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## Important Correlates of Purpose in Life in a Diverse Population-Based Cohort: a Machine Learning Approach

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### Abstract

**Background:** Purpose-in-life (PiL) refers to the tendency to derive meaning and purpose from daily life experiences. Individuals with higher PiL were more likely to have better physical, mental, and cognitive health in prospective studies. Here, we aimed to identify important correlates of PiL among people of diverse backgrounds.

**Methods:** Participants were recruited by the population-based Health and Retirement Study and provided information on 34 different sociodemographic and psychosocial factors through psychometrically validated measures. To identify important correlates of PiL, we employed regularized regression implemented by Elastic Net on the entire cohort as well as among self-identified Black participants only and White participants only, respectively.

**Results:** A total of 6620 participants were included in this study, among whom 913 were Black and 5707 were White. We identified 12 and 23 important sociodemographic and psychosocial correlates of PiL among Black and White participants, respectively. Notably, all the 12 correlates in Black participants were also correlates among White participants. Interestingly, when we examined both Black and White participants together, being Black was associated with having higher PiL. The correlates with the largest effect on PiL that were shared among Black and White participants were hopelessness, perceived constraint on personal control, and self-mastery.

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#### Author Contribution

Rishab Bhatt conducted the analysis and drafted the manuscript. Adriana Lori, Jiaqi Liu, and Mei Zhen helped with the analysis. Dr. Aliza Wingo and Dr. Thomas Wingo conceptualized the study, supervise the statistical modelling, and critically edited the manuscript. All authors edited and reviewed the manuscript.

#### Conflict of Interest

The authors of this manuscript have no conflicts of interest to report for this manuscript.

**Conclusion:** Several sociodemographic and psychosocial factors most strongly associated with PiL were shared among Black and White participants. Future studies should investigate whether interventions targeting correlates of PiL can lead to higher sense of life purpose in participants of diverse backgrounds.

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## Introduction

Purpose-in-Life (PiL) is a dimension of eudaemonic well-being that reflects an individual's motivations and sustained intentionality through life's dynamic and difficult trials<sup>1,2</sup>. PiL is associated with better physical, mental, and cognitive health<sup>3-7</sup> and lower mortality rate<sup>8</sup>. The associations of PiL with these outcomes were seen across different socioeconomic statuses<sup>8</sup>, making it an important and intriguing psychological construct that could be targeted to improve public health in general and the quality of life for individuals facing chronic disease<sup>9</sup> and disabilities<sup>10</sup> in particular.

Prior studies have investigated the most important correlates of PiL to better understand why it is strongly associated with positive health outcomes. Using national cohorts, several studies have enumerated factors such as having more relatives and frequent positive affect as associated with enhanced PiL<sup>11</sup>. They have also demonstrated the inverse relationship between hopelessness, loneliness, and anxiety, respectively, and PiL among adult female nurses in the Nurses Health Study<sup>11</sup>. Recently, using a machine learning approach, we have shown the strong correlates of PiL in older adults recruited by the Rush Memory and Aging Project<sup>12</sup>, which corroborated findings from earlier studies and identified novel ones.

To date, many studies of the important correlates of PiL have focused on self-identified White individuals. There is a pressing need to expand the study of PiL into other racial and ethnic groups given the protective effects PiL has on cognitive decline<sup>13</sup> and midlife physical health<sup>14</sup>. Self-identified Black individuals face different social experiences compared to White individuals, including racial discrimination and other social experiences. Examining other components of psychological wellbeing beyond PiL has shown that institutional discrimination profoundly impacts self-acceptance and mental health stability in African Americans<sup>15</sup>. Racial discrimination was also strongly correlated with suicidal ideation, with PiL serving as a key mediator in this relationship<sup>16</sup>. Furthermore, higher levels of discrimination have diminished eudemonic wellbeing in African Americans, especially in African American women<sup>17</sup>. This makes it imperative to understand the underlying correlates of PiL in order to mitigate mental health inequities among African Americans.

Here, we aimed to identify the important correlates of PiL among older Blacks/African Americans enrolled in the Health and Retirement Study (HRS). This unique population-based sample of the U.S. provides an opportunity to understand what factors may be unique and shared between Black and White participants with regard to PiL. The HRS provides a rich set of psychosocial variables for examination, including social life, discrimination, living environments and psychological factors. We used Elastic Net, a machine learning approach, to isolate the most significant correlates of PiL, referred to as robust correlates, among numerous potential factors for Black and White individuals separately and together.

## Methods

### Health and Retirement Study (HRS)

The Health and Retirement Study (HRS) is a longitudinal population-based cohort study with households participating in biennial psychosocial survey. The HRS is sponsored by the National Institute on Aging (grant number NIA U01AG009740) and is conducted by the University of Michigan<sup>18</sup>. In this analysis, data were merged across the survey iterations from 2006 to 2012, resulting in a total of 6620 participants to be included in this study. Among these, 5707 were Whites and 913 were Blacks.

