ethical standards. According to CSW theory, individuals are likely to base their self-esteem in domains in which they believe that *if* they could succeed, they would feel safe and secure. A common assumption is that financial success leads to happiness and fulfillment, yet studies suggest that people are inaccurate forecasters of their future emotional reactions (Wilson & Gilbert, 2005) and both the rich and the poor experience a mix of positive and negative emotions on a daily basis (O'Brien et al., 2018, c.f. Kushlev, Dunn, & Lucas, 2015; Piff & Moskowitz, 2018).

Thus, while individuals may believe that financial success will bring them greater happiness (Aknin et al., 2009), this is not always the case. In fact, there are critical thresholds for this association, such that after people make a certain amount of money, income no longer predicts life satisfaction or emotional well-being (Jebb, Tay, Diener, & Oishi, 2018). Focusing on financial success – when done so for social approval or social comparison reasons – can also undermine happiness (Srivastava et al., 2001). In the present research, people may expect to feel happy and fulfill their psychological needs by being financially successful, but if they *base their self-worth* in this domain, this should be related to lower well-being, because people strive to continually achieve higher and higher levels of success in domains of contingency (Crocker & Park, 2004), and based on past research showing that Financial CSW predicts negative psychological outcomes (Park et al., 2017).

### The role of upward social comparisons

Finally, we explored the possibility that social comparison processes – specifically, upward social comparisons – may play a key role in linking exposure to income inequality with well-being in adulthood. Humans are concerned about their subjective status relative to others, as high status affords greater access to material, psychological, and social rewards (Anderson et al., 2015; Kraus et al., 2013). Because people's attributes often lack an objective frame of reference, individuals are likely to compare themselves to others to determine their perceived standing in a domain (Festinger, 1954; Suls et al., 2002). Furthermore, social comparisons with *other people*, rather than self-comparisons across time or domains, have the largest impact on self-evaluations and affective reactions (Zell & Strickhouser, 2020).

The tendency to compare one's own outcomes to others' is likely to be heightened under conditions of high economic inequality. Indeed, economic inequality is thought to intensify concerns about one's social class and relative status in society (Piff et al., 2018; Kraus et al., 2013). In such contexts, people feel increased anxiety and pressure to show that they have high status and may compare themselves with reference groups whose incomes are higher than their own (De Botton, 2004; Kawachi & Kennedy, 1999; Marmot, 2004; Paskov et al., 2013; Schor, 1998; Wilkinson & Pickett, 2009). Through media and advertising, for example, people are exposed to wealthier individuals and their lifestyles, which is thought to shape upward financial aspirations and comparisons (Callan et al., 2017; John et al., 2014; Knell, 1999).

Consistent with this notion, a study of over 1.7 million adults in the U.S. found that individuals were more likely to compare their social rank with others and to feel less satisfied with their lives in more economically unequal (vs. equal) counties, even after controlling for household income (Cheung & Lucas, 2016). Other studies find that people living in economically unequal environments are more likely to compare themselves with others (e.g., their neighbors, coworkers; Heffetz, 2011), especially with those whose incomes are higher than their own (Smith & Huo, 2014). If people are continually seeking to achieve higher levels of status in areas of high income inequality, they may be inclined to make upward comparisons, given that people tend to compare themselves with others who are superior to themselves when their motivation is to improve their attributes or abilities (Collins, 1996).

Although some studies suggest that poor people report lower life satisfaction in areas with higher income inequality (Cheung & Lucas, 2016), other studies find that everyone experiences greater status anxiety, social comparison, and competition – even those at the top of the social ladder – in economically unequal societies (Layte & Whelan, 2014; Paskov et al., 2013). People living in areas with higher income inequality show greater status seeking behaviors, such as searching for more positional goods that signal higher class (Walasek & Brown, 2015) and working long hours to obtain more material and financial rewards (Bell & Freeman, 2001). Such findings suggest that income inequality may have a “social pollution” effect ... that appears to affect every group exposed in a similar manner” (Subramanian & Kawachi, 2006, p. 206).

Given research suggesting that income inequality heightens status anxiety across all social strata, we posit that when people grow up in areas with high income inequality, they will engage in more frequent upward financial comparisons with

others and be more likely to expect hedonic and psychological benefits of financial success – to believe that *if* they were financially successful, *then* they would be happier and fulfill their fundamental psychological needs for autonomy, competence, and relatedness. In turn, they may base their self-worth more on financial success, but doing so may be related to less happiness and life satisfaction, based on past research showing that Financial CSW is related to worse psychological outcomes (Park et al., 2017).

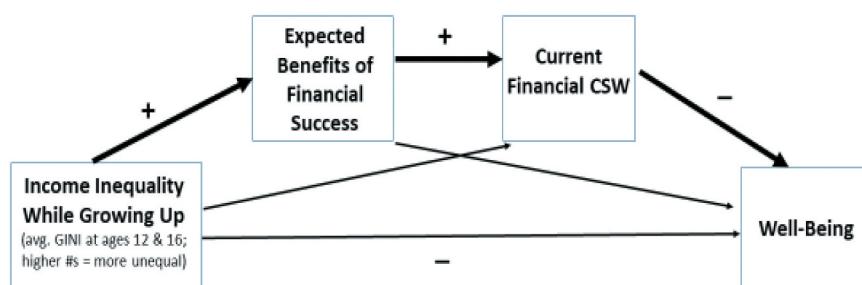
### **Overview of present research**

Spanning diverse theoretical perspectives and methods, we sought to gather converging evidence to elucidate how and why past exposure to income inequality relates to well-being in adulthood. In the first two studies, we tested a psychological process model linking income inequality in adolescence to well-being in adulthood. Study 1 tested the basic components of the model presented in Figure 1. Study 2 expanded upon this model by exploring the proximal role of upward financial comparisons. Specifically, we examined whether individuals who grew up in areas with higher income inequality were more likely to compare their financial status with others, and in turn expect greater benefits of financial success and to base their self-worth more in this domain as adults, with negative consequences for happiness and life satisfaction. Across both studies, we controlled for relevant covariates and sought to rule out alternative explanations by testing alternate models.

Study 3 used experimental methods to home in on the role of current upward (vs. downward) financial comparisons in shaping perceptions of disadvantage, expected benefits of financial success, Financial CSW, and well-being. We expected that individuals who engaged in upward financial comparisons would endorse greater expectations of the benefits of financial success and to base their self-worth more in this domain, but report lower subjective well-being.

### **Study 1**

Study 1 examined whether exposure to income inequality in adolescence predicted greater expected benefits of financial success, Financial CSW, and satisfaction with life



**Figure 1.** Proposed serial mediation model. + positive relationship, – negative relationship

in adulthood. Importantly, based on previous research (e.g., Cheung & Lucas, 2016; Manduca, 2019), we controlled for variables in the past or current environment that may be associated with income inequality or life satisfaction, such as county-level indices of median household income, poverty, population density, and region of the U.S. that participants grew up in, as well as current household income.<sup>1</sup> We also tested the proposed theoretical model against alternative models to provide further support for our claims.

## Method

### *Participants and procedure*

We sought to recruit as many participants as possible during a 3–4 week period with the aim of recruiting at least 450 participants to have ample power to detect a minimal effect of .20. We aimed for 450 because we knew that some participants' data might not be usable (e.g., if they reported growing up in a country outside the U.S. or did not report their age, which was needed to calculate the GINI coefficient, or chose to withdraw their data).

Participants ( $N = 462$ ) completed the study via ResearchMatch, an online registry developed by a number of academic organizations with the goal of matching researchers with participants. Anyone living in the U.S. from any demographic background who is over 18 years of age can join ResearchMatch, although the site typically seeks to recruit participants for health-related behavioral research. Participants in the current studies were preexisting members of ResearchMatch (i.e., they had signed up on the site of their own volition). To recruit participants, researchers emailed a study description to a randomly selected sample of ResearchMatch users. The current study was titled, "Study of Personality and Beliefs" and was described as a survey examining people's personal beliefs, preferences, and experiences. Upon receiving this information, participants indicated whether or not they wanted to be considered for the study. The research team then sent participants a follow-up e-mail with a link to access the study and participants decided whether or not they wished to participate.

