Nice Guys Finish Last: When and Why Agreeableness is Associated with Financial Hardship

Datasets and R scripts are made available on OSF through the following link:

https://osf.io/e3j9v/

Abstract

Recent research suggests that agreeable individuals experience greater financial hardship than their less agreeable peers. We explore the psychological mechanisms underlying this relationship and provide evidence that it is driven by agreeable individuals considering money to be less important, but not (as previously suggested) by agreeable individuals pursuing more cooperative negotiating styles. Taking an interactionist perspective, we further hypothesize that placing little importance on money – a risk factor for money mismanagement – is more detrimental to the financial health of those agreeable individuals who lack the economic means to compensate for their predisposition. Supporting this proposition, we show that agreeableness is more strongly (and sometimes exclusively) related to financial hardship among low-income individuals. We present evidence from diverse data sources, including two online panels (n_1=636, n_2=3,155), a nationally-representative survey (n_3=4,170), objective bank account data (n_4=549), a longitudinal cohort study (n_5=2,429), and geographically aggregated insolvency and personality measures (n_6=332,951, n_7=2,468,897).

Keywords: Agreeableness, Financial Health, Income, Negotiation style, Money attitudes.

Nice Guys Finish Last: When and Why Agreeableness Is Associated with Financial Hardship

Economists and policy makers have long been puzzled by the frequency with which people engage in financial behaviors that run counter to their long-term well-being. Research suggests that people save too little (Madrian & Shea, 2001) spend too much (Sussman & Alter, 2012), and fall behind on their financial commitments (Stango & Zinman, 2014). As a result, they regularly struggle to make ends meet (Lusardi, Schneider, & Tufano, 2011). While financial hardship is widespread, psychological research suggests that specific traits may lead some individuals to be at greater risk of experiencing this than others. For example, studies have linked adverse financial outcomes to the widely established Five Factor Model of personality (Goldberg 1999, McCrae and John 1992). These studies find that Neuroticism predicts higher debt rates (Webley and Nyhus 2001) and an increase in instances of compulsive buying (e.g., Brougham et al. 2011, Mowen and Spears 1999). Conscientiousness has been linked to increased savings (Brandstatter, 1996 and Warneryd, 1996), more positive attitudes towards saving (Brandstatter, 2005), and the avoidance of debt (Webley and Nyhus 2001). One interpretation of these studies, taken together, is that socially undesirable psychological traits go hand-in-hand with undesirable financial behaviors – and vice versa.

However, contrary to this perception, recent research has found a relationship between Agreeableness – a personality trait associated with positive attributes (McCrae & John, 1992) – and negative financial outcomes such as lower credit scores (Judge, Livingston, & Hurst, 2012) and reduced earnings (Bernerth, Taylor, Walker, & Whitman, 2012). A common explanation for why agreeableness might contribute to impaired financial circumstances focuses on the trusting and accommodating tendencies of agreeable individuals. These characteristics may leave them more prone to sacrifice personal resources for others (Judge et al., 2012) and more vulnerable to

commit to promises that they might later be unable to keep (e.g. following the request of a salesman to take up a new credit or signing a new loan for a friend or family member; Bernerth et al., 2012). However, no empirical research has tested these explanations.

One way to conceptualize and test this proposition empirically is by looking at differences in negotiating styles. Negotiating styles represent people's tendencies to deal with interpersonal situations of conflict and cooperation (Rahim, 1983; Thomas, 1992; Thomas & Kilmann, 1978). Given that agreeableness reflects prosocial dispositions as opposed to a narrower focus on one's self-interest (Messick & McClintock, 1968), it is likely to affect the way in which individuals negotiate. For example, individuals with a prosocial orientation make fewer demands and more concessions than their more competitive peers (De Dreu & Van Lange, 1995) and are more likely to adopt a cooperative negotiation style that benefits the other party (Antonioni, 1998; Moberg, 2001). As a result, agreeable individuals end up with poorer economic outcomes from negotiations than do their disagreeable counterparts (Barry & Friedman, 1998). Thus, while there are many contexts in which being trusting and cooperative might produce positive outcomes, agreeableness also has the potential to undermine the pursuit of self-interest in situations of conflict and negotiation. Building on the outlined reasoning we test the following hypothesis:

> *Hypothesis 1a:* The relationship between agreeableness and negative financial outcomes can be explained by highly agreeable people pursuing more cooperative negotiation styles.

However, there are alternative explanations which could explain the role of agreeableness in financial health. We propose that agreeable people experience greater financial hardship because they care less about money. Studies show that people who place a high value on money score

higher on competitiveness, an indicator of low agreeableness (Kirkcaldy & Furnham, 1993; Richins & Rudmin, 1994; Wong & Carducci, 1991), and that agreeable individuals care less about material possessions (Watson, 2014). We reason that placing a low value on money means less cognitive attention and resources will be allocated to keeping track of personal finances, resulting in financial mismanagement. Building on the outlined reasoning we test the following hypothesis:

Hypothesis 1b: The relationship between agreeableness and negative financial outcomes can be explained by highly agreeable people placing less subjective value on money.

Caring less about money is unlikely to impact the financial health of everyone equally. For example, it seems reasonable to expect the effect of caring less about money –and therefore the effect of agreeableness– on financial health to be dependent on people's economic circumstances (e.g., their income). Agreeable individuals with a sufficiently high income should have the financial resources to protect themselves from the risks of money mismanagement that may arise from their negative (or indifferent) attitude towards money. Conversely, agreeable individuals with low income might not have a sufficient financial safety net to compensate for their economically disadvantageous attitudes. Hence, we argue that people's agreeable predisposition makes them more prone to experiencing negative financial outcomes, but that this predisposition posits a greater threat to the financial health of only those with limited financial resources. More specifically, we test the following hypothesis:

Hypothesis 2: Income moderates the relationships between agreeableness and negative financial outcomes, such that agreeableness is more strongly associated with these outcomes for low-income individuals.

Our conceptualization of financial health is broad, and while previous work has focused purely on wages and credit scores, we would expect agreeableness to be related to a wide range of financial indicators. Therefore, in addition to testing our hypotheses, we use multiple dependent variables across studies to test whether more agreeable people take on more debt, hold less in savings, and are more likely to fall delinquent or even default on their financial commitments. Table 1 presents an overview of the six studies presented in this paper, outlining (1) the hypothesis tested, (2) the outcome variables used to capture financial health, and (3) the characteristics of the sample.

Insert Table 1 here

Ethics Approval

Study 1 received ethical approval (exemption) from the UCL School of Management, Director of Research. No protocol number is supplied as a result of this process, but confirmation of approval is available upon request. Study 4 received ethical approval from University of Cambridge Judge Business School (protocol number: 15-016). Studies 2-3 and 5-7 are based on secondary datasets, and therefore do not require ethical approval. Datasets and scripts are made available on OSF (https://osf.io/e3j9v/).

Studies 1-2: Mediation effects

Studies 1-2 are aimed at investigating the mediating mechanisms underlying the relationships between agreeableness and negative financial outcomes. We test two potential mediators: cooperative negotiation style (Hypothesis 1a) and importance of money (Hypothesis 1b).

Study 1

Study 1 tested whether agreeable individuals' more cooperative negotiation style (Hypothesis 1a), and/or the lower value they assign to money (Hypothesis 1b), mediates the association between agreeableness with savings and debt.

Method

Participants. We used Prolific Academic[1] – a UK-based recruitment service similar to Amazon Mechanical Turk – to recruit participants. To increase the reliability of our findings, we aimed to collect a convenience sample of approximately 600 participants, which exceeds the sample size recommended for mediation analysis (Wolf et al. 2013). We collected a slightly larger sample of 662 participants to allow us to exclude inattentive participants. As the study aimed to measure behavior of those who are in control of their financial life we only recruited participants aged 30 years and older. Participants were excluded if they failed to pass at least one of the two attention checks incorporated in the survey. This left us with 636 participants (61% female; $\bar{x}$ (age) = 44.10 years, SD = 9.77).

Measures. *Agreeableness.* Agreeableness was measured with the nine items of the agreeableness scale included in the BFI-44 measure of personality (John & Srivastava, 1999). With a Cronbach's α of 0.81 the scale reliability was good.

Savings. Savings were measured by asking: "Overall, what is the total amount of your savings, in GBP". Responses were recorded in an open text field. Reported savings were highly positively skewed, with an average of £17,300 and a median of £4,000. We identified and excluded extreme outliers using the standard definition (> outer upper fence = Q3 + 3*IQR).

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[1] Prolific academic workers were found to be more diverse and honest than their counterparts on Amazon Mechanical Turk, and to produce data quality comparable to that of Amazon Mechanical Turk workers (Peer et al., 2017)

Debt. Debt was measured by asking: "What is the total outstanding balance of your personal loans and/or credit cards, in GBP?". Responses were recorded in an open text field. Similar to savings, reported debt was highly positively skewed, with an average of £3,330 and a median of £0. Extreme outliers (> outer upper fence = Q3 + 3*IQR) were excluded.

Negotiation Styles. The Rahim Organizational Conflict Inventory-II (ROCI-II; Rahim, 1983) was developed to measure five styles of handling interpersonal conflict in the workplace. We adapted the ROCI-II scale to reflect "others" rather than one's boss (e.g., "I usually accommodate the wishes of others"). Given the high correlations between cooperation-oriented conflict styles "compromising," "obliging," and "integrating" ($\bar{r}$ = 0.58), we averaged the scores across these three conflict styles to obtain a composite measure of "cooperative negotiation style" (our results were stable when using any of the individual styles as mediators instead).

Importance of Money. The subjective importance of money was measured using 16 items in the Money Attitudes Scale (Furnham, Wilson, & Telford, 2012), which measures people's attitudes towards money. Items include statements such as "There are very few things money can't buy," "You can never have enough money," or "Money can help you be accepted by others". While the original scale measures the importance of money along four different facets (e.g., power or security), we aggregated the scores across all items to obtain a comprehensive measure of the overall importance people assign to money. With a Cronbach's α of 0.76 the scale reliability was acceptable.