**Demographics**—Demographic factors such as employment status, race, and sex were treated as dichotomous variables. Marital Status was dichotomously constructed, by joining divorced, separated, and widowed, while maintaining married/partnered as one category. Family income was treated as continuous. We performed winsorization for outlier incomes (greater than \$1,000,000 a year) and Yeo Johnson Transformation on the continuous variables to improve their normality. Education was treated as categorical, re-leveled as participants with high school education and below, some college, and beyond college.

**Psychosocial Variables**—All variables were scored by averaging across the scale's items, unless otherwise indicated. Different variables had different missingness thresholds, which were discussed in each following respective subsection<sup>19</sup>. Furthermore, unless otherwise indicated, all questions were coded in a Likert scale, with 1= Strongly Disagree, 2 = Somewhat Disagree, 3 = Slightly Disagree, 4 = Slightly agree, 5 = Somewhat agree, 6 = Strongly agree. After calculating the mean score, unless otherwise specified, all the psychosocial variables that did not have a normal distribution after Yeo Johnson Transformation were median dichotomized.

**Purpose-in-Life:** Using the Ryff scales, participants responded to 7 questions pertaining to PiL<sup>20,21</sup>. The aggregate score was computed by averaging the responses, some of which were reverse-coded, to ensure that a higher score corresponded with greater PiL. Participants needed to respond to a minimum of 4 items within the scale to be included in the study, as specified by the HRS data manual.

*Optimism* and *Pessimism* were evaluated using the revised Life Orientation Test (a six-item scale), with 3-item scale each for pessimism and optimism (pessimism and optimism are different constructs, and analyzed separately)<sup>22</sup>. Scores were calculated using an average, and participants with more than one missing answer in a question set were excluded. A higher optimism score reflects greater optimism, while a greater pessimism value indicated greater pessimism. The optimism and pessimism questions center around how frequently individuals anticipate positive events occurring in their lives and how much they trust it will occur in the future.

*Cynicism* was assessed through the 5-item Cook-Medley Hostility Inventory and participants with 4 missing responses were excluded from the analysis. A higher cynicism score reflects greater cynicism<sup>23</sup>. Cynicism questions ask participants whether they believe if people have genuine or hidden motives in helping others as well as if the motives are ethical.

*Hopelessness* was evaluated through a combined Everson and Beck scales, a four-item questionnaire. Participants with three missing responses were excluded from the analysis. Higher hopelessness score should be interpreted as an augmented degree of hopelessness in an individual's life<sup>24,25</sup>. Hopelessness evaluates if participants believe their circumstances will change for the better and if their efforts in life will materialize towards achieving their life goals.

*Loneliness* was evaluated with a 11-item Revised UCLA Loneliness scale. Participants that responded to at least six questions were included. A higher loneliness score indicated more loneliness<sup>26,27</sup>. Loneliness assesses if participants feel connected with companions, friends, or if they feel socially isolated altogether.

*Anxiety* was assessed with the 5-item Beck Anxiety Inventory and we included participants who responded to at least 3 items. This variable did not employ the Likert scale, with a discrete scale of "Never" (1), "Hardly Ever" (2), "Some of the time" (3), "Most of the time" (4). A higher score indicates a greater level of anxiety<sup>28,29</sup>. Anxiety measures if patients felt a fear of death, fainting sensation or trembling (more broadly a change in physiological behavior), and/or nervousness.

*State and Trait Anger* were evaluated through the Spielberg Anger Expression Scale (STAX), which participants responded through another 4-item scale "Almost Never" (1), "Sometimes" (2), "Often" (3), and "Almost Always" (4)<sup>30</sup>. Aggregate scores were taken by averaging across questions, with state and trait anger mandating at least two and four responses to their question sets, respectively. In contrast to state anger, which was median dichotomized, trait anger was a continuous variable undergoing Yeo Johnson transformation. State Anger evaluates if participants outwardly express their anger through arguments or outbursts. On the other hand, trait anger determines if participants inwardly manage their anger and limiting other people's perception of how angry they truly are.

*Neighborhood Disorder and Social Cohesion* were reported by participants through a 7-item Likert Scale<sup>31</sup>. Three questions for the Neighborhood Disorder were reverse-coded to ensure the compatibility of data from 2006 and subsequent waves. We included participants that answered a minimum of 2 items out of a 4-question set. These themes evaluate neighborhood safety, cleanliness, vandalism, and occupancy of adjacent homes and living complexes.

*Spirituality* was assessed with a 4-item questionnaire. Participants needed to answer at least 2 questions out of the 4-question set to be included<sup>32</sup>. Spirituality assesses themes such as belief in God, how religious beliefs affect perceptions of life domains, and if they find their religion uplifting or empowering.

**Perceived Everyday Discrimination:** Participants answered six questions about the frequency with which they experience discrimination<sup>33</sup>. Using a 6-point scale, participants chose responses from "Almost every day" (1), "At least once a week" (2), "A few times a month" (3), "A few times a year" (4), "Less than once a year" (5), and "Never" (6). Prior to averaging, responses were reverse-coded, thus, higher score indicating

more perceived discrimination. Perceived discrimination determines if participants feel institutional level discrimination at healthcare settings, restaurants, harassment, and other forms of stereotyping.

