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Family Health and Income: A Two-Sample Replication

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Abstract

The current study examined psychological and family health predictors of change over time in household income, using data from longitudinal studies of African American ($N = 889$, 93.5% female) and Mexican origin ($N = 674$, 100% female) families. Participants self-reported their household income, as well as their emotional, personality, and cognitive resources. Participant behavioral and physical resources were coded from observed family interactions. Although income did not predict change in any personal resources, all five classes of personal resources (i.e., emotional, personality, cognitive, behavioral, physical) predicted change in income across a ten-year span (Study 1) and a six-year span (Study 2). Income is potentially caused by these personal resources, or both income and these personal resources share a common cause. The dominant approach of assuming income causes personal and family health needs stronger support.

Keywords

income; mental health; African Americans; Mexican American; physical attractiveness; coping; optimism; parenting style

Income is a widely studied family resource (Bradley & Corwyn, 2002; Hossain & Roopnarine, 1994; Letourneau, Duffett-Leger, Levac, Watson, & Young-Morris, 2011). The scientific consensus is that income influences personal resources such as emotional stability, positive parenting behavior, and ability to resolve conflict (Linver, Brooks-Gunn, & Dafna, 2002). However, empirical support for this consensus comes largely from cross-sectional correlations between income and these resources (Barajas & Brooks-Gunn, 2014; Garrett-Peters, Mills-Koonce, Zerwas, Cox et al., 2011; Letourneau, Duffett-Leger, Levac, Watson,

& Young-Morris, 2011; Yeung, Linver, & Brooks-Gunn, 2002), which provide limited information about the direction of causality (Bliege & Power, 2015; Cseh, 2008; Mobius & Rosenblat, 2006). Clarifying the nature of the association between income and personal resources is crucial to inform policies aimed at increasing family health through increases in income (e.g., Bahls, 2011) because if current policies (e.g., Earned Income Tax Credits, Temporary Assistance for Needy Families, Supplemental Nutritional Assistance Program, Community Development Block Grants, subsidized child care) assume and claim that income causes many or all of these family resources, they may be inadvertently misleading both policymakers and benefit recipients and may actually be ineffective. In the current study, we consider one alternative interpretation drawn from human capital theory; namely, that income and personal resources are correlated in part because personal resources either cause family income or both hold a common cause (Heckman, 2006). We test the causality hypothesis by examining reciprocal prediction between personal resources and household income across a ten-year period.

The assumption that any correlation between income and personal resources is predominantly attributable to the causal influence of income is understandable. There are multiple reasons why income might causally affect personal resources (Duncan, Magnuson, & Votruba-Drzal, 2014). First, people with higher incomes typically have more money to spend developing assets (e.g., education, self-care) that facilitate cognitive, emotional, and behavioral resources. Second, people with higher incomes live in areas with more nurturing environments typified by safe housing, opportunities to exercise, and better community resources. Finally, people with higher incomes are relatively less likely to experience the financial stress that accompanies material needs being unmet. Humans are sensitive to cues of environmental risk and instability (Del Giudice, 2009), and to the extent that low household income creates such contextual cues (Cohen, Kaplan, & Salonen, 1999; Zalewski, Lengua, Thompson, & Kiff, 2016), income is likely to affect human development. These explanations are routinely offered to account for correlations between income and multiple resources including: emotional resources like low levels of depression and anxiety (Gallo & Matthews, 2003), positive cognitions like optimism, coping skills, and mastery (Adler et al., 1994; Brantley, O'Hea, Jones, & Mehan, 2002; Goosby, 2007; Poetz et al., 2007; Robb, Simon, & Wardle, 2009; Schutte, Valerio, & Carrillo, 1996; Taylor & Seeman, 1999), behavioral resources like positive interactions with romantic partners and offspring (Conger & Dogan, 2007), and physical resources like physical attractiveness (Frieze, Olson, & Russell, 1991; Hamermesh & Biddle, 1994; Judge, Hurst, & Simon, 2009; Lynn, 2009). Based on this theoretical and empirical support, income is regularly included as a baseline covariate in studies of these and other personal resources.

Despite the ubiquity of this perspective, associations between income and personal or family characteristics do not necessarily reflect a causal effect of income. Longitudinal and quasi-experimental research showing that income can predict *changes* in personal resources is limited, and typically produces smaller effects (Evans & Garthwaite, 2010; Hao & Matsueda, 2006; Sariaslan et al., 2014; Schieman, Nguyen, & Elliott, 2003) in fewer domains (Biddle, 2014; Costello, Compton, Keeler, & Arnold, 2003; Milligan & Stabile, 2009) than results from cross-sectional research. This pattern of results is consistent with research in other areas where the presumed causal effect of a variable is reduced or

eliminated after examining prospective effects and controlling for prior levels of the outcome (Larzelere, Kuhn, & Johnson, 2004). Thus, although income is clearly associated with many family and developmental outcomes, the fact that these associations are attenuated when more rigorous research designs are used raises doubts about the causal effect of income and opens the door to an alternative possibility – perhaps in this context income is the consequence, not the cause (Milligan & Stabile, 2009). For example, an emotionally stable person would have fewer negative exchanges at work, increasing the likelihood of promotion. A person who is conscientious and agreeable would be more successful at pursuing higher education or advanced vocational training, more thorough in job searches, better at interviewing for a given position, more productive at work, and more successful at securing additional sources of income. All these would lead to increases in income, and fit well within a human capital-based explanation of income differences. Human capital theory explains income as a function of personal attributes such as knowledge, intelligence, habits and personality that link to economic reward in the labor market.