Controls. We included as covariates participants' self-reported age, gender (0 = male, 1 = female), education level (1 = no educational qualifications, 2 = Secondary School, 3 = Sixth Form College, 4 = University degree, 5 = Masters degree, and 6 = Doctoral degree), and 12 categories of income (1 = Less than £10,000, 2 = £10,001 to £15,000, 3 = £15,001 to £20,000, 4 = £20,001 to £30,000,

5 = £30,001 to £40,000, 6 = £40,001 to £50,000, 7 = £50,001 to £60,000, 8 = £60,001 to £80,000,

9 = £80,001 to £100,000, 10 = £100,001 to £120,000, 11 = £120,001 to £140,000, 12 = More than

£140,000).

Analysis. To test for main effects of agreeableness on savings and debt – a prerequisite for the

subsequent mediation analysis – we ran two regression models, including all controls. We

employed poisson models, with Huber-White robust standard errors, to account for the positive

skew in our outcome variables. An inspection of the variance inflation factors (VIF) for the two

regression models suggests multi-collinearity was not a cause for concern (Hair et al., 1995). To

test Hypotheses 1a and 1b, we ran a path analysis with bootstrapping and MLR estimation for non-

normal continuous data, again with Huber-White robust standard errors, using the lavaan package

in R (Rosseel et al., 2017). The models tested whether the relationships between agreeableness and

savings, as well as debt, were mediated by (a) the negotiation style of participants and (b) the

subjective importance participants placed on money. All models controlled for the effects of age,

gender, education, and income on the outcome variables.

Results

The results of the two poisson regression analyses partly support the proposition that agreeable

people experience greater financial hardship than their disagreeable counterparts (see Table S1 for

univariate correlations and Table S2 for a full model output). Corresponding to Hypothesis 1,

agreeableness was negatively related to savings (B = -0.17, SE = 0.060, z = -2.83, IRR = 0.84, p =

0.005). However, there was no significant relationship between agreeableness and debt (B =

0.09, SE = 0.081, z = 1.58, IRR = 1.10, p = 0.247). Given that a significant relationship between

the predictor and the outcome variable is a prerequisite for mediation analyses (Baron & Kenny,

1986), we only report the mediation results on savings. Figure 1 illustrates the results of the mediation model using standardized regression coefficients.

Insert Figure 1 here

The hypothesized path model for savings provided a good fit to the data ($\chi 2$= 20.87, df = 8, p = 0.007, CFI = 0.95, TLI = 0.88, RMSEA = 0.052 [0.026;0.080]). We do not find support for our first mediation hypothesis (Hypothesis 1a), with no indirect effect of compromising negotiation style (a2*b2: B = 0.007, SE = 0.018, β = 0.007, p = 0.619). While agreeableness was found to have a highly significant effect on cooperative negotiation style (a2: B = 0.38, SE = 0.045, β = 0.38, p < 0.001), there was no significant effect of cooperative negotiation style on savings (b2: B = 0.019, SE = 0.039, β = 0.019, p = 0.499). In contrast, the evidence does provide support for our second mediation hypothesis, finding a significant indirect effect of importance of money (a1*b1: B = -0.024, SE = 0.009, β = -0.024, p = 0.007), which accounted for 22% percent of the variance in the direct effect. Agreeableness was found to have a highly significant direct effect on the subjective importance of money (a1: B = -0.14, SE = 0.042, β = -0.14, p = 0.001), which in turn had a highly significant direct effect on savings (b1: B = 0.18, SE = 0.036, β = 0.18, p < 0.001). The direct effect of agreeableness on savings remained significant (c'; B = -0.090, SE = 0.042, β = -0.090, p = 0.034) but decreased in size compared the direct effect of savings in a model that did not include the mediators (c; B = -0.11, SE = 0.041, β = -0.11, p = 0.010). Overall, the results suggest that the subjective importance of money, but not a more compromising negotiation style, partially mediates the negative relationship between agreeableness and savings.

Taken together, the results of Study 1 suggest that agreeableness is related to financial hardship, as measured by lower savings. However, we do not find support for an association with increased

debts. Debt and savings provide different signals of a person's financial health; while increased

savings is almost always a sign of better financial health, some debt is inevitable and even useful

when used judiciously (for example, most people simply could never buy substantial assets like

houses and cars without taking on debt). This distinction might explain the fact that agreeableness

was significantly related to savings, but not debt. In addition, the results of the mediation analysis

provide correlational evidence consistent with the hypothesis that the relationship can be explained

in part by agreeable people assigning less value to money than their disagreeable counterparts, but

not by the fact that they are predisposed to less favorable negotiation styles.

Study 2

Study 2 was aimed at replicating the findings of Study 1 on a larger and more diverse sample of

participants. More specifically, we test whether the effect of agreeableness on savings is

mediated by the value individuals assign to money.

Methods

Participants.

We use data collected through two online surveys in collaboration with the BBC television public

broadcaster in the UK in 2011. The surveys were conducted as part of two projects - the '*Big

Money Test'* and the '*BBC Big Personality Test*' – designed to measure personality and money

attitudes in the UK population. While these data collection efforts were independent, we use a

combined dataset containing matched respondents who completed both (held at the UK Data

Archive under SN 7656). The dataset contains responses from 3,869 participants in total (68.2%

female; $\bar{x}$ (age) = 35.31 years, SD = .20). We excluded participants with missing data on our

variables of interest, leaving a total sample of 3,155.

Measures. *Savings.* Savings was measured with the following question: "If you have any savings and other financial investments, what do you think is the value of these savings and investments?". Participants responded using one of eight categories (1 = £0, 2 = £0-£500, 3 = "£500-£1,000", 4 = "More than £1,000 but less than £5,000" 5 = "More than £5,000 but less than £10,000", 6 = "More than £10,000 but less than £20,000", 7 = "More than £20,000 but less than £50,000", 8 = "£50,000 or more".

Agreeableness. Agreeableness, along with the other Big 5 traits, was measured using the BFI-44 measure of personality (John & Srivastava, 1999). With a Cronbach's α of 0.77 for Agreeableness, the scale reliability for this nine-item measure was acceptable.

Importance of Money. As in Study 1, the subjective importance of money was measured using the 16-item Money Attitudes Scale (Furnham, Wilson, & Telford, 2012). Scores were aggregated across all items to calculate a measure of the overall importance people assign to money. With a Cronbach's alpha of α = 0.76, the scale reliability was found to be acceptable.

Controls. We included the following demographic control variables: Self-reported age and gender (0 = male, 1 = female), highest education qualification (six categories, 1 = not completed GCSE (secondary school certificate) or equivalent, 2 = completed GCSE or equivalent, 3 = completed post-16 vocational course or equivalent, 4 = completed A-levels or equivalent, 5 = completed undergraduate studies or equivalent, 6 = completed postgraduate studies or equivalent), employment status (1 = employed full-time, 2 = employed part-time, 3 = retired, 4 = student, 5 = unemployed), the remaining Big Five traits as measured by the BFI-44, and income per annum (eight categories, 1 = up to £9999, 2 = £10,000 to £19,999, 3 = £20,000 to £29,999, 4 = £30,000 to £39,999, 5 = £40,000 to £49,999, 6 = £50,000 to £74,999, 7 = £75,000 to £149,999, 8 = £150,000 or more).

Analysis. To assess whether there was a main effect of agreeableness on savings – a prerequisite for the subsequent mediation analysis (Baron & Kenny, 1986) – we ran an ordered logistic regression analysis, including all controls. An inspection of the variance inflation factors (VIF) for the regression model suggests multi-collinearity was not a cause for concern (Hair et al., 1995). We tested Hypothesis 1b by running a path analysis with bootstrapping and WLSMV estimation, using the lavaan package in R (Rosseel et al., 2017). The models tested whether the relationship between agreeableness and savings was mediated by the degree to which participants considered money important. All models included the effects of all controls on savings.

Results

The results of the ordered logistic regression analyses replicate the findings presented in Study 1 by showing that agreeableness is negatively associated with savings ($B = -.14$, $t(3131) = -4.10$, OR $= .87[0.81,0.93]$, $p < 0.001$; see Table S3 for univariate correlations and Table S4 for a full model output). Figure 2 illustrates the results of the mediation models for savings, using standardized regression coefficients.

Insert Figure 2 here

The hypothesized model provided a good fit to the data ($\chi2 = 109.57$, df $= 9$, $p < 0.001$, CFI $= 0.89$, TLI $= 0.73$, RMSEA $= 0.060$ [0.050;0.070]). Replicating the findings of Study 1, there was a significant indirect effect of importance of money (a*b: B $= -0.013$, SE $= 0.003$, $\beta = -0.011$, $p < 0.001$; Hypothesis 1b), which accounted for 17% percent of the variance in the direct effect. Agreeableness was found to have a highly significant negative effect on the subjective importance of money (a: B $= -0.12$, SE $= 0.018$, $\beta = -0.12$, $p < 0.001$), which in turn had a highly significant positive effect on savings (b: B $= 0.11$, SE $= 0.019$, $\beta = 0.10$, $p < 0.001$). The direct effect of

agreeableness on savings remained significant (c': B = -0.063, SE = 0.20, β = -0.054, p = 0.002) but decreased in size compared the direct effect of savings in a model that does not include the mediators (c; B = -0.076, SE = 0.020, β = -0.066, p < 0.001).

Taken together, the results of Study 2 replicated the findings of Study 1, showing that (1) agreeableness is negatively related to savings and that (2) this relationship might be partly mediated by the fact that agreeable people assign less value to money than do their disagreeable counterparts.