**Perceived Social Status and Change in Social Status:** The former was measured with the Cantril Ladder, where participants indicated their perceived position between 1 and 10, with 10 as the highest status<sup>34</sup>. Social Status was treated as a continuous variable after Yeo-Johnson transformation. In contrast, change in social status was recoded to ensure that “a drop in status”, “no change in status”, and “an increase in status” were three different categories.

**Perceived Constraint on Personal Control and Self Mastery:** Both were assessed using 5-item questionnaires<sup>35,36</sup>. For both variables, participants were required to have responses to at least two of the five questions, and higher scores indicated greater perceived constraint and/or greater self-mastery. Perceived constraint gauged participants beliefs in overcoming life problems and if they believe they have concrete control on the life events they experience. Self-Mastery measured if they had self-belief in their success, ability to overcome major life challenges, and overall control of their life.

*Perceived Control Over Health, Finances, and Social/Work Life* were assessed through a one-item questionnaire adapted from Lachman et. al. Although the 2006 questionnaire’s phrasing asked about work life, due to its similarity to social life, these questions were treated as equivalent across years. Each of these questions were scored by participants using a discrete scale ranging from 0 to 10, with 0 representing “no control” and 10 signifying “very much control”<sup>37</sup>. Perceived Financial Control was treated as a continuous variable after applying Yeo-Johnson transformation. All questions were phrased to ask about if the participants could control elements in their health, financial, and social lives.

*Positive and Negative Affect* were evaluated by the MIDUS<sup>38</sup> (2006) and PANAS-X<sup>39</sup> scales (2008–2016). The affect questions asked participants about the level of specific emotions they had experienced within the past month. Participants were required to respond to at least 50% of the question components to be included. All questions were reversed-coded prior to computing the average. The affect scales used a discrete scale ranging from 1 to 5 to code for patient’s frequency in experience a certain emotion, with 1 = Very much, 2 = Quite a bit, 3 = Moderately, 4 = A little, 5 = Not at all. Higher scores indicate more positive affect or less negative affect, respectively. Overall, these themes evaluated the magnitude with which participants experienced emotions such as sadness, hostility, calmness, excitement, etc.

*Satisfaction with Personal Financial Situation* was assessed with a single question that indicates a participant’s satisfaction with their financial circumstances<sup>40</sup>. It was based on a scale of “Completely satisfied” (1), “Very satisfied” (2), “Somewhat satisfied” (3), “Not very satisfied” (4), and “Not at all satisfied” (5). Responses were reverse-coded to ensure that a higher score reflected greater satisfaction.

**Financial Strain:** participants indicated the level of financial strain experienced by self or their family members as “Not at all difficult” (1), “Not very difficult” (2), “Somewhat

difficult” (3), “Very difficult” (4), and “Completely difficult” (5)<sup>41</sup>. The greater the score, implied participants experienced more financial strain. Financial strain determined if participants were able to meet monthly bill expectations.

**Chronic Stress:** Study participants responded to 8 questions about their perception of stressful life events through a four-item Likert scale, “No, didn’t happen” (1), “Yes, but not upsetting” (2), “Yes, somewhat upsetting” (3), and “Yes, very upsetting” (4)<sup>42</sup>. It was treated as a continuous variable, with higher scores indicating more chronic stress. Chronic stress inquired about the sources of stressors, such as housing, finances, substance abuse, and familial relationships.

## Statistical Analysis

We performed Spearman correlation in each dataset (All participants, White participants, or Black participants) to examine pair-wise correlations between pairs of these psychosocial variables. Multiple testing was addressed with Bonferroni correction (adjusting for 435 tests within each data matrix) and only significant correlations were plotted in the heatmaps.

We used Elastic Net, a machine learning algorithm combining Ridge and LASSO, to identify important correlates of PiL using all sociodemographic and psychological variables described above. For Elastic Net, participants needed to have complete data for all the sociodemographic and psychosocial variables to be included in the analysis. We performed Elastic Net in both White and Black/African American participants (referred to as “All model”), in White participants only, and in Black/African American participants only, respectively. Thus, a total of three Elastic Net models were created. The continuous variables were either normalized or median dichotomized within each group of participants (White and Black participants; White participants only; Black participants only) independently before performing Elastic Net following its algorithm. We also standardized all predictor variables to provide the standardized coefficients for each of the Elastic Net models. Elastic Net algorithm randomly partitioned the dataset into a 2:1 ratio for training and testing. Subsequently, Elastic Net iteratively sought the most optimal penalty factor that resulted in the lowest mean squared error, through a 10-fold cross validation. To better interpret the results from the Elastic Net and Spearman correlations, similarly themed psychosocial variables were clustered into categories. These categories included Demographics, Negative Outlook, Positive Outlook, Societal Effects, Perceived Control, and Hardships.

## Results

### Participant Characteristics

In total, our study includes 6620 people, with 913 Black and 5707 White participants, respectively. Most of the cohort were females, comprising 63.4% and 55.3% of respondents in Black and White participants correspondingly. The median income for Black participants was \$29,594 compared with \$49,612 for White participants (Table 1). Additional demographic information about the cohort can be found in Table 1.