Because the study focused on income inequality in the U.S., participants were excluded if they grew up outside the U.S. ( $n = 11$ ), reported a non-identifiable county of residence while growing up ( $n = 25$ ), did not report their age, which was needed to calculate the GINI based on when they were 12 and 16 years old ( $n = 18$ ), or chose to withdraw their data ( $n = 2$ ). The final sample was 405 participants (74 men, 327 women, 4 other;  $M_{age} = 54.72$ ,  $SD = 14.55$ ) that was 92% White, 3% Black, 2% Asian, 1% Hispanic, 2% other and grew up in these regions: 23% Northeast, 34% Midwest, 28% South, 15% West.

### *Income inequality while growing up*

To measure income inequality while growing up, participants reported the county, city, and state where they grew up (i.e., lived for the majority of their life up to age 16). Participants were asked to list only one county, city, and state. Based on this information, we looked up the Federal Information Processing Standards (FIPS) code, which uniquely identifies U.S. counties. We merged these data with the GINI coefficient of the county that participants lived in at ages 12 and 16 based on their

reported birthdate and rounded to the nearest decade. We used county-level GINIs that were computed and made publicly available by Nielsen (2002) for the time period of 1970–1990 and by Moller (2012) and Moller et al. (2009) for the year 2000; no county-level GINIs are publicly available prior to 1970. Thus, participants who reached age 12 before 1970 were assigned the 1970 GINI for their childhood county to replace missing data.<sup>2</sup>

Nielsen and colleagues' county-level GINIs are based on family pretax income from Census data. For the 2010 GINIs, we used the RPME module in Stata 14 (von Hippel & Powers, 2015) to estimate the GINI by county based on family income data from the 2006–2010 American Community Survey 5-year estimates (U.S. Census Bureau, 2010). When we compared the GINIs estimated using the RPME module with those estimated by Moller et al. (2009) for the years 1990 and 2000, the two measures were highly correlated ( $r = .97$ ,  $p < .001$ ;  $M = .36$ ,  $SD = .04$ ). We then computed an average GINI across the two time points when participants were age 12 and age 16.

### ***Expected benefits of financial success***

Participants were asked, "To what extent do you think being financially successful would make you happy?" from 1 (*definitely not*) to 5 (*definitely yes*) ( $M = 3.48$ ,  $SD = .89$ ). Agreement with this item reflects a belief that being financially successful will lead to greater happiness. Test-retest reliability of this item was  $.58$ ,  $p < .001$  over a 2–6 week period.

### ***Financial CSW***

Participants completed the 5-item Financial CSW scale (Park et al., 2017), which measures how much individuals base their self-worth on financial success from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items include, "My self-esteem is influenced by how much money I make" and "I feel bad about myself when I feel like I don't make enough money" ( $M = 3.94$ ,  $SD = 1.00$ ,  $\alpha = .74$ ). Because people are thought to select specific domains that are important to their self-esteem, they are assumed to be able to consciously report which domains they value as a basis of self-worth. Furthermore, in studying individual differences such as Financial CSW, a primary way of validating such self-report questionnaires is by demonstrating how it relates to other existing measures (Funder, 2001). The Financial CSW scale has been shown to have good internal reliability, test-retest reliability, and good convergent validity with scales such as materialism and financial aspirations, and discriminant validity in relation to other CSWs (see Park et al., 2017).

### ***Satisfaction with life***

Participants completed the 5-item Satisfaction with Life Scale (e.g., "I am satisfied with life," Diener et al., 1985) on a response scale from 1 (*strongly disagree*) to 7 (*strongly agree*) ( $M = 4.75$ ,  $SD = 1.27$ ,  $\alpha = .87$ ).

## Covariates

### *Current household income*

Participants reported their total family household income from 1 = *Less than 5,000 USD* to 10 = *150,000 USD or greater* (*Median* = \$75,000 USD-\$99,999).<sup>3</sup>

### *County household income while growing up*

Based on the county, city, and state that participants grew up in, we merged these data with the median household income of the county in which participants grew up at ages 12 and 16, based on their reported birthdate and rounded to the nearest decade. We then computed an average median household income in the county across the two time points. The median household income data for each county are available from the Census Bureau (Table C1) from 1969 to 1989 in constant dollars. We merged these data with the median household income for each county for 2000 and 2010 from the National Historical Geographic Information System. The data for 2000 come from the 2000 Census; the 2010 data come from the 2008–2012 American Community Survey 5-year estimates. We adjusted all income figures (using the CPI-U-X1 series) so that the data series was in constant dollars (*Median* = \$29,542 USD; county household income at ages 12 and 16:  $r = .98, p < .001$ ).

### *County poverty level while growing up*

Based on the county, city, and state that participants grew up in, we merged these data with the proportion of the population living below the poverty line for that county when participants were 12 and 16 years old, based on their reported birthdate and rounded to the nearest decade. We then computed a proportion of the population living below the county poverty line across the two time points. The measure of county poverty while growing up was estimated by dividing the total number of people (for whom poverty status is determined) who reported an income below the poverty line by the total number of people in the county. These measures are available from the National Historical Geographic Information System for 1970 to 2010. The measures come from the Census for 1970 to 2000 and the 2008–2012 American Community Survey 5-year estimates for 2010 (*Median* = .10, range = .03-.46, county poverty at ages 12 and 16:  $r = .97, p < .001$ ).

### *County population density while growing up*

To compute population density while growing up, we divided county population by county size information. First, we examined historical population estimates for each U.S. decennial census year for U.S. counties. These data come from the University of Minnesota Data Repository (Schroeder, 2016). We calculated and rounded the years when participants were 12 and 16 years old to the nearest decade and then converted the geographic locations (i.e., county, city, and state that participants grew up in) into county FIPS codes. Based on this information, we merged the dataset with the historical population estimates and averaged the estimates across the two time points (i.e., ages 12 and 16). Measures for county size also come from the University of Minnesota Data Repository (Schroeder, 2016). Based on the county, city, and state that participants grew up in, we searched the FIPS code and then merged these data with the measures for county size in square miles. Sizes of counties were equivalent across census years. We then divided the

population data by county size to compute population density while growing up (*Median* = 60.81 sq. mi.).

### **Region where participants grew up**

Participants reported growing up in various regions across the U.S. (see Participants section for details). Regions were coded as 1 = Northeast, 2 = Midwest, 3 = South, 4 = West and were controlled for in the analyses, based on past research suggesting regional income divergence across the U.S. over the past 40 years (Manduca, 2019). Regions were later dummy coded such that the Northeast, South, and West were compared to the Midwest, given that the highest number of participants came from this region.

## **Results**

Table 1 presents zero-order correlations after standardizing all variables. Income inequality while growing up was significantly related to greater expected benefits of financial success, lower county-level household income, and higher county-level poverty while growing up. Greater expected benefits of financial success were significantly related to basing self-worth more in this domain (i.e., having higher Financial CSW), and Financial CSW was related to lower life satisfaction. Income inequality was unrelated to life satisfaction, consistent with studies showing no significant association between income inequality and subjective well-being in developed, affluent countries such as the U.S. (Esping-Andersen & Nedoluzhko, 2017; Kelley & Evans, 2016; Kenworthy, 2017). Perhaps income inequality is not directly related to well-being because people in the U.S. tend to underestimate inequality (Norton & Ariely, 2011) and overestimate upward mobility (Davidai & Gilovich, 2015). Although these correlational findings suggest that past income inequality is unrelated to current well-being, it could still be the case that exposure to inequality while growing up *indirectly* predicts life satisfaction in adulthood through distinct psychological processes.