Studies 3-6: Moderation effects

Studies 1 and 2 show that the importance people place on money, or the lack thereof, mediates the relationship between agreeableness and financial health. As outlined in the introduction, we hypothesize that the impact agreeableness has on financial health will vary based on people's economic circumstances. We expect the effect to be stronger for lower-income individuals, who lack the financial 'safety net' to compensate for their inattention towards their personal finances. Studies 3-7 are therefore aimed at investigating the moderating effect of people's financial resources – their income – on the relationship between agreeableness and financial health (Hypothesis 2).

Study 3

Method

Participants. We investigated the interaction effect of agreeableness and income on negative financial outcomes by analyzing survey responses from a nationally representative sample of UK residents. The survey was commissioned in 2013 by a UK-based charity in collaboration with one

of the study authors and investigated the financial behaviors of 4,170 UK households. It included questions covering financial behavior, as well as several demographic and socio-economic variables, including age, gender, education level, and employment status.

Measures. *Agreeableness.* Agreeableness was measured using three items taken from the British Household Panel Survey (BHPS; Brice, Buck, & Prentice-Lane, 2002). Participants were asked to indicate their agreement with the statements "I see myself as someone who is sometimes rude to others" (reverse coded), "I see myself as someone who has a forgiving nature" and "I see myself as someone who is considerate and kind to almost everyone". With a Cronbach's alpha of $\alpha = 0.57$ the reliability was below the recommended threshold for acceptable consistency (P. Kline, 2013), yet comparable to other well-established, short measures of agreeableness such as the BFI-10 (Rammstedt & John, 2007) or the TIPI (Gosling, Rentfrow, & Swann, 2003). Given that Cronbach's alpha is a function of both the mean inter-item correlation and the number of items, short scales like the one used in this Study often don't yield acceptable alphas but nevertheless display acceptable inter-item correlations (MIC = 0.33).

Total Savings. Savings were measured by asking: "Which of the following best describes the total amount of savings your household has at the moment?" Responses were recorded in 16 bands (1 = Nothing, 2 = Less than £100, 3 = £100 - £250, 4 = £251 - £500, 5 = £501 - £1,000, 6 = £1,001 - £2,000, 7 = £2,001 - £4,000, 8 = £4,001 - £6,000, 9 = £6,001 - £8,000, 10 = £8,001 - £10,000, 11 = £10,001 - £15,000, 12 = £15,001 - £20,000, 13 = £20,001 - £30,000, 14 = £30,001 – £40,000, 15 = £40,001 - £50,000, 16 = £50,001+).

Debt. Debt was measured by asking: "Which of the following best describes the total amount of debt your household owes at the moment? By debt we mean any loans, overdrafts, credit card/store card debts etc. that you pay interest on. Please do not include any mortgage debt or student debt".

Responses were recorded using the same 16 bands used for savings, ranging from 'Nothing' to '£50,000+.'

Indicators of Insolvency. Negative financial behaviors were measured by asking: "Which of the following events, if any, has your household experienced in the last month?". There were 10 events which participants could indicate 'yes' or 'no' to. These were: (1) Defaulted on a rent payment, (2) Defaulted on a mortgage payment, (3) Defaulted on a bank loan, (4) Defaulted on a different type of loan, (5) Taken out a payday loan, (6) Used an unauthorized overdraft, (7) Taken out a new credit card, (8) Defaulted on a bill, (9) Borrowed money from friends or family, (10) Used an authorized overdraft. Responses were recorded in a 'check all that apply' format. Based on the dichotomous responses we created an ordinal scale ranging from 0 = 'No default behavior' to 10 = 'All possible default behaviors'.

Income. Income was recorded using a list of 13 categories (1 = Up to £7,000, 2 = £7,001 to £14,000, 3 = £14,001 to £21,000, 4 = £21,001 to £28,000, 5 = £28,001 to £34,000, 6 = £34,001 to £41,000, 7 = £41,001 to £48,000, 8 = £48,001 to £55,000, 9 = £55,001 to £62,000, 10 = £62,001 to £69,000, 11 = £69,001 to £76,000, 12 = £76,001 to £83,000, 13 = £83,001 or more). The modal response (18.64%) was '£14,001 to £21,000'.

Control Variables. We used participants' self-reported age, gender (0 = male, 1 = female), whether they had children (0 = no, 1 = at least one child), education level (1 = no education/primary education, 2 = high school, 3 = university, 4 = higher degree), employment status (1 = not in employment, 2 = full time, 30 hours or more per week, 3 = part time, 8-29 hours per week, 4 = retired), and the remaining four traits in the Five Factor Model as controls. Due to a mistake in the coding of the study, one of the items measuring conscientiousness was omitted, resulting in only two questions measuring this trait.

Analysis. We used the *polr* function in the MASS package in R (Ripley et al., 2013) to run ordered logistic regressions for each of the three outcome variables. All continuous variables were z-standardized before being submitted to the analyses. Given that not all participants responded to all questions, the sample size varies marginally by outcome. Model 1 includes agreeableness, income and controls as predictors. Model 2 adds the interaction between agreeableness and income. An inspection of the variance inflation factors (VIF) for the three regression models suggested multi-collinearity was not a cause for concern (Hair et al., 1995).

Results

The main effects of agreeableness in Model 1 were found to be significant across all outcome variables, including savings (B = -0.15, SE = 0.03, t(3279) = -4.40, OR = 0.86[0.80,0.92], $p <$ 0.001), debt (B = 0.10 , SE = 0.04, t(3279) = 2.74, OR = 1.10[1.03,1.18], $p =$ 0.006), and default behavior (B = 0.09, SE = 0.04, t(3279) = 2.00, OR = 1.09[1.00,1.19], $p =$ 0.045). The results of Model 3, including the interactions with income, are displayed in Table 2.

Insert Table 2 here

Supporting Hypothesis 2, the interaction between agreeableness and income was significant for all three outcome variables, such that agreeableness was more strongly associated with negative financial outcomes among those with low-incomes than those with high-incomes (see Table S5 for univariate correlations). Given that adding covariates in the form of control variables can alter the focal effect due to multicollinearity or suppression effects (Giner-Sorolla, 2016), we tested the robustness of our effects by adding only the main effects for agreeableness and income, as well as their interaction, into a separate model. While we found the interaction to remain significant for

savings (B = 0.060, SE = 0.030, $t(3284)$ = 2.01, OR = 1.06[1.00,1.13], p = 0.044), and default

behavior (B = -0.078, SE = 0.039, $t(3577)$ = 2.00, OR = 0.92[0.86,1.00], p = 0.046), it no longer

reached significance for debt (B = -0.042, SE = 0.032, $t(3284)$ = -1.28, OR = 0.96[0.90,1.02], p =

0.202). However, given that the controls we added are important confounds of the effect we are

testing, this should be taken as a note of caution rather than evidence against the interaction effect.

Figure 3 illustrates the interaction effects between agreeableness and income on the three outcome

variables savings, debt, and default.

Insert Figure 3 here

The results of Study 3 suggest that more agreeable people have, on average, worse financial health

as measured by savings, debt, and default behaviors. In accordance with hypothesis 2, this

relationship is stronger for those individuals with lower incomes.

Study 4

A disadvantage of using participant self-reports is that they may not always be accurate (Podsakoff

& Organ, 1986). In addition to response biases (e.g., consistency motive), the accuracy of a

participant's answers may be influenced by personality traits. For example, it is possible that

agreeable people are more transparent and honest in their responses to questions about their

financial affairs, providing an alternative explanation for our effect. Therefore, in Study 4 we

aimed to replicate the results of Study 3 by using objective behavioral data collected from

participants' bank accounts.

Method

Participants. The dataset used in Study 4 was collected in collaboration with a UK-based multinational bank in late 2014. Customers of the bank were sent a survey link by email asking them to take part in a study. No incentives were offered for completing the survey. We only included participants with complete datasets (on the variables of interest) who had indicated that the account was their main account. This left us with 549 participants (50% female; $\bar{x}$ (age) = 37.56 years, SD = 14.24).

Measures. *Agreeableness.* Agreeableness was measured using the BFI-10 (Rammstedt & John, 2007), an established short measure of the Five Factor Model of personality. Participants were asked to indicate their agreement with the statements "I see myself as someone who is generally trusting" and "I see myself as someone who tends to find fault with others" (reversed). With a Cronbach's alpha of $\alpha = 0.77$ the scale showed acceptable reliability.

Indicators of insolvency. As part of the survey, participants were asked to consent to their responses being matched with their account information held by the bank for research purposes. This information included the number of times the customer's account had registered one of the following events: (1) A late payment fee on a credit card, (2) exceeding an agreed overdraft limit, (3) a returned transaction fee (payment made with insufficient funds), (4) taking out a payday loan, or (5) taking cash out on a credit card. Given the low frequencies for these individual events, we calculated a single comprehensive measure of negative financial outcomes. Similar to Study 3, we used the dichotomous responses to create an ordinal scale ranging from 0 = 'No default behavior' to 5 = 'All possible default behaviors'.

Income. Income was measured as one of 15 categories, ranging from £0-4,999, to £150,000+ (1 = £0-4,999, 2 = £5,000-9,999, 3 = £10,000-14,999, 4 = £15,000-19,999, 5 = £20,000-24,999, 6 = £25,000-29,999, 7 = £30,000-34,999, 8 = 35,000-39,999, 9 = £40,000-44,999, 10 = £45,000-

49,999, 11 = £50,000-59,999, 12 = £60,000-69,999, 13 = £70,000-99,999, 14 = £100,000-149,999,

15 = £150,000+).

Control Variables. We included self-reported responses about participants' age, gender (0 = male,

1 = female), whether they had children under 18 (coded as 0 = no children and 1 = at least 1 child),

employment status (1 = unemployed, 2= full/part time employed, 3 = retired, 4 = student), and the

four remaining traits in the Five Factor Model as controls.