## Spearman Correlation Analysis

Across the three datasets (all participants; White participants only; Black participants only), the majority of pairwise correlations were statistically significant after Bonferroni adjustment for multiple testing. Factors such as spirituality, financial strain, and chronic stress were strongly correlated with PiL among all participants (Figure 1) and among White participants (Figure 2). In both Figures 1 and 2, hopelessness was most strongly associated with PiL ( $R = 0.4$ ). Among Black participants specifically (Figure 3), higher levels of financial control were associated with improved control over health, as well as higher income leading to augmented employment status and companionship ( $R = 0.4$ ). In Blacks, pessimism and hopelessness also had a high paired association. Within Black participants, chronic stress and employment status were correlated with PiL (Figure 3), but there were no known associations involving PiL with  $R = 0.4$ . Given the statistically significant effect of several moderately impactful correlates among African Americans, Elastic Net was crucial to prioritizing the most salient factors that defined PiL in each group of participants.

## Elastic Net results

**Both Black and White participants**—We found 24 significant correlates for PiL, out of a total 34 variables, among both White and Black participants (Table 2). The five correlates with the highest magnitudes for association with PiL include hopelessness, perceived constraint on personal control, race, self-mastery, and optimism. Being Black, having greater self-mastery, and higher optimism was each associated with higher PiL. Conversely, lower levels of hopelessness and perceived constraint on personal control was each associated with a higher sense of PiL. Considering thematic categories, the majority of factors from Perceived Control and Demographics, and all the Negative and Positive Outlook factors are important correlates of PiL.

**Black participants only**—In Black participants, among the 34 variables, 12 were considered important correlates for PiL by Elastic Net (Table 3). Correlates of lower PiL included lower income, lower than high-school education, frequent experience of negative affect, anxiety, loneliness, and hopelessness. Correlates of higher PiL were optimism, frequent experience of positive affect, perceived control over social life, perceived financial control, perceived constraint on personal control, and self-mastery. We found that the five most influential correlates of PiL in Black participants were hopelessness, perceived constraint on personal control, self-mastery, positive affect, and optimism (Table 3).

**White participants only**—Among White participants only, 23 among 34 variables had significant effects on PiL (Table 4). These consisted of college education, income, lower than high school education, marital and employment statuses, negative affect, anxiety, trait anger, cynicism, negative affect, pessimism, loneliness, hopelessness, optimism, positive affect, perceived everyday discrimination, spirituality, perceived social status, neighborhood disorder, perceived control over social life, perceived financial control, perceived control over one's health, self-mastery, and perceived constraint on personal control. The five most important correlates of PiL in White participants are hopelessness, perceived constraint on personal control, self-mastery, loneliness, and pessimism (Table 4).



## Discussion

Despite the heightened racial discrimination African Americans face, our Elastic Net model shows that a higher PiL was associated with being Black. Furthermore, the important PiL correlates identified in Black participants were shared with those of the White participants. Notably, factors such as perceived everyday discrimination, neighborhood disorder, and social status were not robust correlates for PiL in Black participants (Table 3). These results corroborated previous findings of greater resilience and optimism among Blacks and Hispanics experiencing financial and health inequities both prior and subsequent to the pandemic<sup>43</sup>. These published studies show that while disparities affected life opportunities and overall life quality, the Black participants exhibited higher levels of resilience<sup>44</sup>. Higher level of resilience has been linked to improved meaning in life<sup>45</sup>. In support of these findings, our findings suggest that while it may have been previously believed that sociodemographic factors were the most important determinants of PiL and mental health, intrinsic qualities such as hope can be equally significant. Our studies show that hopelessness, perceived constraint on personal control, and self-mastery are among the top five most robust correlates of PiL in both Black and White participants. Ultimately, given that the majority of important correlates of PiL are shared among participants of different races, strategies that can enhance self-mastery or decrease a sense of hopelessness or perceived constraint on personal control, among other factors identified above, can serve as potential promising interventions to enhance PiL, which is associated with better physical, mental and cognitive health across diverse populations and social identities<sup>3-7</sup>. Moreover, our analysis shows that self-mastery is the most influential factor associated with PiL and can be a target for intervention since African American have lower levels of self-mastery relative to Whites among men with 60–84 years old<sup>46</sup>.

The use of Elastic Net allows us to implement optimal regression models to filter out psychosocial correlates that have weak correlations or act as mediators. By focusing on the most important associations, these models provide a clearer insight into complex interactions across demographics and societal effects. Nonetheless, Elastic Net remains a model that determines associations rather than causal connections. Additionally, due to the smaller sample size of Black participants, there was less power to detect robust correlates of PiL than among White participants. Future studies with larger sample sizes are likely to detect other important factors associated with PiL in Blacks. Equally, due to sample size constraints, our study was unable to include information on health and disability status, which are known to have correlations with PiL and protect against mobility disabilities<sup>47</sup>. Finally, as a cross-sectional study, this study is limited in its ability to determine longitudinal and long-term effects of these predictors on PiL.