Specifically, we hypothesized that individuals who grew up in areas with higher income inequality would be more likely to expect that being financially successful would make them happier. These individuals may be more likely to base their current self-worth on financial success, which may be related to less happiness and life satisfaction. Furthermore, if there is something unique about past exposure to income inequality, then it should be related to the outcomes even after controlling for current household

**Table 1.** Study 1 zero-order correlations.

|   | Correlations |        |        |         |      |         |       |   |
|---|--------------|--------|--------|---------|------|---------|-------|---|
|   | 1            | 2      | 3      | 4       | 5    | 6       | 7     | 8 |
| 1. Income inequality while growing up         | –            |        |        |         |      |         |       |   |
| 2. Current income                             | -.03         | –      |        |         |      |         |       |   |
| 3. Expected benefits of financial success     | .12*         | -.01   | –      |         |      |         |       |   |
| 4. Financial CSW                              | .09          | -.03   | .40*** | –       |      |         |       |   |
| 5. Life Satisfaction                          | -.04         | .32*** | .01    | -.24*** | –    |         |       |   |
| 6. County income while growing up             | -.29***      | .00    | -.01   | .06     | .01  | –       |       |   |
| 7. County poverty level while growing up      | .68***       | -.00   | .05    | -.00    | .02  | -.73*** | –     |   |
| 8. County population density while growing up | -.02         | -.02   | -.01   | .05     | -.07 | .17**   | -.12* |   |

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

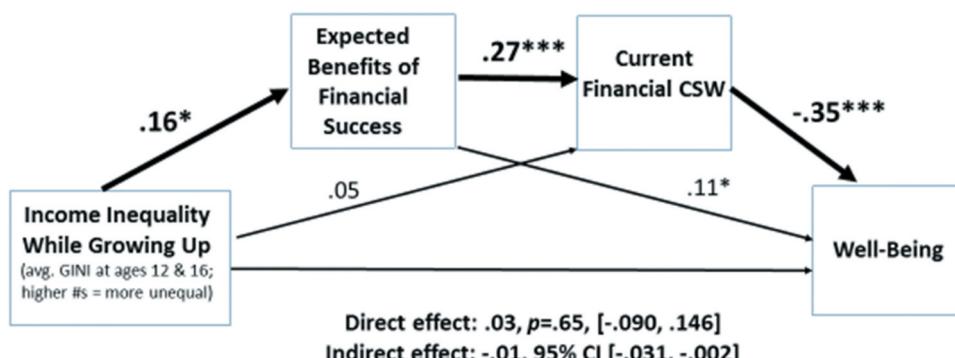
income, region of the U.S. that participants grew up in, and county-level variables of median household income, poverty, and population density while growing up.

For the primary analyses, we used Hayes's (2018) PROCESS macro for SPSS (model 6) to test a sequential mediation model whereby income inequality while growing up predicted expected benefits of financial success, basing self-worth on financial success, and life satisfaction, controlling for current household income, region of the U.S. that participants grew up in, and all county-level variables while growing up. Figure 2 summarizes the results. Consistent with hypotheses, income inequality while growing up predicted greater expected benefits of financial success,  $\beta = .16$ ,  $p = .042$ , 95% CI [.006, .314], which was related to basing self-worth more on financial success,  $\beta = .27$ ,  $p < .001$ , 95% CI [.204, .335], and lower satisfaction with life,  $\beta = -.35$ ,  $p < .001$ , 95% CI [-.472, -.220]. Results of bootstrapping analyses based on 5,000 resamples showed that the bias-corrected confidence interval excluded zero, indicating a significant sequential mediation effect of expected benefits of financial success and Financial CSW on life satisfaction,  $\beta = -.01$ , 95% CI [-.031, -.002].<sup>4</sup>

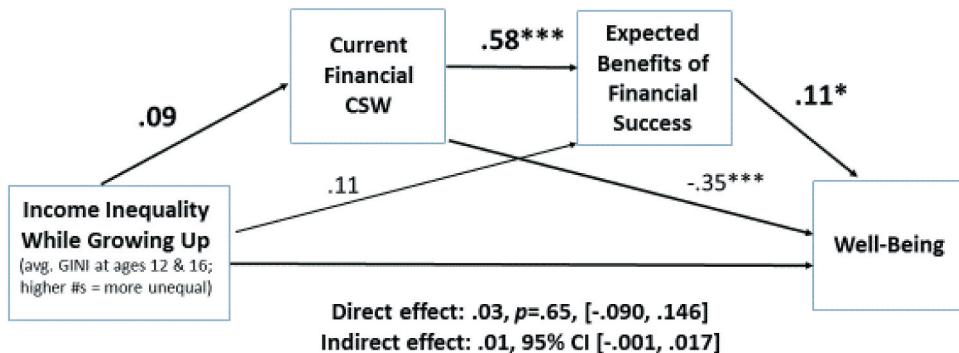
### Tests of alternate models

To provide further evidence for these claims, we tested a series of alternative models. The first alternate model tested whether past exposure to income inequality while growing up predicts basing self-worth on financial success (rather than expected benefits of financial success), which predicts well-being. In other words, it could be the case that growing up in areas of high income inequality predicts lower well-being, not because people have Financial CSW, but because they expect (perhaps erroneously) that money will bring them happiness and increase their satisfaction with life. This model was not supported, as indicated by a non-significant indirect effect (see Figure 3).

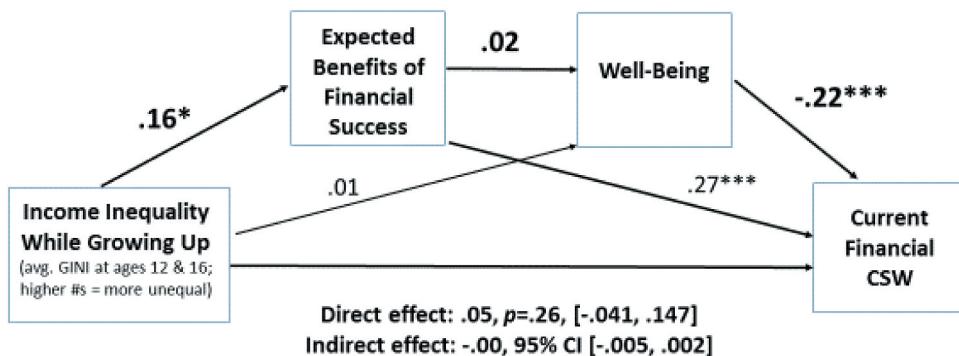
The second alternate model tested the possibility that past exposure to income inequality predicts greater expected benefits of financial success, which predicts lower well-being and basing one's self-worth more in this domain. That is, people who grow up in areas with high income inequality may expect more benefits of financial success, but feel less happy and satisfied with life, which then predicts basing their self-worth more on



**Figure 2.** Results of serial mediation model for Study 1. Paths reflect standardized coefficients. Bolded paths depict the significant indirect effect from income inequality while growing up to well-being in adulthood. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .



**Figure 3.** Results of alternative serial mediation model #1 for Study 1. Paths reflect standardized coefficients. \*p<.05; \*\*p<.01; \*\*\*p<.001.



**Figure 4.** Results of alternative serial mediation model #2 for Study 1. Paths reflect standardized coefficients. \*p<.05; \*\*p<.01; \*\*\*p<.001.

financial success. This model was also not supported, as indicated by a non-significant indirect effect (see Figure 4).

## Discussion

Study 1 provides the first known evidence that individuals who grew up in counties with higher income inequality were more likely to believe that if they were financially successful, they would be happier. These individuals, in turn were more likely to base their current self-worth on financial success, which was related to experiencing lower life satisfaction. Notably, these outcomes emerged even after controlling for current income and county-level variables such as median household income, poverty, density, and region of the country that participants grew up in.

A question that arises from this study is how expected benefits of financial success differ from basing self-esteem on financial success. Individuals are thought to differ in their contingencies of self-worth, or the domains in which they base their self-esteem

(Crocker & Wolfe, 2001). One of the reasons why people may base their self-worth in certain domains is because they hold expectations or beliefs about the emotional rewards and psychological benefits to be obtained from investing their self-worth in a particular domain. In the financial domain, individuals may base their self-worth on money because they believe that being financially successful will make them happier and satisfy their psychological needs for competence, autonomy, and relatedness. From this perspective, expecting benefits of financial success is thought to precede basing self-worth in this domain. On the other hand, if individuals do not think that money will buy them happiness, they may be less likely to value financial success as a basis of self-worth.