Analysis. We used the *polr* function in the MASS package in R (Ripley et al., 2013) to run ordered

logistic regressions for each of the three outcome variables. Model 1 included agreeableness,

income and controls as predictors. Model 2 added the interaction between agreeableness and

income. All continuous variables were z-standardized. An inspection of the variance inflation

factors (VIF) for the regression models suggested multi-collinearity was not a cause for concern

(Hair et al., 1995).

Results

The main effect of agreeableness in Model 1 was found to be significant (B = 0.24, SE = 0.10,

t(538) = 2.45, OR = 1.27[1.05,1.55], *p* = 0.014). The results of Model 2 are displayed in Table 3.

Insert Table 3 here

Consistent with hypothesis 2, the significant interaction between agreeableness and income

suggests that higher levels of agreeableness lead to a more pronounced increase in the likelihood

of experiencing negative financial outcomes among those with low incomes than those with high-

incomes (B = -0.23, SE = 0.10, t(537) = -2.42 , OR = 0.79[0.65,0.96], *p* = 0.016). Similar to Study

3, we tested the robustness of the interaction effect by excluding all covariates from Model 2. The interaction effect remained marginally significant (B = -0.17, SE = 0.092, t(557) = -1.84, OR = 0.84[0.70,1.01] p = 0.067). Figure 4 illustrates the interaction effect between agreeableness and income on the insolvency indicator.

Insert Figure 4 here

Study 5

The use of cross-sectional data in Studies 1-4 means that any claims about the directionality of the effects remain speculative. In Study 5 we therefore utilized data from a longitudinal cohort study where participants' agreeableness was measured at age 16-17. This measure is then used to predict financial outcomes 25 years later, at age 42.

Method

Participants. To test the relationship between adolescent personality and adult savings and debt rates, we use data from the British Cohort Study (BCS), a nationally representative study of children born in Britain in a single week in 1970. The BCS contains a self-reported personality measures at age 16–17 (collected in 1986). Complications in data collection during the survey wave (a teacher's strike meant the survey needed to be sent to student's homes), resulted in only a sub-sample of participants (4,947 from 11,622 cohort members) completing this measure[2]. The survey captures participants at nine points across their life, with different questions asked in each

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[2] The significant portion of missing data in this analysis means the results from this study should not be interpreted as providing a representative sample of the UK population.

wave. The most recent data available is for the 2012 survey, when cohort members were 42 years old. As this is also the only wave in which both savings and debt are measured, we focus our analysis on savings and debt in the 2012 wave. Of the 4,947 participants, 2,429 had completed all independent measures as well as providing self-reported savings and/or debt.

Measures. *Agreeableness.* A measure of agreeableness has previously been derived using a factor analysis of various attitude items in the 1986 BCS wave (Lenton, 2014). Self-reported agreeableness was measured in 1986 when the cohort members were aged 16 –17. Participants rated the three items "I am friendly", "I am helpful", and "I am obedient" on a scale of 1 (Does not apply), 2 (Applies somewhat), and 3 (Applies very much). Previous work has demonstrated the validity of this measure (Egan, Daly, Delaney, Boyce, & Wood, 2017) by showing that it correlates highly (r = 0.70) with the standard 50-item version of the International Personality Item Pool (IPIP; Goldberg, 1999). With a Cronbach's alpha of 0.45, the scale reliability for our sample was poor, however, comparable to other short measures of agreeableness such as the BFI-10 (Rammstedt & John, 2007) or the TIPI (Gosling et al., 2003). Similar to Study 3, the short three-item scale makes the interpretation of alpha problematic as Cronbach's alpha is a function of both the number of items and the mean inter-item correlation, which was found to be acceptable (MIC = 0.21)

Demographics. Participants' gender (0 = male, 1 = female; 57% female), the age at which they left full-time education (Mean = 18.84, SD = 3.20), information on whether they had children in their household (0 = no, 1 = yes) and their employment status (1 = unemployed, 2 = full time, 3 = part time, and 4 = student) were added as controls. The sample represents a cohort born in the same week, therefore age was not included in the analysis.

Savings and Debt. Our dependent variables were savings and debt rates at age 42 (collected in 2012). These were measured using open response self-reports of total savings and debt. Reported savings and debt were highly positively skewed, with an average of £30,620 and a median of £6,000 for savings, and an average of £5,146 and a median of £500 for debt. Similar to Study 1, we excluded extreme outliers using the standard definition (> outer upper fence = Q3 + 3*IQR).

Analysis. We ran two poisson regression models (with Huber-White robust standard errors), predicting savings and debt at age 42 from agreeableness measured in adolescence. We use poisson models because they account for the positive skew in our outcome variables. Model 1 included agreeableness, income and controls as predictors. Model 2 added the interaction between agreeableness and income. All continuous variables were z-standardized. An inspection of the variance inflation factors (VIF) for the two regression models suggested multi-collinearity was not a cause for concern (Hair et al., 1995).

Results

The main effects of agreeableness in Model 1 were found to be non-significant for savings (B = -0.028, SE = 0.033, z = 0-0.85, p = 0.395), and debt (B = -0.021, SE = 0.038, z = -0.56, p = 0.573). The results of Model 2 are displayed in Table 4 (see Table S7 for univariate correlations).

Insert Table 4 here

Supporting Hypothesis 2, we found a significant interaction effect between agreeableness and income on participants' savings, suggesting that an agreeable personality was associated with lower savings among those with low-incomes but not necessarily those with high-incomes (B =

0.096, SE = 0.034, z = 2.81, *p* = 0.005). Following the approach used in Studies 3-4, we tested the robustness of the interaction effect by excluding all covariates from Model 2. The interaction effect remained statistically significant (B = 0.099, SE = 0.036, *z* = 2.77, *p* = 0.006). We did not find a significant interaction effect between agreeableness and income on debt, suggesting lower levels of agreeableness in adolescence are not related to increased debt in later life at any level of income. Figure 5 illustrates the interaction effects between agreeableness and income on savings.

Insert Figure 5 here

The results of Study 5 provide some preliminary evidence that the relationship between agreeableness and negative financial outcomes may follow a causal path. For low income participants', the level of agreeableness at the age of 16 was related to significantly lower levels of savings 25 years later at the age of 42. Although this design cannot establish causality directly, the ability to observe the temporal order of events makes it more powerful than purely cross-sectional designs (see discussion): Notably, the effects were smaller in magnitude than those found in Studies 1-4. However, given that the predictor of agreeableness was far removed in terms of time from the outcomes (25 years), this is not surprising. Hence, the fact that the effect of agreeableness on savings is still detectable after 25 years supports – rather than undermines – its robustness.

Study 6

Study 6 was aimed at testing whether the results from Studies 3-5 hold when investigated at an aggregated macro level rather than individual micro level.

Method

Procedure.

The research design is based on recent findings suggesting that personality traits are unevenly distributed geographically, with specific traits being more prevalent in some areas compared to others (Jokela, Bleidorn, Lamb, Gosling, & Rentfrow, 2015; Rentfrow, Gosling, & Potter, 2008; Rentfrow, Jokela, & Lamb, 2015). These geographical distributions of personality have been associated with important societal outcomes, including crime rates, political values, employment, health, and mortality (Rentfrow et al., 2008). Using this approach, we tested whether agreeableness, when aggregated across geographic units, was predictive of insolvency rates (e.g., bankruptcy) in that area. Our analysis investigates this relationship across 324 Local Authority Districts (LAD)*,* which are subnational divisions of the UK for the purposes of local government. In our previous studies, the measures we used captured behaviors indicative of financial hardship on the individual or household level. In study 6, by using publicly available data on insolvency rates on the LAD level, we measure the rate of bankruptcies for each of these populations. The study is based on the following logic: Geographic regions with a higher proportion of agreeable people will have a higher geographically-aggregated agreeableness score. Based on the hypothesis that agreeable people will be more likely to engage in negative financial behaviors, when living on a low-income, these higher regional agreeableness scores will be associated with poorer aggregate financial outcomes for poorer geographic areas, as measured by insolvency rates.

Measures and Participants. *Agreeableness.* The agreeableness level of LADs was calculated based on the responses of 332,951 British respondents from 324 LADs (Rentfrow et al., 2015).

The data were collected as part of the '*BBC Big Personality Test*', the same large survey dataset

we used a small subset from in Study 2. The mean age of respondents was 36.09 years (SD = 13.93

years) and 64% of respondents reported to be female. As part of the Survey, participants completed

the Big Five Inventory (BFI, John & Srivastava, 1999) which measures agreeableness with nine

statements such as "I see myself as someone who has a forgiving nature". Using a 5-point Likert-

type rating scale with endpoints at 1 (*Disagree strongly*) and 5 (*Agree strongly*), respondents

indicated the extent to which they agreed with each statement. The scale revealed acceptable

internal reliability (α= 0.77). For each respondent, we determined which LAD they lived in based

on their self-reported postcodes, provided as part of the survey. The sample size of individual

LAD's varied across geographic areas (SD = 709.23), ranging from 167 in Ribble Valley to 5,588

in Leeds. To calculate LAD-level agreeableness scores we first calculated the agreeableness score

of each participant in the dataset by averaging the responses to the nine questions. We subsequently

averaged the agreeableness scores of all participants associated with a particular LAD and z-

standardized across the 324 LADs.

Insolvency Rates. We collected LAD-level insolvency data from the 2010 statistical release issued

by the UK Government insolvencies service, which includes the total number of insolvencies by

geographic unit. There are three forms of insolvency recorded: bankruptcies, Debt Relief Orders

(DROs), and Individual Voluntary Arrangements (IVAs). These are summarized by the UK

Government data release under a comprehensive insolvency measure, which we use as our

dependent variable. Our measure of the insolvency rate for each LAD was calculated as the number

of total insolvencies per 10,000 adults. The average number of insolvencies per 10,000 adults

across the LADs was 30.31 (SD = 8.15). Given the slight positive skew in the distribution of

insolvency rates, we used the square root of this variable in our models.