To our knowledge, this is the first study to evaluate a PiL in a diverse population cohort using Machine Learning approach. Similar to a previous study of PiL using machine learning approach in an older community-based cohort, this study also highlights loneliness as a substantial negative influence on an individual's PiL<sup>12</sup>. However, this study also demonstrates that when considering additional personality traits and social circumstances, self-mastery is significantly associated with PiL. Equally, to the best of our knowledge, this study is also the first to show hopelessness and perceived constraint on personal control

as leading detrimental correlates of PiL. Furthermore, in contrast to previous studies, this study uniquely examined a rich array of 35 factors across demographic, personality trait, social, and psychological categories, strengthening its generalizability about significant associations. Ultimately, while the current literature has provided insights into important factors associated with PiL among White participants, this study fills a crucial knowledge gap in identifying the significant correlates of PiL among Blacks.

## Conclusion

Our approach using machine learning empirically shows and enumerates several shared factors that are substantially associated with PiL among Blacks and Whites. The correlates of PiL across both ethnicities may be targeted to help improve psychological and physical health outcomes for persons of diverse backgrounds.

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## Data Statement

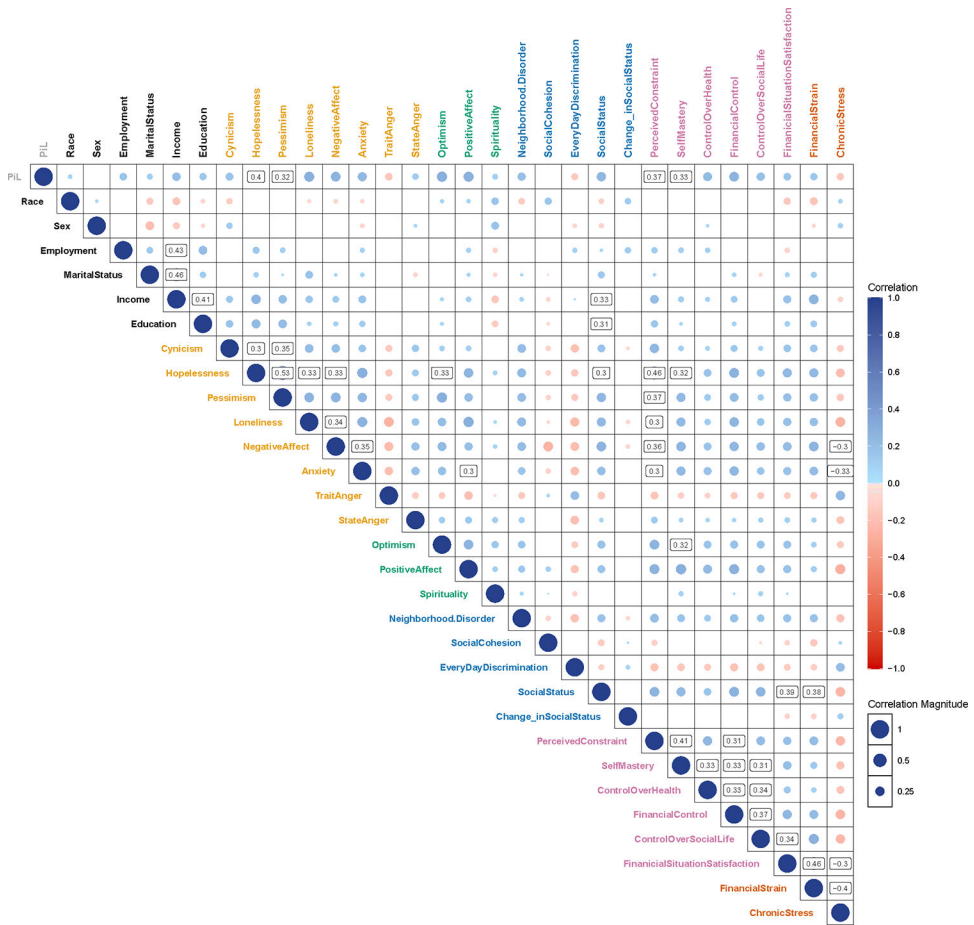
The data were previously presented as a poster at the Atlanta VA Research Day on 5/19/2022.