Supporting these ideas, results described earlier showed that income inequality while growing up was significantly associated with greater expected benefits of financial success, which was related to greater Financial CSW and lower life satisfaction. In contrast, tests of alternative models – in which the mediators were reversed and the mediator and outcome were reversed – showed non-significant indirect effects (see Figures 3 and 4).

At a theoretical level, it makes sense that individuals who grew up in economically unequal environments would expect more benefits of financial success as adults, which would be related to Financial CSW. Given that past work suggests that income inequality breeds competition and status anxiety (Paskov et al., 2013), individuals who grew up in unequal environments may be more likely as adults to believe that if they were more financially successful, then they would be happier and fulfill their psychological needs for autonomy, competence, and relatedness. The more they expect such benefits, the more they may base their self-esteem on financial success. However, given that Financial CSW is associated with maladaptive outcomes due to feeling pressured to satisfy their contingency of self-worth (Park et al., 2017), the more individuals stake their self-worth in this domain, the lower their well-being. In sum, the present findings provide support for the proposed model, in which exposure to income inequality while growing up is associated with greater expected benefits of financial success, which is related to basing self-worth on financial success and experiencing lower satisfaction with life.

## Study 2

Study 2 sought to replicate and extend the findings of Study 1 by assessing both hedonic and psychological expectations of the benefits of financial success, examining additional indices of well-being (i.e., happiness as well as life satisfaction), and exploring the role of upward financial comparisons. Furthermore, we assessed and controlled for current economic inequality in this study to test the unique role of *past* exposure to income inequality on the outcomes of interest. People may base their self-worth in domains in which they think that, if they could succeed, they would feel safe and secure and fulfill basic psychological needs (Crocker & Park, 2004). It therefore seems plausible that individuals who grew up in areas of high income inequality would not only expect to feel happier if they were financially successful, but to also believe that financial success would help them fulfill psychological needs for competence, autonomy, and relatedness (Ryan & Deci, 2000). Why might this be? One possibility is that growing up in areas with high income inequality may be associated with a greater tendency to make upward financial comparisons with others. Indeed, research has shown that economic inequality

increases the salience of income disparities, evoking upward comparisons that result in lower well-being (Cheung & Lucas, 2016).

Based on such findings, we explored the possibility that individuals who grew up in areas with higher income inequality would be more likely to compare their financial status with others and, in turn expect more benefits of financial success and to base their self-worth in this domain as adults. Similar to Study 1, we also predicted that when individuals stake their self-worth on financial success, they may experience less satisfaction with life and less happiness.

## Method

### *Participants and procedure*

Using data from Study 1, we conducted a Monte Carlo power simulation to verify that we had adequate power to test for the key sequential indirect effect. This simulation indicated that the final sample from Study 1 ( $N = 405$ ) yielded a power level of 0.89 for the proposed sequential mediation design (Schoemann et al., 2017). Thus, we recruited a similar yet slightly larger sample in Study 2 to account for potential participant attrition.

A total of 513 participants completed the study using Qualtrics, an online survey platform which offers a crowd-sourcing service that allows researchers to request users to complete various types of research studies. Participants completed this survey as part of a larger study. They were excluded if they grew up outside the U.S. ( $n = 2$ ) or reported a non-identifiable county of residence in adolescence or at the time of the survey ( $n = 28$ ). All participants reported their age and no participants withdrew their data. The final sample was 483 participants (353 men, 128 women, 2 other;  $Mode_{age} = 35\text{--}44$ ) that were 76% White, 9% Black, 7% Hispanic, 5% Asian, 3% other. Participants grew up in these regions: 26% Northeast, 26% Midwest, 29% South, 19% West.<sup>5</sup>

### *Income inequality while growing up*

As in Study 1, participants reported the county, city, and state in which they grew up. In the present study, age was assessed with the following scale: 1 = *under 18*; 2 = *18–24*; 3 = *25–34*; 4 = *35–44*; 5 = *45–54*; 6 = *55–64*; 7 = *65–74*; 8 = *75–84*; 9 = *85 or older*. Given this format, we calculated the range of years when each participant was 12 and 16 years old (e.g., participants ages 25–34 were 12 years old between 1996–2005). We then looked up county FIPS codes and merged this file with GINI coefficients of the county for the minimum and maximum years within that range, rounded to the nearest decade, and then averaged together to compute an estimate reflecting the GINI when participants were 12 and 16 years old ( $M = .38$ ,  $SD = .04$ ,  $r = 1.00$ ,  $p < .001$ ).

### *Upward financial comparisons*

Given that there were no existing measures of the extent to which people currently engaged in financial social comparisons with others, we developed the following item to assess the frequency of upward financial comparisons: "Nowadays, how often do you compare yourself with others who are doing better off financially than you are?" from 1 (*never*) to 5 (*often*) ( $M = 2.70$ ,  $SD = 1.16$ ).

### **Expected benefits of financial success**

As in Study 1, participants reported: "To what extent do you think being financially successful would make you happy?" from 1 (*definitely not*) to 5 (*definitely yes*). Participants also indicated whether being financially successful would help them satisfy psychological needs of feeling "... like a competent person?" "... like you had control over your life?" and "... like you had closer relationships with others?" from 1 (*not at all*) to 7 (*extremely*). Items were standardized and averaged ( $M = 3.62$ ,  $SD = .87$ ,  $\alpha = .77$ ).

### **Financial CSW**

Participants completed the same Financial CSW scale as in Study 1 ( $M = 3.97$ ,  $SD = 1.27$ ,  $\alpha = .71$ ).

### **Well-being**

Participants completed two items from the Satisfaction with Life Scale (e.g., "I am satisfied with life," Diener et al., 1985) followed by one item from the Subjective Happiness Scale: "In general, I consider myself ..." from 1 (*not very happy*) to 7 (*extremely happy*) (Lyubomirsky & Lepper, 1999). We included only these items in the current survey due to time and space constraints. Items were standardized and averaged ( $M = 4.77$ ,  $SD = 1.52$ ,  $\alpha = .90$ ).

### **Covariates**

#### **Current household income**

Participants reported their household income from 1 = *less than \$24,999 USD* to 7 = *\$200,000 USD+* (*Median = \$50,000 USD-\$74,999*).

#### **County-level variables while growing up**

Covariates were calculated in the same way as described in Study 1: County income (*Median = \$29,242.25 USD*), poverty (*Median = .12*), population density (*Median = 59.33*), and region of the U.S. (see Participants section for details).

#### **Current income inequality**

To assess current income inequality, participants reported the county, city and state in which they currently lived. We then converted this information into FIPS codes (i.e., county codes) and looked up the GINI coefficients for each county. GINIs were retrieved from the U.S. Census American Community Survey 5-year estimates (2013–2017) ( $M = .46$ ,  $SD = .04$ ).

#### **Region where participants grew up**

Participants reported growing up in various regions across the U.S. (see Participants section for details). Regions were coded as 1 = Northeast, 2 = Midwest, 3 = South, 4 = West and were controlled for in the analyses, based on past research suggesting regional income divergence across the U.S. over the past 40 years (Manduca, 2019). Regions were later dummy coded such that the Northeast, South, and West were compared to the Midwest, given that the highest number of participants came from this region.