People who are emotionally stable, hardworking, and physically attractive are paid more than people who lack those traits (Bliege & Power, 2015; Gensowski, 2014; Mobius & Rosenblat, 2006). Consequently, a body of research addresses the degree to which income could be caused by personal resources like mental health (Cseh, 2008), personality (Duckworth & Weir, 2010), self-esteem (Orth, Robins, & Widaman, 2012); self-control (Moffitt et al., 2011); physical attractiveness (Mobius & Rosenblat, 2006), and prosocial behavior toward others (Bliege & Power, 2015). Much of this research is also cross sectional, which seriously limits causal inference (but see Moffitt et al. 2011; Orth et al., 2012). Furthermore, the majority of this research has been conducted using samples of economically advantaged groups. This is important because it is often assumed that income has particularly strong effects on family health at the low end of the distribution (i.e., poverty or near-poverty; Hossain & Roopnarine, 1994).

In the current study we hypothesize that personal and family resources will predict changes in income over time. We test this hypothesis in middle adulthood when participants have likely reached a plateau in development of human capital and thus their occupational and earning potential. Our analyses center on two longitudinal studies (i.e., Family and Community Health Study and the California Families Project) of economically disadvantaged ethnic groups: African Americans and Mexican Americans. These groups are both at relatively higher risk for low income, but vary due to immigration history and cultural background. Testing separately among these two specific groups allows us to know something about two groups disproportionately represented in the low-income strata, and consequently of high interest to policymakers. Both longitudinal studies have rich baseline information on emotional, cognitive, behavioral, and physical resources, as well as repeated measures of family income. More detail on these studies is provided in the Method section below. We selected a set of resources shown in previous research to be correlated with income, and test for bidirectional associations in instances where the resources were measured over time. Some resources were not measured over time, so in those cases we cannot test for bidirectional prediction between income and personal resources. In those cases, our analytic models are analogous to most existing longitudinal research on the causal

effect of income, which includes income at baseline as an exogenous predictor of personal resources. It is possible that some of these resources (e.g., physical attractiveness) are more tied to income for females than males. For example, research on attractiveness and income sometimes shows stronger effects for females (Hamermest & Biddle, 1994). It is also possible that personal resources are less linked with household income in families with more than one adult in the household, because households with more than one adult would have twice as much social capital (two people instead of one) so the absence of a particular income-related attribute in one adult could be offset by the presence of that same attribute in the second adult. For these reasons, we test for the generalizability of these hypotheses not only across two ethnic groups, but also across males and females, as well as across single-parent and two-parent families.

Study 1

Method

Participants—The Family and Community Health Study (FACHS) recruited 889 families, 467 in Iowa and 422 in Georgia, for participation in an investigation of African American children and their families. The first assessment was in 1992. Each family included a target child, who was between the ages of 10 and 12 years ($M = 10.5$ years, 54% girls) at the time of recruitment and who was identified as African American by the family and/or in school records. Interviews were conducted with the target child, his or her primary caregiver, and an older sibling if one was present. If a second caregiver was living in the home, he or she was invited to participate as well.

The current study focuses on the primary caregiver, or the person who lived in the household with the target child and was responsible for the majority of the child's care. Most (83.5%) of the 889 primary caregivers were the child's biological mother; 5.5% were the child's father; 5.6% were the child's grandmother; 2.5% were foster or adoptive parents; 1.3% were other relatives; 0.6% were stepparents; and fewer than 1% fell into nonrelative categories. Overall, 93% of the primary caregivers were female. Their ages ranged from 23 to 80 years, and their mean age was 37.1 years. Most of the primary caregivers (92%) were African American, 6.7% were Caucasian, 0.4% were Latino, 0.3% were Native American/Alaskan Native, and 0.5% were bi-racial/mixed race/other. Education among primary caregivers ranged from less than high school (18%) to advanced graduate degrees (3%), with most having completed high school (42%). The Iowa and Georgia samples did not differ significantly in income or education of the primary caregiver. The average family per capita income at the first assessment for the Georgia families was \$8,242 ($SD = \$6,990$), compared with \$9,536 ($SD = \$6,437$) for the Iowa families.

Procedures—Each adult was visited at their home for data collection six times over a 13-year period (average interval between assessments was 2.5 years, range: 2.1 - 3.0 years). During each visit, the participating family members individually completed a set of computer-based interviews focusing on family processes, individual family member characteristics, and socioeconomic circumstances. During the first year of the study, the primary caregiver also participated in two video-reported interactions tasks, one with the

secondary caregiver, and another with the adolescent. Observations were rated by trained project staff using the Iowa Family Interaction Rating Scales (Melby & Conger, 2001). Approximately 20% of all videotaped interaction tasks were randomly assigned for rating by a second, independent observer. Intraclass correlations for scales used in this study ranged from .71 to .88. Caregivers received \$100 and youths received \$70 for their participation at the first wave. This study was declared exempt by the Iowa State Institutional Review Board, as it was based on secondary analysis of existing data.

Measures

Income: Adults self-reported their exact income at the first two waves (mean ages: 37 and 39). At later assessment, adults indicated their gross household income over the prior 12 months using the following response options: 1(*less than 10,000*), 2(*10,000-14,999*), 3(*15,000-19,999*), 4(*20,000-24,999*), 5(*25,000-29,999*), 6(*30,000-34,999*), 7(*35,000-39,999*), 8(*40,000-44,999*), 9(*45,000-49,999*), 10(*50,000-59,999*), 11(*60,000-74,999*), 12(*75,000-99,999*), 13(*100,000-124,999*), 14(*125,000-149,999*), 15(*150,000-199,999*), 16(*200,000 or more*). Income included all sources, including “jobs and self-employment for you and other adults who contribute to household expenses, and money from other sources like welfare, disability benefits, and child support”. Income from the first two assessments was categorized post-collection to correspond with the later waves.