Gross Income. To calculate the average Annual Gross income for each LAD, we used data from the Annual Survey of Hours and Earnings (ASHE; Office for National Statistics, 2011). ASHE is the most comprehensive source of earnings information in the United Kingdom, based on a 1% sample of employee jobs taken from official government tax records. Data are weighted to UK population totals based on classes defined by occupation, region, age and gender. The average gross annual income for the 324 LADs was £26,609 (SD = £4,149). Given the slight positive skew in the distribution of gross annual income, we used the square root of this variable in our models.

Control variables. Previous research suggests insolvency rates are influenced by socio-demographic variables such as employment status, age, gender and education (Bishop & Gripaios, 2010). To control for these additional variables, we used UK government Census data, collected in 2011 (Office for National Statistics, 2011). For each LAD, we extracted the employment rate (defined as the percentage of economically active residents), the average age, the percentage of female citizens, as well as the population density for that area. We additionally calculated an education index by taking a population-weighted average for the five education levels measured through the census, ranging from 1, representing no formal qualifications, to 5, representing a university degree or higher (e.g., BSc, MA, PhD). See Table S8 for a full description of the education levels. Higher scores indicate a higher overall education level of the population in that LAD. We also calculated a deprivation index using data provided by the Carstairs Index (Carstairs and Morris, 1991), an established measure of deprivation used in spatial epidemiology in the UK (Morgan and Butler, 2006). The index is based on four dimensions measured through the national census: 1) low social class, 2) lack of car ownership, 3) household overcrowding and 4) male unemployment. The data give the relative number of people in one of five deprivation categories (1 = not deprived in any dimension, 5 = deprived on all four dimensions). For each LAD, we

calculated a Deprivation Index as the weighted average of people in the five different categories.

Finally, we controlled for the aggregated scores on the remaining four personality traits in the Five

Factor Model.

Analysis. An important distinction in the analysis of geographic data, as opposed to individual-

level data, is the need to account for spatial dependencies between regions that are geographically

close to one another (e.g. neighboring LADs; Arbia, 2014). Neighboring LADs will be more

similar in terms of demographic population characteristics and socioeconomic factors, and

therefore are also likely to be more similar in their aggregate-level of agreeableness and their

insolvency rates. A failure to account for existing dependencies results in *spatially autocorrelated*

error terms, which violate the assumption of independent residuals (Arbia, 2014). Neighboring

LADs were defined as those which shared borders. The Isle of White, a small island off the south

coast of England, did not share a physical border with any of the remaining LADs, and therefore

we used the closest mainland LAD (New Forest) as the nearest neighbor. We tested for spatial

autocorrelations using Moran's I test (Moran, 1950). This was conducted using the residuals of a

linear regression analysis with LAD insolvency rate as the outcome, and the interaction between

LAD level agreeableness and gross income, as well as control variables as predictors. The Moran's

I test indicated significant autocorrelations ($R = 0.17$; $p < 0.001$). To account for the spatial

dependencies in our data we therefore repeated the analysis using a spatial lag model provided by

the *spdep* package in R (Bivand et al., 2005). Spatial lag models include "lagged" values of the

outcome variable in the regression, that are comparable to autoregressive terms in longitudinal

analyses (Anselin, Bera, Florax, & Yoon, 1996). Applying the spatial lag model resulted in a non-

significant Moran's I test ($R = 0.03$; $p = 0.460$), indicating that the results are no longer biased by

spatial autocorrelations and can therefore be interpreted meaningfully. Similar to the previous studies, Model 1 included agreeableness, income and controls as predictors. Model 2 added the interaction between agreeableness and income. The variance inflation factors (VIFs) for the regression model suggested multi-collinearity may be a cause for concern (Hair et al., 1995). Both our measures of LAD-level education (VIF = 12.68) and deprivation (VIF = 17.50) were highly correlated with other predictors in the model. We re-ran the spatial lag model excluding deprivation, and our focal results remain unchanged (i.e. the interaction between agreeableness and income remained highly significant). An inspection of the VIF statistics, after removing deprivation from the model, showed they were now all within an acceptable range of VIF < 5.

Results

The main effect of LAD-level agreeableness on insolvency rates in Model 1 was found to be non-significant (B = 0.011, SE = 0.034, z = 0.34, p = 0.734). The results of Model 2 are displayed in Table 5 (see Table S9 for univariate correlations). Consistent with Hypothesis 2, we found a significant interaction effect of LAD-level agreeableness and gross income on insolvency rates (B = -0.075, SE = 0.025, z = -3.02, p = 0.003). This suggests that, at the geographic level, higher levels of agreeableness are more strongly associated with higher bankruptcy rates for those living in areas with lower average incomes, compared to those areas populated by wealthier individuals. Similar to Studies 3-5, we tested the robustness of the interaction effect by excluding all covariates from Model 2. While the direction of interaction remained the same, the effect no longer reached significance (B = -0.03, SE = 0.02, z = -1.41, p = 0.160). However, given that the controls we added are important confounds of the effect we are testing, this should be taken as a note of caution rather than evidence against the interaction effect.

Insert Table 5 here

To provide context to these results, we compared two areas with the same low gross annual income of £20,572 (approximately one SD below the mean), but different levels of agreeableness: Middleborough scored about 2.5SDs lower on agreeableness (-1.05) compared to North Devon (1.42). The total number of insolvencies per 10,000 adults in North Devon (38.66) is 50% higher than the insolvency rate of Middleborough (25.69). While this comparison serves as an illustrative example, our regression model predicts a 4% increase in insolvency rates in areas that are one SD higher in agreeableness, and one SD lower in income. Figure 6 illustrates the interaction effect visually.

Insert Figure 6 here

Study 7

The goal of study 7 was to replicate the analysis of study 6 using a different geographic region. We chose to replicate the results in the USA, using county-level data as the unit of analysis. An advantage of the larger number of counties in the U.S. (n = 2,488), compared to local authority districts in the U.K., is that this provides higher statistical power and allows for a more robust test of our hypotheses.

Method

Measures and Participants. *Agreeableness.* The agreeableness level of counties was taken from work published by Obschonka and colleagues (Obschonka, Stuetzer, Rentfrow, Lee, Potter, & Gosling, 2018), who made the aggregate level estimates of personality available to us for the purposes of this study. To guarantee the validity of personality estimates, we only included counties in the analysis for which more than 50 participants had completed the 44-item BFI (John & Srivastava, 1999), resulting in a sample of n = 2,468,897 responses across 2,488 counties.

Insolvency Rates. We collected county-level bankruptcy data from the 2015 statistical release issued by the US Courts service, which includes the total number of insolvencies by county. Our measure of the insolvency rate for each county was calculated as the number of insolvencies per 10,000 adults (including chapter 7, 11, 12 and 13 insolvencies). The average number of insolvencies per 10,000 adults across the counties was 24.91 (SD = 19.22). Given the slight positive skew in the distribution of insolvency rates, we used the square root of this variable in our models.

Income. To calculate the average income for each county in 2015, we used data from the United States Department of Agriculture. The average gross annual income for the 2,488 counties was $50,399 (SD = $13,293). Given the slight positive skew in the distribution of gross annual income, we used the square root of this variable in our models.

Control variables. We use data for 2015 derived from the US Census to extract the same control variables – or close proxies – as in Study 6 (U.S. Census Bureau, 2010). For each county, we extracted the employment rate (defined as the percentage of economically active residents), the average age and the percentage of female citizens. We additionally calculated an education index

by taking a population-weighted average for the four education levels measured through the census (1 = less than high school diploma, 2 = high school diploma, 3 = college or associates degree, 4 = bachelor's degree or higher), such that higher scores indicate a higher overall education level of the population in that county. As a proxy for our deprivation measure used in Study 6, we include the percentage of people living below the poverty line. Population density was approximated by using the percentage of people living in rural areas (reversed density). Finally, we controlled for the aggregated scores on the remaining four personality traits in the Five Factor Model.

Analysis. Following the approach used in Study 6, we first applied Moran's I test to detect spatial dependencies in the most comprehensive model which included agreeableness, income, their two-way interaction and controls. Given that a number of counties were missing, and spatial lag models cannot operate with missing data, it was not possible to define neighbouring counties by shared borders, as we did in Study 6. Instead, we followed an approach suggested by Obschonka and colleagues (Obschonka, Lee, Rodríguez-Pose, Eichstaedt & Ebert, 2018), which defined neighbouring counties as those for which the county centroids are less than 100km apart. For the 59 counties (mostly islands) that were more than 100km away from the next county centroid, we used the closest county as the nearest neighbour. Moran's I test indicated marginally significant autocorrelations ($R = 0.02$; $p = 0.061$). To account for the spatial dependencies in our data we therefore used spatial lag models provided by the *spdep* package in R (Bivand et al., 2005) instead of normal linear regressions (see Methods section of Study 6 for a description of spatial lag models). Applying the spatial lag model resulted in a non-significant Moran's I test ($R = 0.006$; $p = 0.495$), indicating that the results are no longer biased by spatial autocorrelations and can therefore be interpreted meaningfully. Similar to the previous studies, Model 1 included

agreeableness, income and controls as predictors. Model 2 added the interaction between agreeableness and income. The variance inflation factors (VIFs) were all within acceptable ranges, meaning multi-collinearity was not a cause for concern in the model (Hair et al., 1995).

Results

The main effect of county-level agreeableness on insolvency rates in Model 1 was found to be highly significant (B = 0.17, SE = 0.045, z = 3.77, $p < 0.001$). The results of Model 2 are displayed in Table 5 (see Table S10 for univariate correlations). Consistent with Hypothesis 2, we found an interaction effect of county-level agreeableness and gross income on insolvency rates that was marginally significant at alpha = 0.10 (B = -0.060, SE = 0.035, z = -1.72, $p = 0.096$). This suggests that, at the geographic level, higher levels of agreeableness are more strongly associated with higher insolvency rates for those living in areas with lower average incomes, compared to those areas populated by wealthier individuals. The interaction effect remained stable when excluding the covariates from Model 2 (B = -0.067, SE = 0.035, $z = -1.93$, $p = 0.054$).