**Table 2.** Study 2 zero-order correlations and descriptive statistics.

|   | Correlations |        |        |         |        |         |        |      |      |    |
|---|--------------|--------|--------|---------|--------|---------|--------|------|------|----|
|   | 1            | 2      | 3      | 4       | 5      | 6       | 7      | 8    | 9    | 10 |
| 1. Income inequality while growing up         | –            |        |        |         |        |         |        |      |      |    |
| 2. Current income                             | .08          | –      |        |         |        |         |        |      |      |    |
| 3. Expected benefits of financial success     | .11*         | .06    | –      |         |        |         |        |      |      |    |
| 4. Financial CSW                              | .08          | .03    | .57*** | –       |        |         |        |      |      |    |
| 5. Well-being                                 | .08          | .25*** | .03    | –.17*** | –      |         |        |      |      |    |
| 6. County income while growing up             | –.26***      | .10*   | .01    | .09     | –.08   | –       |        |      |      |    |
| 7. County poverty level while growing up      | .60***       | –.01   | .03    | –.06    | .14**  | –.73*** | –      |      |      |    |
| 8. County population density while growing up | –.04         | –.00   | –.12** | –.09    | .01    | .28***  | –.15** | –    |      |    |
| 9. Current county income inequality           | .55***       | .04    | .03    | .01     | .04    | –.06    | .25*** | –.08 | –    |    |
| 10. Upward financial comparisons              | .06          | .02    | .34*** | .48***  | –.12** | .09*    | –.06   | –.08 | –.03 | –  |

Note. \* $p \leq .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

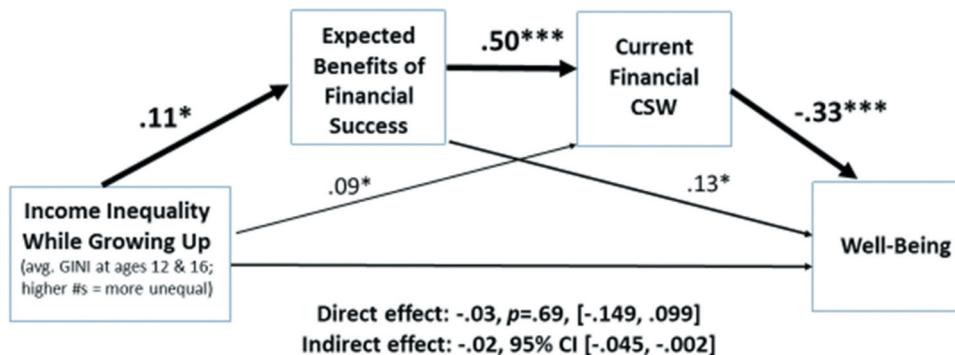
## Results

Table 2 presents zero-order correlations after standardizing variables. Income inequality while growing up was significantly related to greater expected benefits of financial success, county-level income inequality currently, and to lower county-level household income and higher county-level poverty while growing up. As in Study 1, income inequality while growing up was unrelated to well-being, but greater expected benefits of financial success was related to basing self-worth more in this domain, and having higher Financial CSW was related to lower well-being.

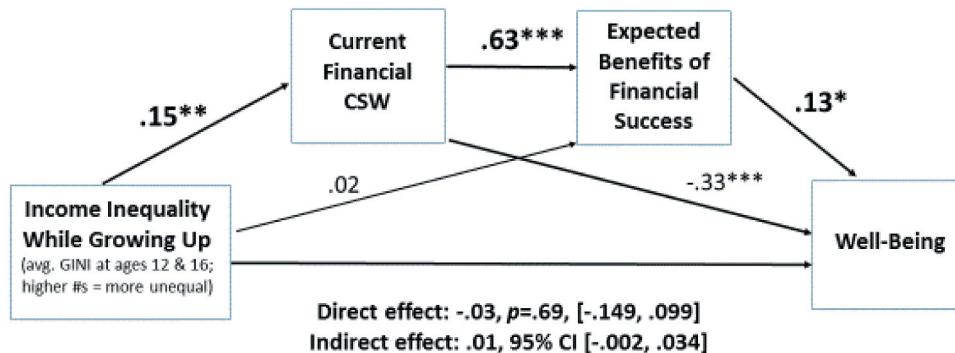
For the primary analyses, we used Hayes (2018) PROCESS macro for SPSS (model 6) to test whether income inequality while growing up predicted the sequential mediators of expected benefits of financial success and basing self-worth on financial success to predict happiness and life satisfaction, controlling for current household income, current county income inequality, and county-level indices of household income, poverty, population density, and region of the country that participants grew up in. To provide further evidence for the proposed model, we also tested a set of alternative models in which the mediators were reversed and the mediator and outcome were reversed.

Consistent with Study 1, results showed that growing up in areas with higher income inequality was associated with greater expected benefits of financial success,  $\beta = .11$ ,  $p = .041$ , 95% CI [.005, .224], which was related to basing self-worth more on financial success,  $\beta = .50$ ,  $p < .001$ , 95% CI [.431, .569], and experiencing lower well-being,  $\beta = -.33$ ,  $p < .001$ , 95% CI [−.476, −.191].

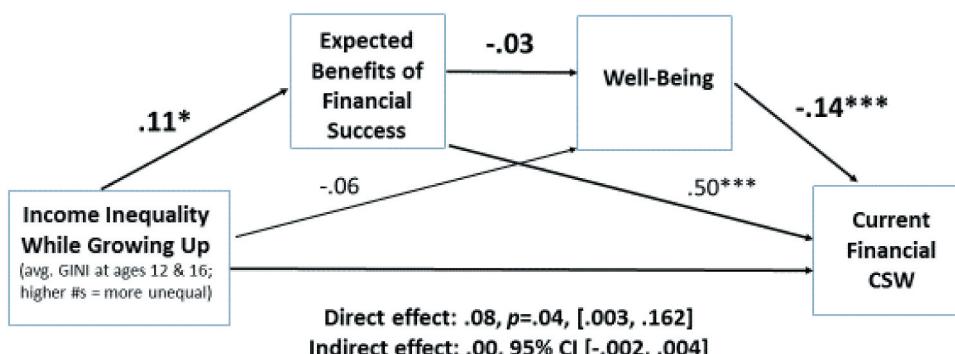
Results of bias-corrected bootstrapping analyses based on 5,000 resamples showed that the sequential mediation effect was significant,  $\beta = -.02$ , 95% CI [−.045, −.002]. Figure 5 summarizes the results. As in Study 1, we also tested alternative models in which the order of the sequential mediators was reversed, and the mediator and outcome were reversed in the model. Results did not support either of these alternative models, as indicated by non-significant indirect effects (see Figures 6 and 7).



**Figure 5.** Results of serial mediation model for Study 2. Paths reflect standardized coefficients. Bolded paths depict the significant indirect effect from income inequality while growing up to well-being in adulthood. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .



**Figure 6.** Results of alternative serial mediation model #1 for Study 2. Paths reflect standardized coefficients. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .



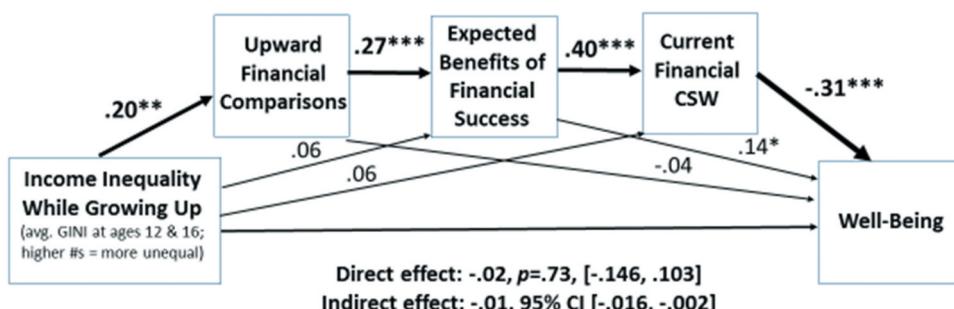
**Figure 7.** Results of alternative serial mediation model #2 for Study 2. Paths reflect standardized coefficients. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

Next, we examined whether upward financial comparisons accounted for the link between exposure to income inequality while growing up and expected benefits of financial success. Figure 8 summarizes the results. Results of sequential mediation analyses showed that growing up in areas with higher income inequality predicted (a) making more frequent upward comparisons with others,  $\beta = .20$ ,  $p = .006$ , 95% CI [.058, .345], which predicted (b) greater expected benefits of financial success,  $\beta = .27$ ,  $p < .001$ , 95% CI [.201, .336], which predicted (c) basing self-worth more on financial success,  $\beta = .40$ ,  $p < .001$ , 95% CI [.333, .471], which predicted (d) lower well-being,  $\beta = -.31$ ,  $p < .001$ , 95% CI [-.464, -.158]. Results of bias-corrected bootstrapping analyses based on 5,000 resamples showed that the sequential mediation effect was significant,  $\beta = -.01$ , 95% CI [-.016, -.002].<sup>6</sup>

Finally, although we hypothesized that exposure to income inequality while growing up would be related to (a) making more financial comparisons, (b) expecting more benefits of financial success, and (c) having higher Financial CSW in adulthood, it seems plausible that the reverse could also be true – that expecting greater benefits of financial success predicts making more upward financial comparisons and basing self-worth more on financial success. We therefore tested this alternate sequential mediation model, in which the order of upward financial comparisons and expected benefits of financial success was reversed. Results showed a very small but significant indirect effect,  $\beta = -.00$ , 95% CI [-.009, -.000].