Emotional resources: Adults reported on their anxiety and depression at the first three assessments using 15 items from the Mini Mood and Anxiety Symptom Questionnaire (Clark & Watson, 1995). Responses ranged from 1 (*not at all*) to 3 (*extremely*). Sample anxiety items include “During the past week, how much have you felt tense or ‘high strung’” and “During the past week, how much have you felt uneasy?” Sample depression items include “During the past week, how much have you felt depressed” and “During the past week, how much have you felt discouraged?” Items were combined into a single scale at each assessment (α s = .86, .84, .86), and reversed to indicate “emotional resources”.

Personality resources: Adults reported on three separate personality resources: adaptive cognitions, maladaptive cognitions, and impulsivity. Adults reported on their dispositional optimism at the first three assessments using eight items from the Life Orientation Test (Scheier & Carver, 1985). Responses ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). A sample item is “In uncertain times, you usually expect the best.” Adults also reported their mastery at the first three assessments using a seven item scale (Pearlin, Lieberman, Menaghan, & Mullan, 1981). Responses ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). Sample items include “You can do just about anything you really set your mind to” and “What happens to you in the future mostly depends on you.” Items were combined into a single scale at each assessment (α s = .81, .83, .84) and used to indicate “adaptive cognitions”.

Adults reported their belief that aggression is a legitimate strategy at the first two assessments using a 10-item scale (Simons et al., 1995). Responses ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). Sample items include “Sometimes you have to use physical force or violence to defend your rights” and “People will take advantage of you if you don’t

let them know how tough you are.” Adults also reported their hostile and cynical views of relationships using a nine-item scale (Simons et al., 1995). Responses ranged from 0 (*false*) to 1 (*true*). Sample items include “Some people go out of their way to keep you from getting ahead” and “When people are friendly, they usually want something from you.” Items were combined into a single scale at each assessment (α s = .82, .83) and used to indicate “maladaptive cognitions”.

Adults completed the 16-item disinhibition scale from the Brief Temperament Survey (Clark & Watson, 1995) at the first three assessments. Items included “you find lots of reasons to goof off instead of work” and “you rarely, if ever, do anything reckless” [reverse coded]. Items were combined into a single scale of impulsivity (α s > .70).

Behavioral resources: At the first assessment, we collected three different composites which reflect the presence or absence of conventional prosocial behavior. Adult prosocial behavior toward their romantic partner was coded during the couple interaction task and toward the adolescent during the parent-adolescent task along five dimensions: warmth/support, assertiveness, responsive listening, communication, and prosociality. These five ratings were combined into two scales: “prosocial behavior toward partner” (α = .86) and “prosocial behavior toward adolescent” (α = .85). During the parent-adolescent task, adult high-investment parenting behavior was also coded along four dimensions: encourages independence, inductive reasoning, quality time with adolescent, and monitoring. These four ratings were combined (α = .75) to indicate “high-investment parenting behavior.” Low-investment parenting behavior was also coded along two dimensions: neglecting/ distancing and permissiveness/ indulgence (α = .78) and combined to indicate “low-investment parenting behavior”.

Physical resources: During both observed tasks (at the first assessment), the same observers rated the adult’s physical attractiveness on a scale from 1 (*unattractive*) to 5 (*very attractive*). Observers were instructed not to consider the individual’s personality and focus on general cultural norms for physical appeal (e.g., pleasing face, weight, etc.) The two ratings were combined to indicate “physical attractiveness”. Body mass was also collected at the first two assessments and last two assessments using interviewer ratings against pictorial stimuli (Yepes, Viswanthan, Bovet, & Maurer, 2015).

Results

We used Mplus Version 7 (Muthén & Muthén, 2012) to estimate a series of structural equation models using full information maximum likelihood. Missingness for all variables was less than 20%. Adults who participated at the final assessment were not different from those who participated only at earlier waves in terms of income. In addition to the standard chi-square index, good model fit was established by the root mean square error of approximation (RMSEA; Browne & Cudeck, 1993) values below .07, and Tucker-Lewis Index (Tucker & Lewis, 1973) values above .90 (Hu & Bentler, 1999). To account for measurement error, we created latent variables for all resource variables by fixing the residual variance of the scale score to [(1-scale reliability) * scale variance] (Hayduk, 1987; Hayduk & Littvay, 2012). Preliminary analyses showed no differences in hypothesized paths

based on participant gender, state of residence, or family structure; therefore, results are presented for the combined sample. However, compared to adults in two-caregiver families, single caregivers were higher on endorsing aggression or violence as a legitimate strategy ($r = .07, p = .031$), hostile or cynical view of relationships ($r = .16, p < .001$), depression ($r = .11, p = .002$), and lower on optimism ($r = -.13, p < .001$), mastery ($r = -.12, p < .001$), coping ($r = -.12, p = .001$), responsive listening to adolescent ($r = -.00, p = .015$), communication with adolescent ($r = -.09, p = .010$), and prosocial behavior towards adolescent ($r = -.08, p = .026$).

Table 1 includes correlations between income and personal resources, with data from the FACHS presented below the diagonal. Income at Wave 1 was correlated with income at Wave 2 ($r = .63, p < .001$). The correlations between income and personal resources ranged from $|.03|$ to $|.32|$, and were typically statistically significant.