Insert Table 6 here

General Discussion

Our findings contribute to the growing empirical literature investigating the psychological determinants of financial hardship. Supporting the results of previous research showing a positive association between agreeableness and lower credit scores (Judge, Livingston, & Hurst, 2012), our findings show that this association holds across a wide range of indicators of financial hardship, including savings, debt and insolvency. Our findings further contribute to a better understanding

of this relationship by providing evidence consistent with the hypothesis that this relationship can be explained in part by agreeable people perceiving money to be less important (Hypothesis 1b), but not because they pursue more cooperative negotiation styles (Hypothesis 1a). Finally, our findings also highlight an important boundary condition to this effect. The relationship between agreeableness and negative financial outcomes is more pronounced among low-income individuals (Hypothesis 2).

The outlined results replicate across different samples, measures, and methodologies; including nationally representative survey responses, digital records collected from customer bank accounts, online panels, and government-recorded insolvency rates across geographical areas in both the United States and United Kingdom. While each individual method has specific limitations (e.g., self-reports suffer from response biases, customer bank account records are not representative, aggregated geographical data limit inferences about individual behavior), the consistency of findings across samples provides strong evidence for the robustness of our effects. It is important to note that the personality trait of agreeableness was the only Big Five trait that was consistently related to financial hardship across all seven studies (see Table S11 in the supplementary materials for an overview of the regression coefficients for the remaining traits across studies).

Our findings make contributions to the existing literature in two important ways. We provide what we believe to be the first empirical evidence for the theoretical mechanisms underlying the link between agreeableness and negative financial outcomes (Bernerth et al., 2012; Judge et al., 2012). It has previously been suggested that the trusting and relationship-focused character of more agreeable people will lead them to be poor negotiators and more vulnerable to being exploited by

others. We do not find support for this proposition. Instead, we provide correlational evidence consistent with the hypothesis that the relationship can be explained in part by agreeable people assigning a lower subjective value to money. The precise underlying mechanisms and processes which link agreeableness to a person's subjective evaluation of money and their financial behaviors require further study to elucidate. Future research should include different measures of the subjective value people place on money, such as by using real-choice tasks (e.g., Hardisty, Thompson, & Krantz, 2013), and establish the importance of those mechanisms in an experimental set-up that allows for tests of causality.

In addition, our results also contribute to the growing body of research investigating the interplay of psychological traits and economic characteristics in influencing financial outcomes (Cobb-Clark et al., 2016). Most research on the macro conditions of deprivation tends to neglect the science of the individual, with personality psychology often remaining largely unconnected to the broader body of knowledge studying conditions of economic resources. By following an interactionist perspective that situates the personality of the individual within broader social and economic conditions, we were able to show that an individual's economic circumstances moderate the extent to which psychological traits predict financial health. This finding is in line with previous research showing that more conscientious individuals, for example, accumulate more wealth only when they fall into the lower end of the wealth distribution (Mosca and McCroy, 2016). Similar to the interaction effects between agreeableness and income in our studies, a conscientious predisposition hence had a diminished impact on the financial health of wealthier individuals. As higher-income individuals are likely to receive more generous pension

contributions from their employer, wealth accumulation may become less dependent on active choices for these individuals, which could explain the weaker association with personality.

Our findings are limited by the fact that the majority of the data analyzed were cross-sectional (and exclusively non-experimental). It is therefore difficult to draw conclusions about causality. Our hypotheses suggest that the combination of agreeableness and income leads to negative financial outcomes, but it is also possible that negative financial outcomes in combination with a generally low socio-economic status influence a person's level of agreeableness. Indeed, research suggests that individuals from lower socio-economic categories tend to prioritize community and focus on social relationships when facing a potentially threatening situation (Piff et al., 2012). Low-income individuals who experience financial hardship may feel more dependent on others and change their behavior in a way that makes them more likely to receive support. Study 5 provides some initial support for the direction of the effect through a longitudinal analysis across the lifecycle. Given that participants' financial situation at the age of 42 cannot have influenced their agreeableness level at the age of 16/17, any effects we find cannot be explained by reverse causality. However, as it is still possible that there are confounding variables that influence both participants' personality at the age of 16/17 and their financial situation at the age of 42, the analysis only provides preliminary evidence for the direction of the effect.

An understanding of the psychological and economic predictors of negative financial outcomes is crucial in attempting to protect vulnerable individuals through the design and implementation of targeted interventions and policies. Given that complex psychological phenomena such as financial health are unlikely to be determined by a small number of strong predictors (Matz,

Gladstone & Stillwell, 2017), it is important to identify a variety of contributing factors that together help inform the debate about *who* to focus on and *how* to change behaviour most effectively. While the effects reported in this paper are relatively small on the individual level (e.g. a 1SD increase in agreeableness was associated with a decrease of about £1,600 ($2,200) in savings in Study 1), the results of Studies 6 and 7 demonstrate that seemingly small effects can have sizable societal consequences when considered at scale. For example, in Study 7 a 1SD increase in county-level agreeableness was associated with a 9% increase in insolvencies. Taken together, the results we report provide a deeper understanding of the antecedents of financial hardship, which can have serious implications for the well-being of individuals, as well as society at large. Our findings suggest that being kind and trusting has financial costs, especially for those who do not have the financial means to compensate for their personality predispositions and the attitudes to money associated with it.

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Tables

Table 1. *Overview of studies.*

#	Hypotheses tested	Outcomes	Sample
1	Mediation (H1a/H1b)	Savings, Debt	Online panel (N=636)
2	Mediation (H1b)	Savings	Online panel (N=3,155)
3	Moderation (H2)	Savings, Debt, Default	Representative panel (N=4,170)
4	Moderation (H2)	Default	Objective bank data (N=549)
5	Moderation (H2)	Savings, Debt	Longitudinal cohort study (N=2,429)
6	Moderation (H2)	Default	Aggregated geographic data (N=332,951)
7	Moderation (H2) – Replication of Study 6	Default	Aggregated geographic data (N=2,468,897)

Table 2. *Results of three ordered logistic regression models predicting savings (left), debt (middle) and default (right) in Study 3. * p < 0.05, ** p < 0.01, *** p < 0.001.*

	Savings (df = 3,168)				Debt (df = 3,596)				Default (df = 3,442)			
	B	SE(B)	t	OR	B	SE(B)	t	OR	B	SE(B)	t	OR
Predictors												
AGR	-0.15***	0.035	-4.46	0.86[0.80,0.92]	0.093**	0.036	2.59	1.10[1.02,1.18]	0.072	0.044	1.62	1.07[0.99,1.17]
Income	0.82***	0.040	20.60	2.27[2.10,2.46]	-0.031	0.039	-0.80	0.97[0.90,1.05]	-0.42***	0.051	-8.26	0.65[0.59,0.72]
AGR× Income	0.12***	0.032	3.65	1.12[1.05,1.19]	-0.086*	0.034	-2.52	0.92[0.86,0.98]	-0.13**	0.043	-2.92	0.88[0.81,0.96]
Controls												
Age	0.45***	0.051	8.91	1.57[1.42,1.73]	-0.052	0.051	-1.03	0.95[0.86,1.05]	-0.45***	0.060	-7.47	0.64[0.57,0.72]
Gender	-0.15*	0.070	-2.21	0.86[0.75,0.98]	-0.15*	0.073	-2.08	0.86[0.74,0.99]	0.038	0.089	0.43	1.04[0.87,1.24]
Children												
Yes	0.50***	0.078	6.51	1.66[1.42,1.93]	-0.60***	0.079	-7.60	0.55[0.47,0.64]	-0.48***	0.089	-5.39	0.62[0.52,0.74]
Education												
High School	0.27	0.24	1.09	1.31[0.81,2.11]	-0.018	0.23	-0.08	0.98[0.63,1.54]	-0.042	0.25	-0.17	0.96[0.58,1.57]
University	0.63*	0.25	2.55	1.88[1.16,3.05]	-0.18	0.23	-0.76	0.84[0.53,1.32]	-0.21	0.26	-0.82	0.81[0.49,1.34]
Higher degree	0.85**	0.26	3.28	2.34[1.41,3.88]	-0.43	0.25	-1.75	0.65[0.40,1.05]	-0.26	0.28	-0.95	0.77[0.45,1.32]
Work Status												
Full-time	0.27**	0.10	2.61	1.31[1.07,1.61]	0.57***	0.10	5.43	1.77[1.44,2.17]	0.10	0.12	0.82	1.10[0.87,1.39]
Part-time	0.73***	0.11	6.52	2.08[1.67,2.59]	0.12	0.11	1.10	1.13[0.91,1.41]	-0.15	0.13	-1.19	0.86[0.67,1.10]
Retired	1.46***	0.13	11.63	4.31[3.37,5.51]	-0.41**	0.13	-3.26	0.66[0.52,0.85]	-0.64***	0.16	-3.96	0.53[0.38,0.72]
Openness	0.048	0.034	1.43	1.05[0.98,1.12]	0.023	0.035	0.66	1.02[0.96,1.10]	0.11*	0.043	2.51	1.11[1.02,1.21]
Conscientious.	0.038	0.035	1.08	1.04[0.97,1.11]	-0.11**	0.036	-3.11	0.89[0.83,0.96]	-0.11*	0.044	-2.57	0.89[0.82,0.97]
Extroversion	-0.11**	0.035	-3.19	0.89[0.83,0.96]	0.09*	0.037	2.51	1.1[1.02,1.18]	0.15**	0.046	3.39	1.17[1.07,1.28]
Neuroticism	-0.11**	0.035	-3.03	0.90[0.84,0.96]	0.18***	0.037	4.79	1.19[1.11,1.28]	0.21***	0.045	4.61	1.23[1.13,1.35]

Note. AGR = Agreeableness. Note. OR = Odds Ratios. The reference category for gender is 'Male'. The reference category for education is 'No education/Primary education'. The reference category for work status is 'Unemployed'.