## Discussion

In sum, Study 2 replicated and extended the findings of Study 1 by showing that participants who grew up in areas with higher income inequality expected greater hedonic and psychological benefits of financial success. The more they expected such benefits, the more they based their self-worth on financial success, which was related to feeling less happy and less satisfied with their lives. These findings emerged even after accounting for current household income and income inequality, as well as county-level variables while growing up. Furthermore, two plausible alternative models were not



**Figure 8.** Results of serial mediation model with upward financial comparisons for Study 2. Paths reflect standardized coefficients. Bolded paths depict the significant indirect effect from income inequality while growing up to well-being in adulthood. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

supported by the data, which bolsters confidence in the process model we have proposed.

Additionally, Study 2 suggested one reason why participants who grow up in areas of high income inequality may expect benefits of financial success: these individuals are more likely to make upward financial comparisons with others and, in turn expect financial success to bring them happiness and fulfillment of psychological needs. Paradoxically, though, the more they based their self-worth on financial success, the less happy and satisfied with life they felt, suggesting that Financial CSW may be a proximal contributor to lowered well-being in adulthood.

Overall, the results of Study 2 suggest that exposure to income inequality while growing up is related to greater expected benefits of financial success and to making more upward financial comparisons with others currently. Because the data are correlational, however, we cannot rule out the reverse possibility – that past exposure to income inequality predicts greater expected benefits of financial success, which predicts more upward financial comparisons. From a theoretical standpoint, we think that upward financial comparisons should precede expected benefits of financial success, because only after individuals compare themselves with others should they be more likely to conclude that *if* they were financially successful relative to others, *then* they would be happier and feel more competent, autonomous, and have better relationships with others. Testing this claim was a central goal of Study 3.

### **Study 3**

The studies thus far suggest that growing up in economically unequal environments predicts greater expected benefits of financial success, which predict basing self-worth more on financial success. However, the more people base their self-worth on financial success, the lower their well-being. Study 2 pointed to the key role of upward financial comparisons in accounting for the link between income inequality while growing up and greater expected benefits of financial success in adulthood.

Given the inherent difficulty in manipulating exposure to income inequality while growing up, we examined the more proximal psychological process of upward (vs. downward) financial comparisons to understand its downstream effects on expected benefits of financial success, Financial CSW, and well-being. Specifically, participants in Study 3 were randomly assigned to an *upward financial comparison condition* – in which they received bogus feedback indicating that their comparative discretionary income (CDI) index was lower than others, or a *downward financial comparison condition* – in which their CDI index was higher than others. This financial feedback manipulation was modeled after a research paradigm used by Callan et al. (2011).

Overall, the main objective of Study 3 was to examine whether upward (vs. downward) financial comparisons would lead people to expect more benefits of financial success and to base their current self-worth in this domain, with consequences for well-being. We also examined the role of perceived disadvantage (feeling worse off compared to others) and whether upward financial comparisons affected such perceptions, even after controlling for income inequality while growing up and current perceived economic pressures. Feelings of *relative deprivation* – the perception that one is worse off than others – is related to diminished health and well-being (Luttmer, 2005; Schor, 1998; Smith & Huo,

2014; Smith et al., 2012). Indeed, upward social comparisons are more threatening to the self and lead to greater stress and negative outcomes than downward social comparisons (Mendes et al., 2001; Muller & Fayant, 2010).

### ***Participants and procedure***

We made the a priori decision to recruit as many participants as possible during a three-week time frame. A total of 368 students from a large public university completed the study for course credit. Thirty-two participants were excluded because they wanted to withdraw their data. The final sample consisted of 336 students (204 men, 132 women;  $M_{age} = 19.02$ ,  $SD = 1.18$ ) that were 35% White, 44% Asian, 8% Black, 8% Hispanic, 5% other. Participants grew up in the following regions: 97.3% Northeast, 0.8% Midwest, 1.5% South, 0.4% West. Although the majority of participants grew up in the Northeast (due to them being students attending a large university in this area), there was still substantial variability with more than 30 counties represented within this region.

Participants came to the lab and were told that they would complete two studies. For the "Study of Comparative Discretionary Income," participants were told that researchers were interested in examining trends in discretionary incomes of students attending their university. This procedure was modeled after a financial feedback paradigm used by Callan et al. (2011). Participants first completed a survey that contained items assessing financially relevant variables, demographic information, filler items, and the county/city/state where they grew up for most of their life, which was used to calculate the average GINI of the county they grew up in at ages 12 and 16 ( $M = .45$ ,  $SD = .05$ ;  $r = 1.00$ ,  $p < .001$ ).

After completing this initial survey, participants were led to believe that the computer was calculating their comparative discretionary income. They saw a sequence of screens that presented animated progress bars indicating that their profile was being analyzed and compared to others. In the *upward comparison condition*, participants received feedback indicating that their comparative discretionary income (CDI) index was – C\$523; in the *downward comparison condition*, their CDI index was +\$C87 (see Callan et al., 2011).

As a manipulation check, participants reported the CDI index they received; all participants entered the correct CDI. They then completed a 4-item Perceived Disadvantage Scale (Greitemeyer & Sagioglou, 2016) from 1 (*not at all*) to 7 (*very much*) with items such as: "How much do you feel like you deserve your discretionary income?" (reversed) and "To what extent do you feel worse off than others who matched your profile?" ( $\alpha = .41$ ).<sup>7</sup>

Participants then moved on to a second, supposedly unrelated study and responded to the same measures as in the previous studies, which were embedded among filler items. The measures of interest were: Expected Benefits of Financial Success ( $\alpha = .68$ ), State Financial CSW ( $\alpha = .78$ ), Satisfaction with Current Financial Status, and Well-Being (happiness/life satisfaction) reworded to assess "at the present moment" ( $\alpha = .87$ ). Participants also reported their perceived economic pressures over the past 6 months (e.g., "I have had difficulty paying monthly bills," Conger, Reuter, & Elder, 1999,  $\alpha = .77$ ), which was treated as a covariate in the analyses. Finally, participants reported demographics, what they

thought the purpose of the study was, and whether they found anything suspicious; no one guessed the purpose of the study or raised suspicion.

## Results

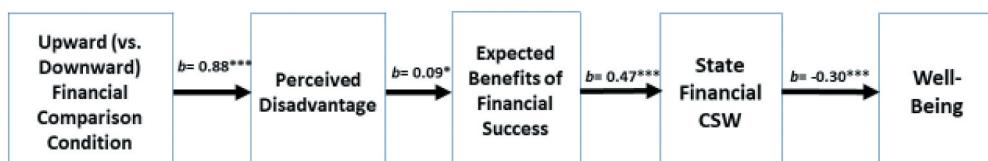
We hypothesized that participants who received upward comparison information – indicating that their financial status was lower (vs. higher) than others – would expect greater benefits of financial success and base their current self-worth more in this domain, with negative consequences for well-being. To test this idea, we first conducted a path analysis to examine whether the Financial Comparison Condition (1 = upward comparison, 0 = downward comparison) predicted expected benefits of financial success, controlling for current perceived economic pressures and income inequality while growing up. Results reflect unstandardized betas and are summarized in Figure 9.