The main tests of study hypotheses were conducted by fitting latent change score models (Ferrer & McArdle, 2010) of income, then modeling each personal resource separately as a predictor of change in income. The unconditional model of change in income is presented in Figure 1 (Panel A). The initial level of income in this sample was 4.88 (a little less than \$25,000) and the linear increase in income was 1.89 (a little less than \$10,000 across the course of the study). In addition to the linear increase in income, there was occasion-specific change in income which ranged from $-.22$ to $-.33$. Prediction to income from personal resources for the FACHS is presented on the left side of Table 2. The fit of these models was good, RMSEA values ranging from .052 to .055 and TLI values ranging from .975 to .977. For example, emotional resources at baseline predicted higher income at the first assessment ($b = 0.39, SE = 0.08$) as well as increases in income over time ($b = 0.14, SE = 0.06$). With a one unit change in income representing approximately \$5,000, emotional well-being is associated with an increase of \$350 a year. Income increased over time when adults were high on emotional resources (i.e., low depression and anxiety), adaptive cognitions (i.e., optimism and mastery), and low on maladaptive cognitions (i.e., cynical hostile, or aggressive views) and impulsivity. Income also increased over time when adults were prosocial towards their adolescents, and engaged in high-investment parenting. Finally, income increased over time when adults were physically attractive and had relatively lower body mass. To assess the possibility that income would predict changes over time in these personal resources, we estimated latent change models for each resource assessed at two or more occasions. Income did not predict change in any personal resources included in this study.

Study 2

Method

Participants—Data come from the California Families Project, a community study of 674 Mexican-origin adolescents and their parents (549 two-parent and 125 single-mother). Using school rosters, adolescents who were enrolled in public schools during the academic years for 2006–2007 and 2007–2008 were randomly selected from the cohort of all fifth-grade students in two cities in northern California. Each family included a target child, who was between the ages of 10 and 13 years ($M = 10.9$ years, 50% girls) at the time of recruitment.

The first criterion for inclusion in the study was that the adolescent's biological mother lived with the adolescent and identified herself as Mexican or Mexican American. Second, we included both single-parent and two-parent families, but, if the father was in the household, he had to be the biological father and identify as Mexican or Mexican American. Third, for father absent households, the mother had to report that the focal adolescent's biological father was Mexican or Mexican American. Of the eligible families, 72.2% agreed to participate in the study.

The current study focuses on the primary caregiver, or the person who lived in the household with the target child and was responsible for the majority of the child's care. In this sample, the primary caregiver was the biological mother. Families lived in urban or in suburban areas. Eighty four percent of the mothers were born in Mexico (the remainder were all born in the United States). On average, mothers had spent 16.1 years ($SD = 10.6$) in the United States, and fathers 19.4 years ($SD = 9.8$). Thirty-eight percent of mothers did not attend high school; 25% completed some high school; 18% completed high school or had a general equivalency diploma; and 19% had some college, a college degree, or a graduate degree; of those who completed high school or less, the median grade achieved was ninth grade.

Procedures—All measures were first assessed when the focal adolescent was in the fifth grade, with follow-up assessments every two years. Trained research staff interviewed the participants in their homes using laptop computers equipped with audio computer-assisted self-interviewing (ACASI). Interviews were conducted in Spanish or English based on the preference of the participant. All interviewers were proficient in both Spanish and English, and most were of Mexican descent. All measures not already available in Spanish were translated to Spanish by bilingual staff members and then back-translated to English by another group of bilingual staff members to confirm that the original meaning remained clear. Family members also participated in several structured tasks, which were then coded with a revised version of the Melby and Conger (2001) coding scheme used in Study 1.

Measures

Income: At each assessment, adults indicated their gross household income using the following response options: 1(*less than 5,000*), 2(*5,000-10,000*), 3(*10,001-15,000*), 4(*15,001-20,000*), 5(*20,001-25,000*), 6(*25,001-30,000*), 7(*30,001-35,000*), 8(*35,001-40,000*), 9(*40,001-45,000*), 10(*45,001-50,000*), 11(*50,001-55,000*), 12(*55,001-60,000*), 13(*60,001-65,000*), 14(*65,001-70,000*), 15(*70,001-75,000*), 16(*75,001-80,000*), 17(*80,001-85,000*), 18(*85,001-90,000*), 19(*90,001-95,000*), 20(*95,000 or more*). Notable for the measurement of income in both studies is the finding that fewer than 5% of families in both studies report any holdings of investment assets such as stocks, bonds, cds, trust funds, retirement annuities, or rental real estate. The implication of such low asset levels is that almost all reported income comes from earned income and/or benefit income- an outcome that we expect to be more closely tied to human capital than income sources related to wealth.

Emotional resources: Adults reported on their anxiety and depression at each assessment using nine items from the same measure as Study 1, the Mini Mood and Anxiety Symptom

Questionnaire (Clark & Watson, 1995). Responses ranged from 1 (*not at all*) to 4 (*very much*). Items were combined into a single scale at each assessment (α s = .85, .86, .87, .87), and used to indicate “emotional resources”.

Personality resources: Adults reported their dispositional optimism at the second, third, and fourth assessments using six items from the same measure as Study 1, the Life Orientation Test (Scheier & Carver, 1985). Responses ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). Unlike Study 1, the CFP did not assess mastery so optimism was used as the sole indicator of “adaptive cognitions” (α s = .54, .62, .64).

Unlike Study 1, impulsivity was not measured in the CFP. Instead, adults reported their conscientiousness using the Big Five Inventory (BFI; John, Naumann, & Soto, 2008) at each assessment. Responses ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). Sample items include “Does a thorough job” and “Is a reliable worker.” Conscientiousness was not assessed in Study 1. Responses were averaged across items into a single scale at each assessment (α s = .67, .69, .76, .77).