Table 3. *Results of ordered logistic regression analyses predicting the presence of negative financial outcomes from agreeableness and control variables in Study 4. * p < 0.05, ** p < 0.01, *** p < 0.001.*

	Insolvency Indicator (df = 539)			
	B	SE(B)	t	OR
Predictors				
Agreeableness	0.24*	0.10	2.45	1.27[1.05,1.55]
Income	-0.035	0.10	-0.35	0.97[0.80,1.17]
Agreeableness × Income	-0.23*	0.10	-2.42	0.79[0.65,0.96]
Controls				
Age	0.036	0.12	0.31	1.04 [0.82,1.31]
Gender	0.16	0.20	0.83	1.18 [0.80,1.73]
Children	-0.08	0.09	-0.83	0.93[0.76,1.10]
Work Status				
Employed	-0.11	0.31	-0.37	0.89[0.49,1.65]
Retired	-1.74**	0.60	-2.89	0.18[0.05,0.54]
Student	-1.54*	0.71	-2.16	0.21[0.04,0.78]
Openness	-0.10	0.10	-1.00	0.91[0.75,1.10]
Conscientiousness	0.14	0.10	1.35	1.15[0.94,1.41]
Extroversion	-0.09	0.10	-0.90	0.91[0.75,1.11]
Neuroticism	0.048	0.10	0.46	1.05[0.85,1.29]

Note. The reference Category for Gender is Male. The Reference Category for employment categories is "Unemployed".

Table 4. *Results of two poisson regression analyses (with Huber-White robust standard errors) predicting savings (left), and debt (right) in Study 5.* [1] *p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.*

	Savings (df = 1,973)				Debt (df = 2,251)			
	B	SE(B)	t	IRR	B	SE(B)	t	IRR
Predictors								
Agreeableness	0.054	0.034	-1.60	0.95	-0.023	0.038	-0.60	0.98
Income	0.37***	0.041	9.16	1.45	0.058	0.035	1.66	1.06
Agreeableness × Income	0.096**	0.034	2.81	1.10	0.023	0.033	0.71	1.02
Controls								
Gender	-0.11	0.071	-1.59	0.89	0.052	0.075	0.69	1.05
Children								
Yes	-0.41***	0.072	-5.65	0.66	0.17	0.091	1.83	1.18
Education	0.18***	0.028	6.28	1.19	-0.079*	0.037	-2.14	0.92
Work Status								
Full-time	-0.23	0.12	-1.88	0.79	0.47**	0.15	3.14	1.60
Part-time	-0.027	0.13	-0.21	0.97	-0.11	0.16	-0.73	0.89
Student	-1.41**	0.46	-3.08	0.24	0.79*	0.35	2.27	2.21
Conscientiousness	-0.020	0.033	-0.60	0.98	-0.009	0.037	-0.23	0.99
Extroversion	0.045	0.031	1.49	1.05	-0.046	0.033	-1.41	0.95
Neuroticism	0.042	0.030	1.43	1.04	-0.006	0.034	-0.18	0.99

Note. The reference Category for Gender is Male. The Reference Category for employment categories is "Not currently employed". IRR = Incident Rate Ratio (= EXP(B)).

Table 5. *Spatial Lag Model predicting the square root of the total number of insolvencies (per 10,000 adults) on LAD-level in Study 6. [†] p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.*

	Insolvency Rates (df = 314)		
	B	SE	z
Predictors			
Agreeableness	0.019	0.034	0.55
Gross Income	-0.24***	0.046	-5.30
Agreeableness × Gross Income	-0.075**	0.025	-3.02
Controls			
Employment	0.075	0.048	1.55
Deprivation Index	-0.086	0.11	-0.81
Population Density	-0.023	0.068	-0.33
Age	-0.050	0.056	-0.89
Percent Female	0.007	0.031	0.21
Education Index	-0.36***	0.091	-3.93
Openness	0.031	0.046	0.68
Conscientiousness	0.041	0.044	0.94
Extroversion	-0.046	0.036	-1.28
Neuroticism	0.004	0.037	0.09
Spatial Lag (Rho)	0.30***	0.056	5.28

Table 6. *Spatial Lag Model predicting the square root of the total number of insolvencies (per 10,000 adults) on county-level in Study 7. ¹ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.*

	Insolvency Rates (df = 2,473)		
	B	SE	z
Predictors			
Agreeableness	0.15**	0.047	3.09
Gross Income	0.05	0.069	-0.79
Agreeableness × Gross Income	-0.60¹	0.035	-1.72
Controls			
Employment	-0.32***	0.059	-5.50
Poverty Rate	-0.22**	0.073	-3.00
Percent Rural	-0.059	0.041	-1.41
Age	-0.15**	0.045	-3.26
Percent Female	0.34***	0.035	9.60
Education Index	-0.27***	0.053	-5.16
Openness	-0.076*	0.037	-2.07
Conscientiousness	0.28***	0.042	6.73
Extroversion	0.058¹	0.034	1.71
Neuroticism	0.13**	0.040	3.26
Spatial Lag (Rho)	0.050	0.038	1.31

Figures
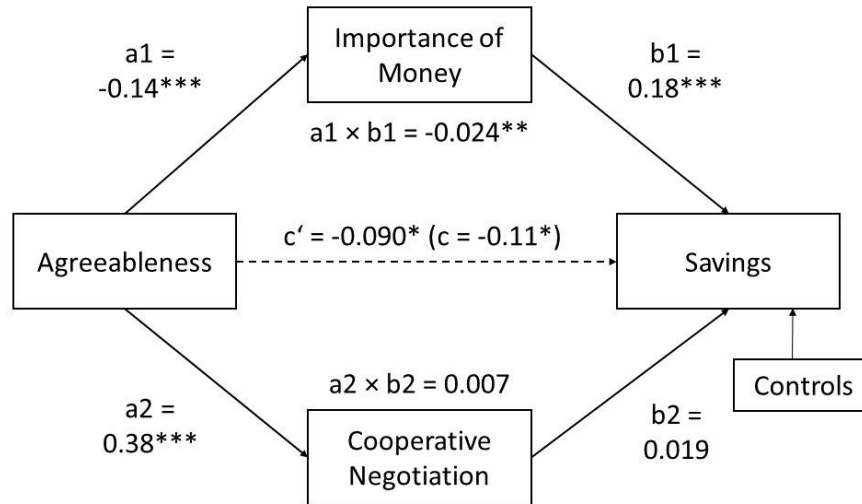
Figure 1. Results of a path model testing the mediating effect of "Importance of Money" and "Cooperative Negotiation Style" on the relationship between agreeableness and savings in Study 1.
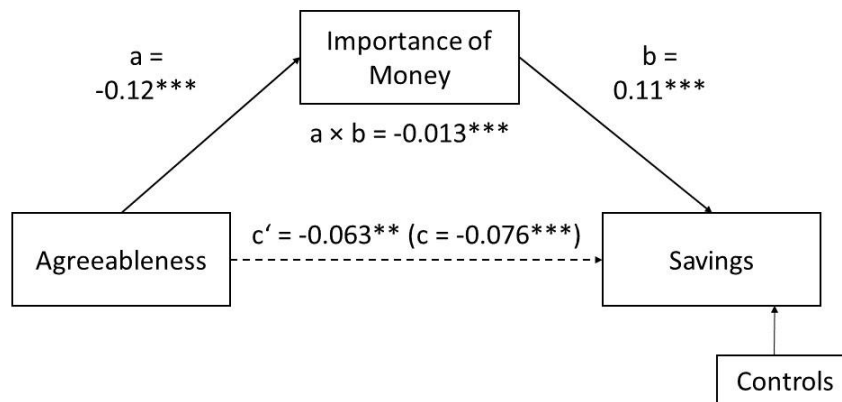