Contrary to initial hypotheses, the Financial Comparison Condition did not significantly affect expected benefits of financial success,  $b = -.20, p = .12, 95\% \text{ CI } [-.44, .05]$ , or state Financial CSW,  $b = -.17, p = .20, 95\% \text{ CI } [-.42, .09]$ . Instead, Condition affected perceptions of disadvantage, such that participants in the upward (vs. downward) comparison condition felt worse off compared to others,  $b = .88, p < .001, 95\% \text{ CI } [.48, 1.29]$ , which predicted greater expected benefits of financial success,  $b = .09, p = .023, 95\% \text{ CI } [.01, .16]$ , which predicted higher state Financial CSW,  $b = .47, p < .001, 95\% \text{ CI } [.36, .58]$ , which predicted lower well-being,  $b = -.30, p < .001, 95\% \text{ CI } [-.44, -.15]$ , controlling for all other variables.

## Discussion

The findings of Study 3 suggest a modification to the initial hypotheses. Rather than directly affecting people's expected benefits of financial success or Financial CSW, upward financial comparison information increased perceptions of disadvantage, which in turn was related to greater expectations of financial success and valuing of this domain as a contingency of self-worth. Specifically, participants who received feedback indicating that their discretionary income was lower (vs. higher) than others reported feeling worse off than others, which predicted greater expected benefits of financial success and basing their current self-worth more in this domain. However, the more people based their self-worth on financial success, the less happy and satisfied they were with their life.

Exposure to income inequality while growing up did not moderate these effects, but this may be due to the fact that participants were college students at a large state university in the Northeast, and the majority of them (97.3%) grew up in the Northeast within that state. Thus, there may not have been enough variability to capture differences in income inequality while growing up with this limited geographic sample. Nevertheless,



**Figure 9.** Study 3. Paths reflect unstandardized coefficients. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

the findings of Study 3 build upon Studies 1 and 2 by suggesting that upward financial comparisons precede expected benefits of financial success, rather than the reverse. Future research could recruit more geographically diverse samples of participants to examine whether people who grew up in areas with higher (vs. lower) income inequality are more susceptible to the negative impact of upward (vs. downward) financial comparisons on well-being.

A limitation of the current study is that we did not include a no comparison (control) condition, which would have been ideal to determine the direction of effects. That is, we do not know for certain whether upward comparisons or downward comparisons contributed to the effects in the current study, given the lack of a baseline condition. However, in Callan et al.'s (2011) research, which used the same experimental paradigm as in the current study, they called their conditions "relative deprivation" (i.e., Comparative Discretionary Index (CDI): - C\$523) and "no deprivation" (i.e., CDI: +\$C87), which corresponded to the conditions that we called "upward comparison" and "downward comparison." Thus, while it would be useful to include a no comparison control condition in future research, the downward comparison condition in the current study could also be viewed as a type of control condition in that it involved the *absence* of deprivation, or "no deprivation."

## General discussion

The present studies provide converging support for a psychological process model linking income inequality while growing up to well-being in adulthood. Study 1 revealed that individuals who grew up in areas with high income inequality were more likely to expect hedonic rewards from achieving financial success, which was related to basing self-worth more in this domain and experiencing lower life satisfaction. These findings emerged even after controlling for region of the country that participants grew up in, county-level poverty, median household income, and population density of the county they grew up in, as well as current household income.

Study 2 replicated and extended these findings by showing that individuals who grew up in areas with higher income inequality were more likely to make upward financial comparisons with others, which was related to greater expectations of the hedonic and psychological benefits of financial success and to basing their self-worth in this domain. However, the more individuals based their self-esteem on financial success, the less happy and satisfied they were with their lives. Although Studies 1 and 2 used cross-sectional designs, a strength of these studies is that we used the GINI coefficient at an earlier time point (i.e., the average income inequality of the county that participants lived in while growing up at ages 12 and 16). Thus, the findings suggest that past exposure to income inequality is related to current outcomes, and results remained significant even after controlling for current income inequality in Study 2.

Because past exposure to income inequality cannot be experimentally manipulated, we focused on the more proximal effects of upward (vs. downward) financial comparisons on people's expectations of the benefits of financial success, Financial CSW, and well-being in Study 3. Results showed that participants who received upward (vs. downward) financial comparison feedback felt worse off than others, which was related to expecting more benefits of financial success, basing self-worth more on finances, but experiencing lower happiness and life satisfaction

### ***Upward social comparisons***

The tendency to compare one's abilities and attributes with others is thought to be a basic human motivation. In particular, individuals are theorized to possess a proclivity to compare oneself with those who are better off in some way (Festinger, 1954). Social comparisons, in turn shape self-perceptions, affective reactions, motivation, and behavior (Corcoran et al., 2011). In Study 2, upward financial comparisons played a key role in linking income inequality while growing up with expectations and self-evaluative processes that were related to well-being in adulthood. Specifically, individuals who grew up in areas with higher income inequality expected more benefits of financial success and based their self-worth more in this domain as adults. In these models, Financial CSW provided a conceptual and empirical bridge between societal inequality and well-being at the personal level. In Study 3, participants who received feedback indicating that their discretionary income was lower (vs. higher) than others perceived greater disadvantage (felt worse off financially compared to others), which was related to greater expected benefits of financial success and, in turn greater tendency to base their current self-worth in this domain.

Certain environments may trigger the tendency to compare one's status with others. In contexts of high income inequality, social comparisons may connect inequality to well-being by increasing the frequency and impact of such comparisons. Along these lines, research has shown that individuals living in areas with higher (vs. lower) income inequality tend to work harder and longer hours to increase their income and opportunities for advancement relative to others (Bell & Freeman, 2001). People show greater interest in high-status brands and positional goods that signal social status (Walasek & Brown, 2015) and engage in more consumer borrowing to keep up their consumption levels relative to households with higher incomes (Christen & Morgan, 2005). Such findings dovetail with the present findings that exposure to income inequality while growing up is associated with greater expectations of the hedonic and psychological benefits of financial success and the motivation to value and pursue this domain as a basis of self-worth.

### ***Limitations and future directions***

Although the current studies found that income inequality while growing up was related to greater expected benefits of financial success and to Financial CSW in adulthood, the cross-sectional nature of the data do not allow for firm causal conclusions to be made. In addition, the overall effects found in these studies were relatively small. It is likely that income inequality while growing up is one of many factors that may contribute to people's expectations of the rewards of financial success and Financial CSW.

Nevertheless, even after controlling for county-level variables, such as median household income, poverty, population density, region of the country that participants grew up in, current income inequality, and household income, there were still significant relationships found between exposure to income inequality while growing up, expected benefits of financial success, and people's tendency to base their self-worth in this domain as adults. To corroborate these findings, future research could use prospective and longitudinal designs to examine the long-term impact of exposure to income inequality while

growing up on later subjective well-being. In addition, there may be other pathways by which past exposure to income inequality affects later well-being, as well as moderators (e.g., childhood socio-economic status) of these relationships.

Although it would have been useful to collect data on childhood socioeconomic status, reliable measures of objective socioeconomic factors are often difficult to obtain in adolescence, as adolescents may be unaware of their household income, assets, or parents' precise occupation or educational level. Indeed, studies examining adolescent health often waive parental consent or do not collect data directly from parents. Rather, adolescents' *perceptions* of their subjective social status (SSS) – i.e., their family's position in the socioeconomic hierarchy as assessed by the MacArthur SSS scale – have been shown to predict symptoms of physical and psychological health (Goodman et al., 2001, 2007, 2015; Lemeshow et al., 2008; Quon & McGrath, 2014; Rivenbark et al., 2019).

Based on such findings, future research could assess adolescents' SSS (or even adults' perceptions of their SSS growing up) to see whether these reports moderate the influence of past exposure to income inequality on psychological processes that relate to well-being. For example, SSS might serve as a protective factor, such that individuals who were exposed to greater income inequality during adolescence and experienced lower SSS may be most at risk for experiencing lower well-being in adulthood, compared to those who experienced higher SSS in adolescence.