Cognitive resources: Adults completed the Woodcock-Johnson III (Simons et al., 1995), which produced two scale scores: verbal intelligence and fluid intelligence. We include fluid intelligence in our primary analyses due to variation in formal education among the sample. Intelligence was not assessed in Study 1.

Behavioral resources: At the first and second assessments, adult emotional prosocial behavior was coded toward the secondary caregiver (during a couple interaction task) and toward the adolescent (during the parent-adolescent task) along three dimensions: warmth/support, communication, and prosociality. This was equivalent to Study 1 in that this revised version of the Melby and Conger (2001) coding scheme combined the scales of listener responsiveness, assertiveness, and communication into a single scale called “communication.” These three ratings were combined to indicate “prosocial behavior toward partner” (α = .80, .86) and “prosocial behavior toward adolescent” (α = .80, .83). During the parent-child task, high-investment parenting behavior was also coded along the same four dimensions as in Study 1 (α = .69, .59). Neglecting/distancing parenting was not assessed in the CFP, so adult low-investment parenting behavior was coded using two alternative scales: insensitive/parent centered and lack of positive reinforcement (α = .72, .75). These two ratings were combined to indicate “low-investment parenting behavior”.

Physical resources: During both observed tasks, the adult’s physical attractiveness was rated using the same scales as in Study 1. These two ratings were combined to indicate “physical attractiveness” (α = .61, .66). Self-reported height and weight were collected at each assessment, and used to calculate body mass index.

Legal resources: Interviewers coded whether the adult had come to the U.S. legally using the following scale 0(*I know this person does not have legal status to reside in the U.S.*), 1(*I know this person is a legal resident or U.S. citizen*).

Results

Missingness for all variables was less than 20%. Adults who participated at the final assessment did not differ from those who participated only at earlier waves in terms of income. Preliminary analyses showed no differences in hypothesized paths based on family structure (single vs. two-parent families); therefore, results are presented for the combined sample. However, compared to mothers in two-parent families, single mothers were higher on fluid intelligence ($r = .09, p = .022$), physical attractiveness ($r = .10, p = .043$) and monitoring ($r = .08, p = .047$), and lower on inductive reasoning ($r = -.08, p = .043$).

Table 1 includes correlations between income and personal resources, with data from the CFP presented above the diagonal. Income at Wave 1 was correlated with income at Wave 2 ($r = .75, p < .001$). The correlations between income and personal resources ranged from $|.04|$ to $|.39|$, and were typically statistically significant. Other descriptive statistics appear in the Appendix.

The main tests of study hypotheses were conducted similarly to Study 1. The unconditional model of change in income is presented in Figure 1 (Panel B). The initial level of income in this sample was 6.95 (a little less than \$30,000) and the linear increase in income was 0.23 (a little over \$1,000). There was no occasion-specific change in income among these families. Results from the CFP are presented on the right side of Table 2. The fit of these models was good, with RMSEA values ranging from .056 to .069 and TLI values ranging from .980 to .986. For instance, emotional well-being at baseline predicted relative increases in income ($b = 0.25, SE = 0.10$). Every resource that predicted change in income in Study 1 also predicted change in this study, with the exception of physical attractiveness, and body mass. Of the resources not included in Study 1, conscientiousness and intelligence were associated with higher income at baseline, but not with change over time in income. Having entered the U.S. legally was associated with higher income at baseline and predicted increase in income over time. Similarly to Study 1, income did not predict change in any personal resources included in this study.

Discussion

The consensus among researchers is that income affects personal resources like those examined in this study (Bradley & Corwyn, 2002; Hossain & Roopnarine, 1994; Letourneau, Duffett-Leger, Levac, Watson, & Young-Morris, 2011; Linver, 2002). Much of the empirical basis for this consensus comes from cross-sectional correlations between income and emotional resources (Gallo & Matthews, 2003), positive cognitions (Adler et al., 1994; Brantley, O'Hea, Jones, & Mehan, 2002; Goosby, 2007; Poetz et al., 2007; Robb, Simon, & Wardle, 2009; Schutte, Valerio, & Carrillo, 1996; Taylor & Seeman, 1999), behavioral resources (Conger & Dogan, 2007), and physical resources (Frieze, Olson, & Russell, 1991; Hamermesh & Biddle, 1994; Judge, Hurst, & Simon, 2009; Lynn, 2009). More causally-rigorous analyses offer weaker support for the hypothesized causal role of income, which invites the possibility of other explanations for the correlation between income and personal resources. The current study contributes to this literature by demonstrating that personal resources persistently predict changes in household income but that income did not predict change in any of these personal resources among two different

low-income samples: the Family and Community Health Study (FACHS) of African American families and the California Families Project (CFP) of Mexican origin families. The combined prediction to changes in income from all these personal resources slightly exceeds \$10,000 across the course of the study (for the FACHS) and \$7,000 (for the CFP).

One possible explanation for these findings is that differences in levels of human capital cause selection into higher-paying employment (Biddle & Hamermesh, 1998; Gensowski, 2014; Harper, 2000). That is, higher-paying employment opportunities may become selectively available to people with high levels of personal resources. These resources may also determine selection into higher education (Heckman & Montalto, 2016), which would also lead to selection into higher-paying employment. Another possibility is that adults with these resources select into relationships with higher income earners (Domingue, Fletcher, Conley, & Boardman, 2014; Tognetti, Berticat, Raymond, & Faurie, 2014). However, these associations did not vary in magnitude between adults who were married or cohabiting and adults who were single, suggesting that personal resources predict changes in income even when there is no romantic partner. While a partner in the household certainly would be expected to lead to more income, income changes are similar across single- and two-parent households. A selection effect of these personal resources is consistent with evidence from the field of child development that current or transitory income has small effects on child development (Letourneau, Duffett-Leger, Levac, Watson, & Young-Morris, 2013), whereas the association between permanent income and child development is much higher (Blau, 1999). We consider the income reported in these studies as closer to permanent income, reflective of stable personal resources or human capital, whereas current or transitory income would also reflect situational effects which are not directly measured in our studies.