Figure 2. Results of path model testing the mediating effect of "Importance of Money" on the relationship between agreeableness and savings in Study 2.
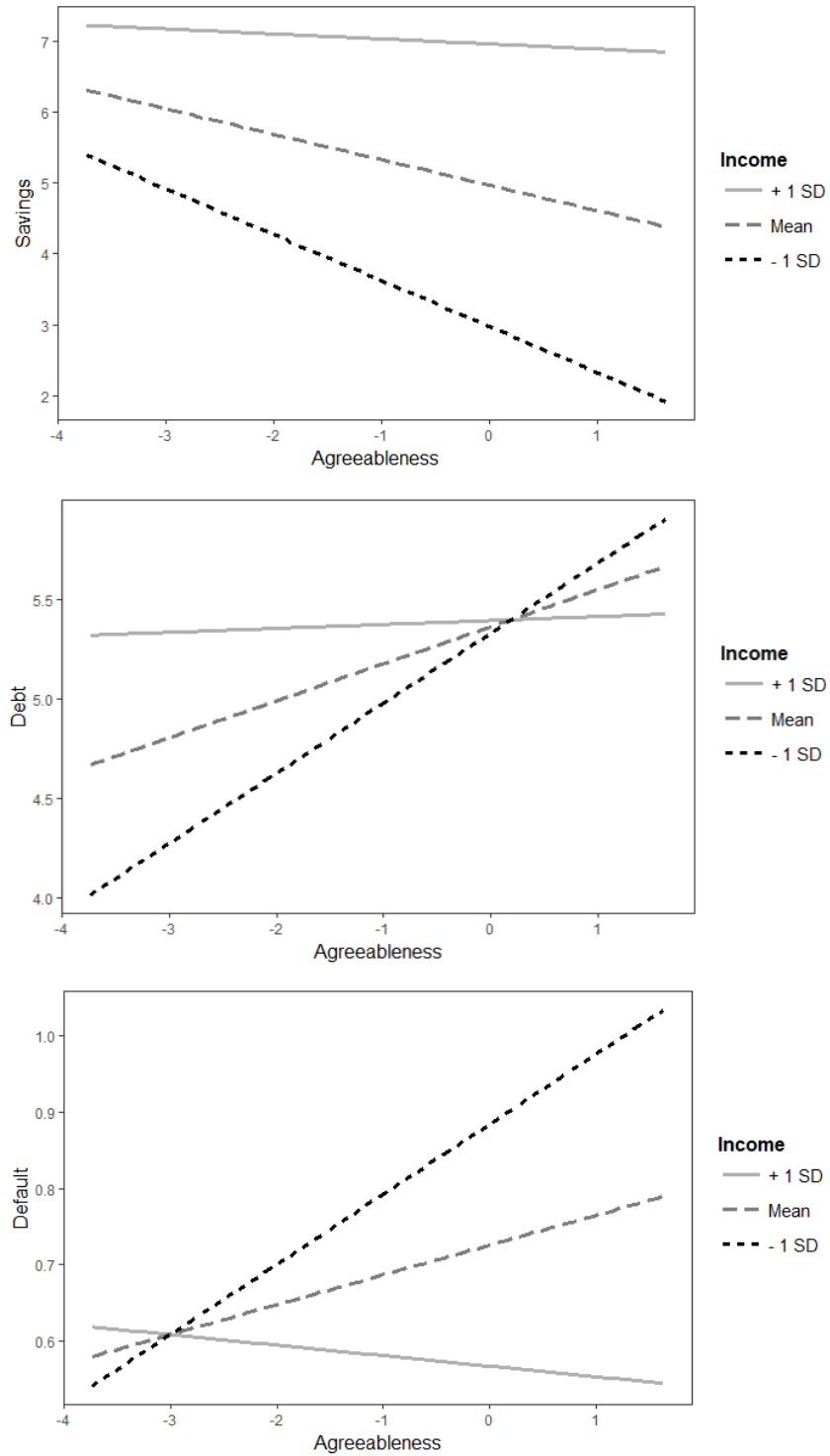
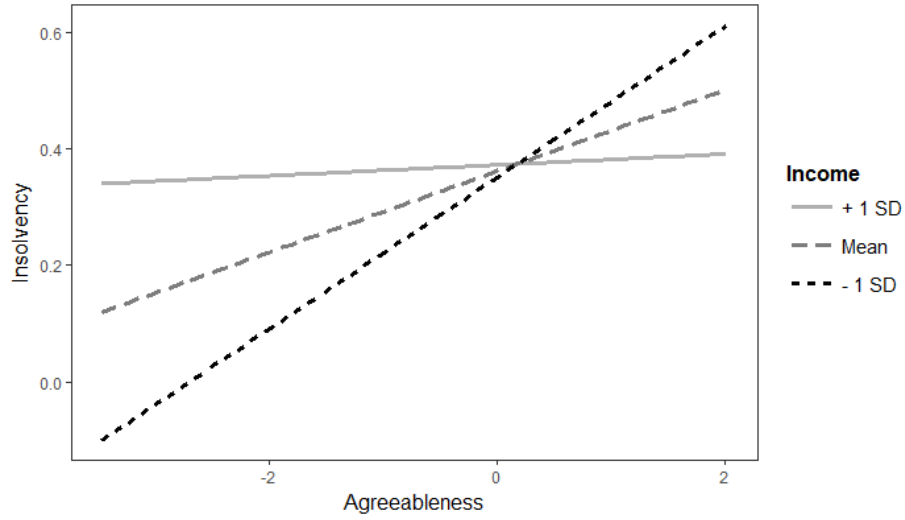*Figure 3.* Interaction effects of Agreeableness and Income on savings (top), debt (middle) and default (bottom) in Study 3.

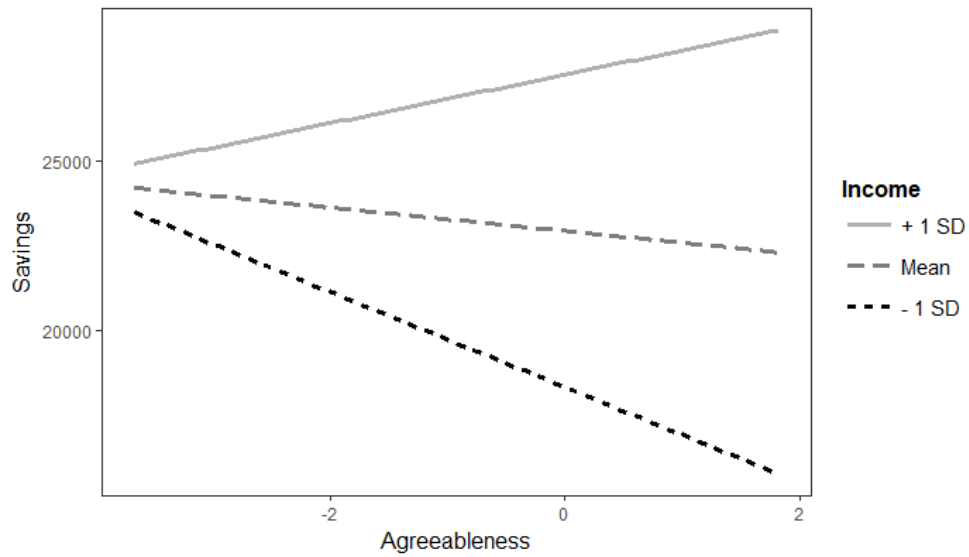*Figure 4.* Interaction effects of Agreeableness and Income on the Insolvency Indicator in Study 4.

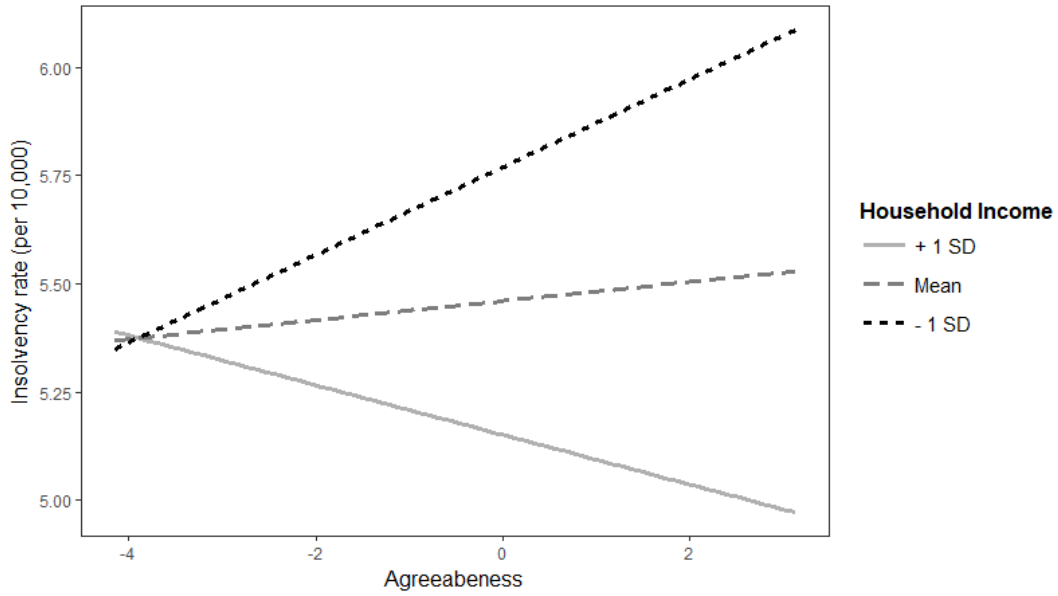*Figure 5.* Interaction effects of Agreeableness and Income on Savings in Study 5.

Figure 6. Interaction of Agreeableness and Gross Annual Household Income in Study 6.
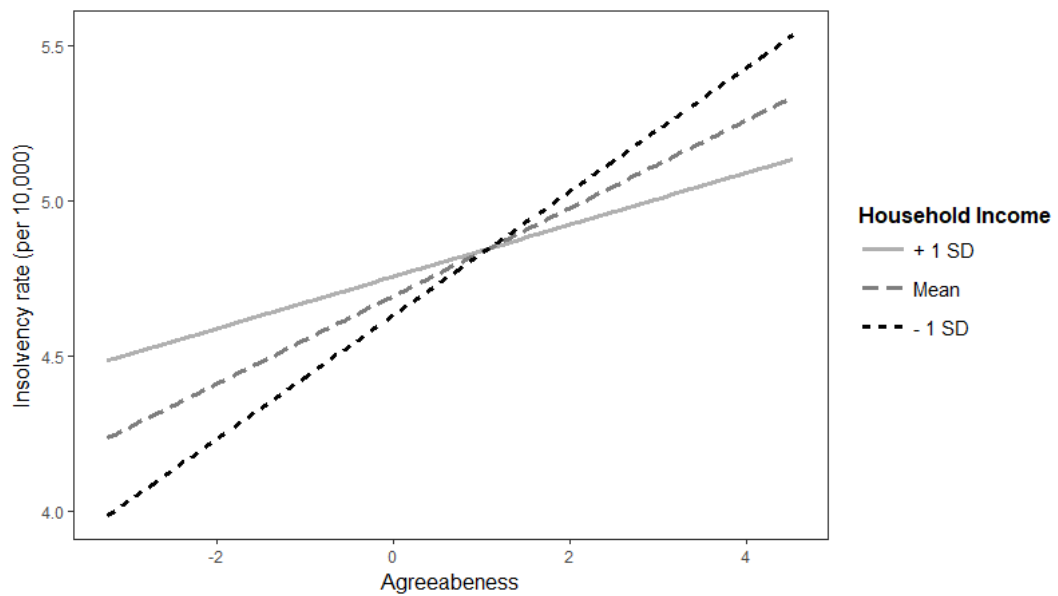

Figure 7. Interaction of Agreeableness and Gross Annual Household Income in Study 7.