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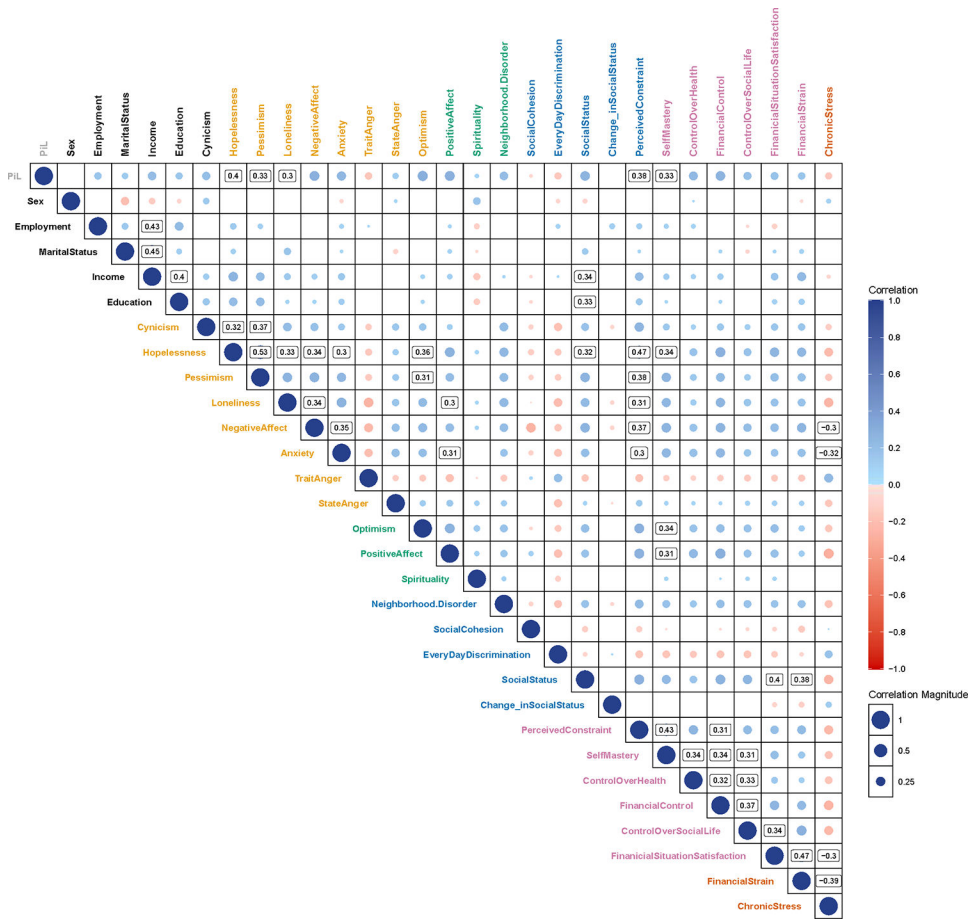
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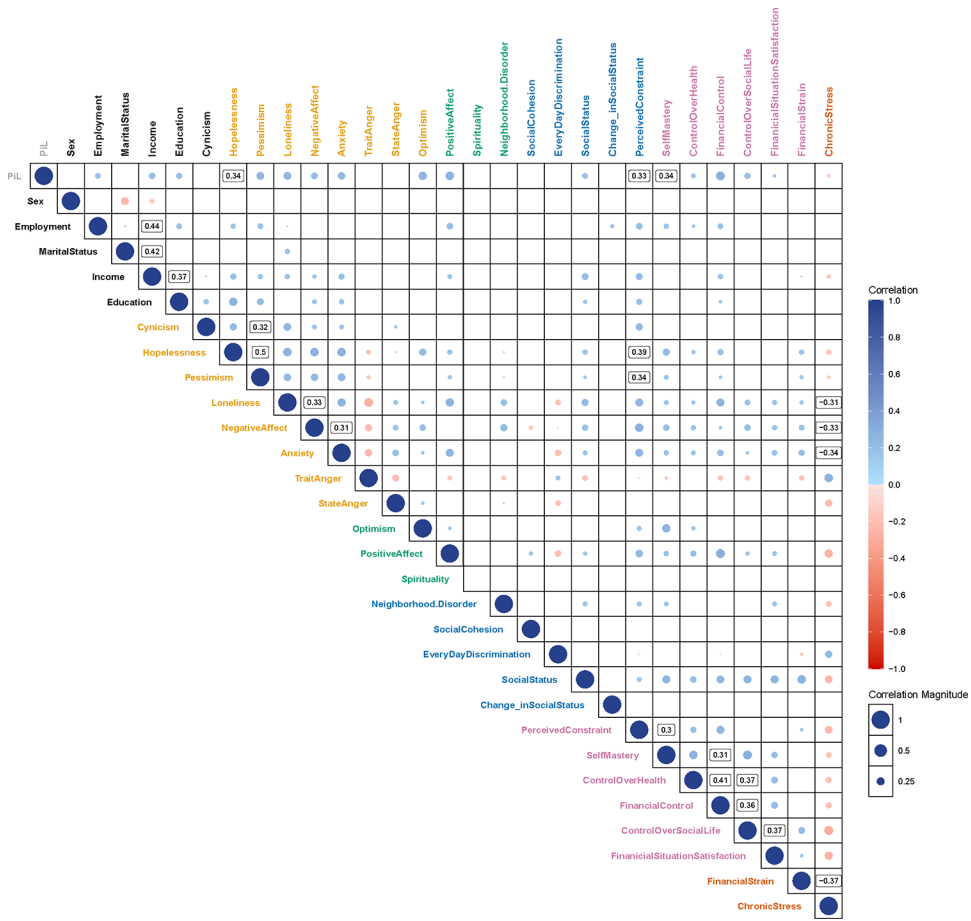


**Figure 1: Correlation Matrix in All participants (N = 6620)**  
 Spearman heatmap of covariate pairwise relationships. The circle size parallels the magnitude of the correlation, with positive and negative correlations indicated by blue and red, respectively. Correlations are only plotted if they are statistically significant under Bonferroni adjustment conditions. Additionally, labels display the R value for correlations that are both statistically significant and have  $1 > |R| > 0.3$ , to avoid labelling self-paired correlations (main diagonal pairings).