A second possible interpretation is that selection into high income circumstances is not driven by these personal resources, but that instead the same characteristics that lead adults to have higher incomes also lead adults to have higher emotional well-being, adaptive cognitions, prosocial behavior, and physical attractiveness (see Votruba-Drzal, 2003 for a cogent elaboration in terms of cognitive stimulation). For example, genetic explanations of social behavior include the argument that unmeasured traits at the level of genome or epigenome are the causal drivers of successful functioning both in terms of socioeconomic status as well as interpersonal domains. Although this explanation is less likely to account for why these resources predict *changes* in income, it is possible that genes continue to activate and influence changes in both personal and financial resources in the period addressed in this study. From this perspective, the actual selection factor remains unknown, and the effects documented in this study are non-causal. Either variant of the selection explanation would account for the fact that controlling for socioeconomic status rarely changes results in studies of family processes. As one group of scholars said:

“Economists might think that socioeconomic status accounts for all important behavioral phenomena. However, absent a reasoned account for how a third variable like socioeconomic status might function as a common cause, the force of this criticism is reduced. Indeed, in 30 years of controlling for socioeconomic status in studies of the association between social processes and individual adjustment, we

have never found that it significantly changed results in any of our investigations” (Widaman, Dogan, Stockdale, & Conger, 2010).

Although we ran multiple sensitivity checks, it remains possible that unmeasured selection factors are in part driving the prediction to change over time in income from these personal resources.

A third possible explanation for the current findings is that adults with high levels of personal resources receive differential treatment. In other words, a non-ignorable portion of the link between income and these personal characteristics is shaped by the responses people with these resources evoke from their environment (Borghans, Golsteyn, Bart, Heckman, & Humphries, 2016). Using emotional resources as an example, supervisors and coworkers may react more negatively toward depressed and anxious individuals and, as a result, they are less likely to receive promotions, raises, and so on. Depressed and anxious individuals are also less likely to actively and thoroughly search for employment (Knafer, Wanberg, & Kantrowitz, 2001; Wanberg, Zhu, Kanfer, & Zhang, 2012) and are consequently more likely to be unemployed or underemployed. Similar mechanisms would operate for optimism or mastery, hostility or aggression, and intelligence. People who are warm, prosocial, and physically attractive are more likely to be hired, and to receive positive evaluations after being hired (Abel, Croysdale, & Stiler, 2009; Knafer, Wanberg, & Kantrowitz, 2001). Legal status not only increases job opportunities, it would provide leverage both to negotiate a higher starting salary, and advocate for subsequent raises. Although the current findings are more causally robust than much of the other work on income and personal attributes, additional research will increase our ability to make strong causal claims about the effect these attributes have on income. We would add however, that if the current results are not sufficiently rigorous to justify causal inference, that same standard should be applied to research purporting to show that income causes family and individual functioning.

In light of the current findings, it would appear that income-focused policies designed to improve family well-being through attendant increases in these personal resources are unlikely to succeed. Programs and interventions that focus on the early development of human capital (e.g., 4-H, Girl Scouts and Boy Scouts) may lead to positive results in terms of eventual household income. Empirical support grows for the continued malleability of personality in adulthood (Roberts & Mroczek, 2008). There is now even evidence that personality traits can be experimentally manipulated (Hudson & Fraley, 2015) showing these personal resources are possible intervention targets. Education and job training programs developed with attention to adult personality and family functioning also seem worthy of additional attention given the possibility of downstream impact on family earnings. Attention to these elements in adult education curriculum often falls under the label of “learner persistence support” (for an example see Comings, Parrella, & Soricone, 1999). The current study failed to identify any domains of personal resources potentially influenced by income. That important task requires additional high quality research spanning earlier developmental periods as well as adulthood.

An important caveat to the existing findings is that although our focus on adulthood allowed us to directly address the hypothesized causal role of income at this point of the life cycle,

our models cannot address the role of these personal resources in early adulthood. For example, we found no support for a causal effect of intelligence on income at this point in development. Nevertheless, the significant prediction to initial status of income by intelligence leaves open the possibility that intelligence could have causally influenced income at an earlier point in adulthood. In sum, a personal resource may have failed to predict change over time in the current study yet still exert a causal effect on earnings at some earlier point. At the same time, the ability of the significant predictors (e.g., legal status) to predict changes in earnings is all the more striking given the absence of effect for an established correlate of income like intelligence. Finally, it is possible that the family income a child experiences when very young may determine many of the social resources to which the child is exposed. In other words, the social resources identified in this study as predictors of change in income may themselves be products of prior income.

Both of these groups (FACHS and CFP) represent low-income ethnic minority groups frequently held up by policy advocates as groups particularly likely to benefit from policies purporting to improve family well-being by increasing family income. However, these groups are meaningfully different in several ways, including immigration history, cultural background, and linguistic background. Both groups likely face discrimination as well, which would be a barrier to employment, promotion, and wage increases.