Although researchers could also ask participants to report on their subjective perceptions of income inequality while growing up, such measures are likely to be limited in that people often underestimate income inequality (Hauser & Norton, 2017; Norton & Ariely, 2011) and racial economic inequality in the U.S. (Kraus et al., 2019, 2017). Individuals may misperceive inequality because they are unaware of such disparities, or are overly confident about the possibility of upward social mobility (Davidai & Gilovich, 2015; Kraus & Tan, 2015; Norton & Ariely, 2011). Assessing perceptions of inequality among children and adolescents may also be limited, as misperceptions of inequality at the national level have been documented among youth, as well (Arsenio & Willems, 2017). Thus, a strength of the current research is that it circumvented potential self-reports biases by using an objective measure of income inequality while growing up as reflected by the GINI coefficient.

Another limitation of the present studies is that the participant samples did not include sufficient numbers of racial minority group members to facilitate comparisons across racial groups (e.g., 76% White vs. 24% nonwhite in Study 2). It is noteworthy, however, that even studies with much larger samples than our own had predominantly White respondents. For example, in a study of the link between current income inequality and self-reported health of over 200,000 participants across 50 states, 86% of the sample was White (Subramanian & Kawachi, 2003). More recently, a study of income inequality and subjective well-being of over 1.7 million people from over 2,425 counties in the U.S. had a sample that was 80% White (Cheung & Lucas, 2016). Both of these studies showed that even after controlling for race, higher income inequality was associated with lower well-being.

Other studies, however, find that the effects of income inequality are no longer significant when controlling for race (Deaton, 2003; Mellor & Milyo, 2002). For example, McLeod et al. (2004) examined associations between income inequality, racial composition, and the well-being of children and adolescents in the U.S., and found that income inequality was unrelated to child well-being when controlling for race. However, "well-being" in that study was operationalized as health and risk behaviors reflecting infant and

teen mortality, low birth rate, high school drop outs, and teenage pregnancy. Perhaps differences in findings across studies may be due to the way researchers operationalized health and well-being (e.g., as subjective self-report measures vs. objective indicators). Income inequality was also assessed slightly differently across studies (at the state, county, or national level). Thus, depending on how inequality and the outcomes of interest were measured across studies, race may or may not have played a role in the link between income inequality and well-being.

Furthermore, to address the question of *moderation* by race – i.e., whether racial minorities who grow up in areas with high income inequality engage in more upward financial comparisons and experience lower well-being relative to majority group members – future research should include more racially diverse samples. It would be important to know, for example, whether upward comparisons are particularly detrimental for later well-being among racial minorities if they expect benefits of financial success, but do not see a clear path forward to achieving their financial aspirations. Indeed, in order for people to feel inspired (vs. threatened or demotivated) by upward comparisons, they need to feel like the upward comparison target's success is attainable (Lockwood & Kunda, 1997).

Also, while the current studies did not find that current household income moderated the association between income inequality and well-being, future research could investigate more diverse samples that vary in socioeconomic status, as the majority of participants in the current studies had fairly high household incomes and might differ from the rest of the population who do not share this status. Studies could also examine whether the psychological processes linking income inequality to well-being in the present studies apply to other countries with different values, economic or social dynamics, or government arrangements than in the global North.

Finally, it is unclear who exactly participants in these studies were comparing themselves to while growing up. Social comparison targets can be local, such as comparisons with immediate others who are physically close (e.g., living in one's community or attending the same school) or relationally close (e.g., family, friends), or they can be general, such as comparisons with larger referent samples (e.g., the "average person" in a neighborhood or country; Suls et al., 2002; Zell & Alicke, 2010). Local comparisons tend to have a stronger impact on self-perceptions and self-evaluations than general comparisons (Zell & Alicke, 2010), suggesting that people who grow up in areas with higher income inequality may compare their financial status more frequently with immediate others, rather than distant others. In addition, factors such as the perceived similarity of the comparison target (Mussweiler, 2003), attainability of the target's success (Lockwood & Kunda, 1997), and self-relevance of the domain (Tesser, 1988) may play a role in shaping self-evaluations and well-being. Future research could thus examine in greater depth the specific types and aspects of targets that people are likely to think about when making financially-based comparisons with others.

## **Conclusion**

The present research tested a psychological process model whereby exposure to income inequality while growing up was related to greater perceived expectations of the benefits of financial success and a tendency to base one's self-worth in this domain in adulthood. However, the more individuals staked their self-worth on money, the less happy and

satisfied they were with their lives. A key component of this model was the role of upward financial comparisons, in that people who grew up in environments of economic inequality were more likely to compare their current financial status with others. In an experimental setting, engaging in upward financial comparison increased people's perceptions of disadvantage, which was related to greater expected benefits of financial success, Financial CSW, and less happiness and life satisfaction. Together, these studies provide a generative conceptual model to guide future examinations into how psychological processes link societal-level inequality with individual differences in personal well-being throughout life.

## Notes

1. We sought to recruit participants from the U.S. population, not individuals within cohorts within counties (i.e., we did not select representative samples of particular birth cohorts across different counties). Thus, we did not analyze individual data clustered within counties as in a standard multilevel design. This means that bias resulting from the non-independence of observations was not an issue. Even if individuals grew up in the same county, their measures of inequality vary depending on birth cohort. We therefore analyzed effects of birth cohort on individual level outcomes and operationalized cohort effects with measures of inequality in the county that participants grew up in during early to middle adolescence.
2. When removing these participants ( $n = 233$ ) from the dataset, the indirect effect of the sequential mediation analysis was comparable to the results including all participants, but was not significant, which was likely due to reduced statistical power from excluding over half of the sample.
3. We did not assess number of people living in a household, so we were unable to adjust for this variable when controlling for income in the current studies.
4. Because of the limited sample of nonwhite participants in Study 1 (92% White, 8% nonwhite) we did not test for moderation by race in Study 1. When we controlled for race (dummy coded such that Whites were the reference group) and reran the analyses, the indirect effect – of expected benefits and Financial CSW as serial mediators – remained significant,  $\beta = -.01$ , 95% CI  $[-.032, -.001]$ .
5. Data for Study 1 was collected by one of the authors who typically asks participants to report their age using an open-ended format. Study 2 was conducted by a coauthor who typically asks participants to report their age using an age range scale. Regardless of the different approaches to assessing age, exposure to income inequality during adolescence predicted greater expected benefits of financial success and Financial CSW in adulthood, which was related to lower well-being in both studies.
6. Study 2's sample had slightly more racial diversity (76% White, 24% nonwhite) than in Study 1, so we ran moderated mediation analysis using Hayes (2018) model 83 to test whether the link between income inequality and well-being differed across racial groups. Results showed no significant interaction between race and income inequality while growing up, indicating that race did not play a role in this serial path. The index of moderated mediation further confirmed that the moderated mediation effect was not significant,  $\beta = .001$ , 95% CI  $[-.01,.01]$ . Controlling for race, the indirect effect – of upward financial comparisons, expected benefits, and Financial CSW as serial mediators – remained significant,  $\beta = -.01$ , 95% CI  $[-.015, -.001]$ . When we re-analyzed the data with "whites and Asians" versus the other racial groups, there was no significant interaction between race and income inequality growing up, and the index of moderated mediation was not significant,  $\beta = .006$ , 95% CI  $[-.03,.05]$ .
7. Given the low reliability of the Perceived Disadvantage Scale, we conducted a factor analysis on the 4 items. The first three items loaded onto the first factor (primary

loadings  $>.37$ ; cross-loadings  $<.21$ ); the last item ("To what extent do you feel worse off than others who matched your profile?") loaded onto the second factor (primary loading  $=.64$ , cross-loading  $= -.18$ ). Given the low reliability of the first three items ( $\alpha =.50$ ) and because we were specifically interested in perceived disadvantage, we used the item – "To what extent do you feel worse off than others who matched your profile?" – for all subsequent analyses.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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