**Figure 2: Correlation Matrix in White participants (N = 5707)**

Spearman heatmap of covariate pairwise relationships. The circle size parallels the magnitude of the correlation, with positive and negative correlations indicated by blue and red, respectively. Correlations are only plotted if they are statistically significant under Bonferroni adjustment conditions. Additionally, labels display the R value for correlations that are both statistically significant and have  $1 > |R| > 0.3$ , to avoid labelling self-paired correlations (main diagonal pairings).



**Figure 3: Correlation Matrix in Black/African American participants (N = 913)**  
 Spearman heatmap of covariate pairwise relationships. The circle size parallels the magnitude of the correlation, with positive and negative correlations indicated by blue and red, respectively. Correlations are only plotted if they are statistically significant under Bonferroni adjustment conditions. Additionally, labels display the R value for correlations that are both statistically significant and have  $1 > |R| \geq 0.3$ , to avoid labelling self-paired correlations (main diagonal pairings).

**Table 1:**

## Demographic Characteristics of Study Participants

Demographic	All Participants	Black Participants	White Participants
	(N = 6620)	(N = 913)	(N = 5707)
<b>Partner status</b>			
Partnered	4884 (73.8%)	536 (58.7%)	4348 (76.2%)
Not Partnered	1736 (26.2%)	377 (41.3%)	1359 (23.8%)
<b>Employment</b>			
Employed	2944 (44.5%)	421 (46.1%)	2523 (44.2%)
Not Employed	3676 (55.5%)	492 (53.9%)	3184 (55.8%)
<b>Sex</b>			
Male	2886 (43.6%)	334 (36.6%)	2552 (44.7%)
Female	3734 (56.4%)	579 (63.4%)	3155 (55.3%)
<b>Education</b>			
High School and Below	3365 (49.7%)	528 (57.8%)	2837 (50.83%)
Some College	1657 (24.6%)	251 (27.5%)	1406 (25.03%)
College and Above	1598 (25.7%)	134 (14.7%)	1464 (24.14%)
<b>Income</b>			
Mean (SD)	72,052 (90,254)	47,442 (57,916)	75,990 (93,811)
Median (Min, Max)	46,990 (0, 1,000,000)	29,594 (0, 764,327)	49,612 (0, 1,000,000)

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**Table 2:**

Elastic Net model in both White and Black participants (All model, N = 6620)

Group Theme	Covariate	Standardized Coefficient	Association
Demographics	Income	0.049	Higher PiL ~ Higher Income
Demographics	College and Above	0.052	Higher PiL ~ College and Above
Demographics	HS and Below	-0.069	Lower PiL ~ Less than HS Education
Demographics	Marital Status	0.14	Higher PiL ~ Partnered
Demographics	Employment Status	0.25	Higher PiL ~ Employed
Demographics	Race	0.34	Higher PiL ~ African Americans
Demographics	Sex	.	
Demographics	Some College	.	
Negative Outlook	State Anger	-0.035	Lower PiL ~ Higher State Anger
Negative Outlook	Trait Anger	-0.035	Lower PiL ~ Higher Trait Anger
Negative Outlook	Cynicism	-0.045	Lower PiL ~ Higher Cynicism
Negative Outlook	Anxiety	-0.065	Lower PiL ~ Higher Anxiety
Negative Outlook	Negative Affect	-0.16	Lower PiL ~ Higher Negative Affect
Negative Outlook	Loneliness	-0.27	Lower PiL ~ Higher Loneliness
Negative Outlook	Pessimism	-0.29	Lower PiL ~ Higher Pessimism
Negative Outlook	Hopelessness	-0.47	Lower PiL ~ Higher Hopelessness
Positive Outlook	Positive Affect	0.28	Higher PiL ~ Higher Positive Affect
Positive Outlook	Optimism	0.30	Higher PiL ~ Higher Optimism
Positive Outlook	Spirituality	0.14	Higher PiL ~ Higher Spirituality
Societal Effects	Perceived Social Status	0.074	Higher PiL ~ Higher Perceived Social Status
Societal Effects	Neighborhood Disorder	-0.14	Lower PiL ~ Higher Neighborhood Disorder
Societal Effects	Social Cohesion	.	
Societal Effects	Perceived Everyday Discrimination	.	
Societal Effects	No Perceived Change in Social Status	.	
Societal Effects	Decreased Perceived Change in Social Status	.	
Societal Effects	Increase Perceived Change in Social Status	.	
Perceived Control	Perceived Control Over Social Life	0.076	Higher PiL ~ Higher Perceived Control Over Social Life
Perceived Control	Perceived Financial Control	0.11	Higher PiL ~ Higher Financial Control
Perceived Control	Perceived Control Over One's Health	0.16	Higher PiL ~ Higher Perceived Control One's Health
Perceived Control	Self-Mastery	0.34	Higher PiL ~ Higher Self-Mastery
Perceived Control	Perceived Constraint on Personal Control	-0.41	Lower PiL ~ Higher Perceived Constraint on Personal Control
Perceived Control	Satisfaction With Personal Financial Situation	.	
Hardships	Financial Strain	.	

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Group Theme	Covariate	Standardized Coefficient	Association
Hardships	Chronic Stress	.	