One unexpected finding was the difference between the two samples in terms of prediction to income by physical resources like body mass and physical attractiveness. Physical resources predicted change over time in income only among the adults of the FACHS. This may be because African Americans experience higher than average discrimination because of body weight (Puhl, Andreyeva, & Borwnell, 2008). Although physical attractiveness influences mate selection across cultures, the effect of physical characteristics on mate selection and retention may be particularly strong among African Americans (Ross, 1997). Even so, we do not wish to overstate these differences. Physical attractiveness was positively related to baseline income among the Mexican origin adults in Study 2, leaving open the possibility that attractiveness causally influenced income at a previous point in adulthood.

These analyses are based on two samples and replication of these findings among other families and across other ethnic groups will increase confidence in their generalizability. Although we found support consistent with a causal role of personal characteristics on change in adult household income, the nonexperimental data cannot support strong causal inference. It may be that the pattern of results would be different at earlier or later points in development. A portion of the unexplained variance in income may be due to forces beyond the individual level such as cultural forces or policy application. Additional research is necessary to adequately test for a causal role of these macro factors on changes over time in income. Finally, our focus on lower income families results in a restriction of range, making it unclear how much these personal resources predict changes in income among higher income families.

These limitations notwithstanding, the current study advances the literature on personal resources and income in several ways. First, it shows that correlations between income and personal resources are not solely the result of the causal effects of income. Directives to

control for income in studies of family processes based on the assumption that income is the driver of associations seen with these personal resources (APA, 2015) may create specification errors. It would be productive to accumulate more methodologically robust evidence before the field includes income as a covariate in every model of personal resources or family processes. The current study also helps bridge the disparate results between correlational work and natural experiments on this topic, in that the smaller more sporadic effects among the latter are consistent with research in other areas showing an elimination of effect after controlling for initial status (Larzelere, Kuhn, & Johnson, 2004). It is inappropriate to include income as a covariate in models predicting personal resources until the field more fully understands the nature of the association between the two (Liberson, 1986), because inclusion of a correlated covariate without consideration of selection could lead to greater bias in parameter estimates. Finally, the message to policymakers that increasing income will improve family health functioning and personal resources should be limited to the specific domains supported by causally rigorous research and program evaluation.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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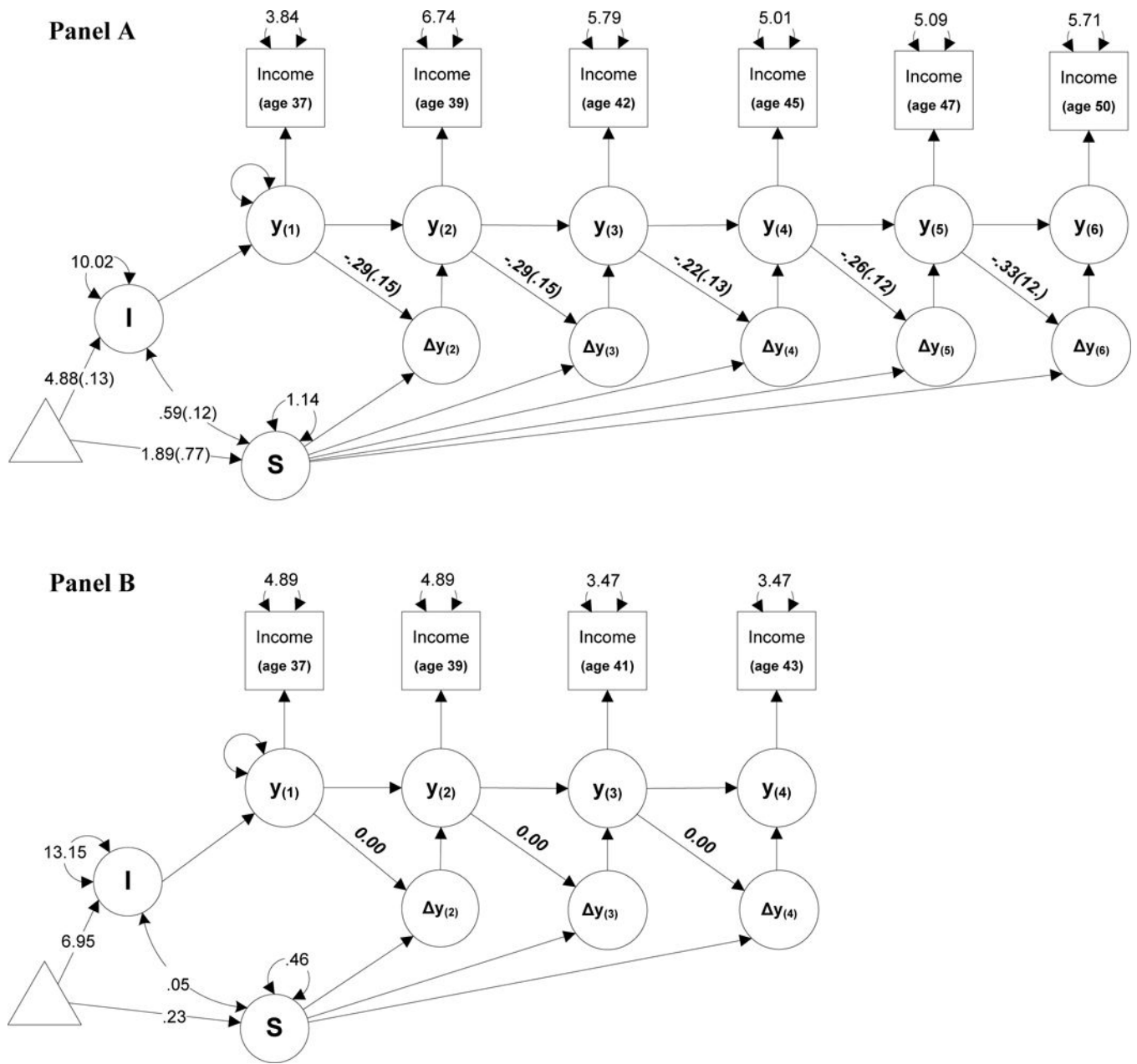


Figure 1. Unconditional Model of Change Over Time in Income Among the Family and Community Health Study (Panel A, N = 889) and the California Families Project (Panel B, N = 674)

Table 1

Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Income (Wave 1)	–	.75	.74	.70	–	–	.04	.09	–	.14	.13	.09	.19	–.14	.18	.28	–.05	.28
2. Income (Wave 2)	.63	–	.79	.73	–	–	.09	.09	–	.22	.10	.12	.29	–.22	.14	.29	.01	.37
3. Income (Wave 3)	.61	.62	–	.82	–	–	.14	.15	–	.19	.15	.11	.28	–.23	.20	.24	.01	.38
4. Income (Wave 4)	.54	.58	.68	–	–	–	.12	.14	–	.19	.11	.12	.22	–.21	.20	.26	–.02	.39
5. Income (Wave 5)	.55	.56	.62	.72	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6. Income (Wave 6)	.53	.52	.60	.67	.71	–	–	–	–	–	–	–	–	–	–	–	–	–
7. Emotional resources	.18	.13	.17	.19	.17	.22	–	.28	–	.16	.30	.23	.18	–.18	.06	–.02	.03	.01
8. Adaptive cognitions	.24	.20	.25	.31	.26	.23	.29	–	–	.23	.26	.20	.24	–.24	.09	.07	–.01	.08
9. Maladaptive cognitions	–.27	–.25	–.26	–.30	–.27	–.32	–.30	–.42	–	–	–	–	–	–	–	–	–	–
10. Prosocial towards offspring	.25	.25	.30	.32	.27	.26	.12	.27	–.26	–	.12	.45	.64	–.74	.23	.09	.08	.20
11. Personality resources ^A	–.14	–.10	–.09	–.13	–.10	–.12	.27	–.23	.30	–.13	–	.04	.12	–.13	.14	.20	–.02	.02
12. Prosocial towards partner	.23	.21	.26	.22	.25	.23	.04	.24	–.28	.48	–.08	–	.36	–.40	.20	.11	.09	.10
13. High–investment parenting	.16	.15	.22	.26	.24	.22	.08	.21	–.15	.60	–.13	.38	–	–.68	.24	.16	.04	.19
14. Low–investment parenting	–.03	–.09	–.11	–.14	–.11	–.10	–.07	–.09	.04	–.29	.13	–.18	–.24	–	–.25	–.08	.05	–.21
15. Physical attractiveness	.13	.15	.20	.18	.18	.21	.11	.06	–.03	.24	–.09	.14	.17	–.12	–	.19	–.39	.11
16. Fluid intelligence	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.06	.14
17. Body mass	–.08	–.07	–.05	–.12	–.11	–.12	.05	.04	.04	–.04	.03	–.06	–.09	.07	–.28	–	–	.03
18. Legal immigrant	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Note. Family and Community Health Study (FACHS) below diagonal, California Families Project (CFP) above diagonal. Personal resources come from baseline assessment.

^AImpulsivity for the FACHS, Conscientiousness for the CFP. Boldface correlations are significant at $\alpha = .05$.

Table 2

Predicting Change in Income from Personal Resources

Predictor	Family and Community Health Study						California Families Project					
	Intercept		Slope		Model fit		Intercept		Slope		Model fit	
	b	SE	b	SE	RMSEA	TLI	b	SE	b	SE	RMSEA	TLI
1. Emotional resources	0.39	0.08	0.14	0.06	.053	.976	0.43	0.36	0.25	0.10	.064	.983
2. Adaptive cognitions ^A	0.29	0.05	0.11	0.05	.055	.975	1.64	0.80	0.52	0.23	.064	.983
3. Maladaptive cognitions	-0.36	0.04	-0.12	0.05	.054	.975	-	-	-	-	-	-
4. Personality resources ^B	-0.29	0.07	-0.08	0.04	.053	.976	2.28	0.73	0.14	0.21	.064	.983
4. Fluid intelligence	-	-	-	-	-	-	0.11	0.01	0.01	0.21	.063	.984
5. Prosocial to offspring	0.78	0.10	0.24	0.11	.054	.976	0.66	0.19	0.12	0.06	.062	.984
6. Prosocial to partner	0.57	0.12	0.19	0.10	.053	.976	0.48	0.24	0.10	0.08	.060	.985
7. High-investment parenting	0.76	0.17	0.38	0.15	.053	.976	1.27	0.27	0.19	0.08	.069	.980
8. Low-investment parenting	-0.78	0.52	-0.67	0.27	.052	.977	-0.80	0.22	-0.21	0.06	.065	.982
9. Physical attractiveness	0.68	0.17	0.27	0.13	.053	.976	0.91	0.07	0.09	0.06	.062	.984
10. Body mass	-0.21	0.10	-0.11	0.05	.054	.975	-0.02	0.03	0.00	0.01	.060	.985
11. Legal immigrant	-	-	-	-	-	-	1.99	0.40	0.26	0.12	.056	.986

Note. Values in the table are unstandardized coefficients from latent change models.

^A Adaptive cognitions were not assessed until Wave 2 in the CFP, so the latent change model was estimated starting at Wave 2.

^B Impulsivity in the Family and Community Health Study. Conscientiousness in the California Families Project. Coefficients in boldface are significant at $\alpha = .05$.