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**Table 3:**

Elastic Net Model in Black participants (N = 913)

Group Theme	Covariate	Standardized Coefficient	Association
Demographics	Income	0.051	Higher PiL ~ Higher Income
Demographics	HS and Below	-0.072	Lower PiL ~ Less than HS Education
Demographics	Sex	.	
Demographics	Employment Status	.	
Demographics	Marital Status	.	
Demographics	Some College	.	
Demographics	College and Above	.	
Negative Outlook	Negative Affect	-0.012	Lower PiL ~ Higher Negative Affect
Negative Outlook	Anxiety	-0.098	Lower PiL ~ Higher Anxiety
Negative Outlook	Loneliness	-0.15	Lower PiL ~ Higher Loneliness
Negative Outlook	Hopelessness	-0.58	Lower PiL ~ Higher Hopelessness
Negative Outlook	Cynicism	.	
Negative Outlook	Pessimism	.	
Negative Outlook	Trait Anger	.	
Negative Outlook	State Anger	.	
Positive Outlook	Optimism	0.37	Higher PiL ~ Higher Optimism
Positive Outlook	Positive Affect	0.40	Higher PiL ~ Higher Positive Affect
Positive Outlook	Spirituality	.	
Societal Effects	Neighborhood Disorder	.	
Societal Effects	Social Cohesion	.	
Societal Effects	Perceived Everyday Discrimination	.	
Societal Effects	Perceived Social Status	.	
Societal Effects	No Perceived Change in Social Status	.	
Societal Effects	Decreased Perceived Change in Social Status	.	
Societal Effects	Increase Perceived Change in Social Status	.	
Perceived Control	Perceived Control Over Social Life	0.038	Higher PiL ~ Higher Perceived Control Over Social Life
Perceived Control	Perceived Financial Control	0.13	Higher PiL ~ Higher Perceived Financial Control
Perceived Control	Perceived Constraint on Personal Control	-0.46	Lower PiL ~ Perceived Constraint on Personal Control
Perceived Control	Self-Mastery	0.63	Higher PiL ~ Higher Self-Mastery
Perceived Control	Perceived Control Over One's Health	.	
Perceived Control	Satisfaction With Personal Financial Situation	.	
Hardships	Financial Strain	.	
Hardships	Chronic Stress	.	

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**Table 4:**

Elastic Net model in White participants (N = 5707)

Group Theme	Covariate	Standardized Coefficient	Association
Demographics	College and Above	0.014	Higher PiL ~ College and Above
Demographics	Income	0.028	Higher PiL ~ Higher Income
Demographics	HS and Below	-0.033	Lower PiL ~ Less than HS Education
Demographics	Marital Status	0.20	Higher PiL ~ Partnered
Demographics	Employment Status	0.30	Higher PiL ~ Employed
Demographics	Sex	.	
Demographics	Some College	.	
Negative Outlook	Anxiety	-0.023	Lower PiL ~ Higher Anxiety
Negative Outlook	Trait Anger	-0.023	Lower PiL ~ Higher Trait Anger
Negative Outlook	Cynicism	-0.033	Lower PiL ~ Higher Cynicism
Negative Outlook	Negative Affect	-0.18	Lower PiL ~ Higher Negative Affect
Negative Outlook	Pessimism	-0.31	Lower PiL ~ Higher Pessimism
Negative Outlook	Loneliness	-0.33	Lower PiL ~ Higher Loneliness
Negative Outlook	Hopelessness	-0.53	Lower PiL ~ Higher Hopelessness
Negative Outlook	State Anger	.	
Positive Outlook	Optimism	0.28	Higher PiL ~ Higher Optimism
Positive Outlook	Positive Affect	0.29	Higher PiL ~ Higher Positive Affect
Positive Outlook	Spirituality	0.074	Higher PiL ~ Higher Spirituality
Societal Effects	Perceived Everyday Discrimination	0.023	Higher PiL ~ Higher Perceived Everyday Discrimination
Societal Effects	Perceived Social Status	0.098	Higher PiL ~ Higher Perceived Social Status
Societal Effects	Neighborhood Disorder	-0.17	Lower PiL ~ Higher Neighborhood Disorder
Societal Effects	Social Cohesion	.	
Societal Effects	No Perceived Change in Social Status	.	
Societal Effects	Decreased Perceived Change in Social Status	.	
Societal Effects	Increase Perceived Change in Social Status	.	
Perceived Control	Perceived Control Over Social Life	0.024	Higher PiL ~ Higher Perceived Control Over Social Life
Perceived Control	Perceived Financial Control	0.098	Higher PiL ~ Higher Financial Control
Perceived Control	Perceived Control Over One's Health	0.20	Higher PiL ~ Higher Perceived Control Over One's Health
Perceived Control	Self-Mastery	0.34	Higher PiL ~ Higher Self-Mastery
Perceived Control	Perceived Constraint on Personal Control	-0.47	Higher PiL ~ Perceived Constraint on Personal Control
Perceived Control	Satisfaction With Personal Financial Situation	.	
Hardships	Financial Strain	.	

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Group Theme	Covariate	Standardized Coefficient	Association
Hardships	Chronic Stress	.	

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