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Left-Wing Ideology, Mental Health and Body Modifications

Meng Hu, independent researcher, Hong Kong. E-mail: mh19870410@gmail.com

Emil O. W. Kirkegaard, independent researcher, Denmark.

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Supplementary materials: Data, figures, R notebook are available at https://osf.io/fh685, and the R notebook is furthermore available at https://rpubs.com/EmilOWK/politics_p_physiognomy_2025.

Abstract

Recent research has identified a recurring association between left-wing political ideology and poorer mental health. These findings show both reduced positive well-being (e.g., life satisfaction) and increased negative symptoms (e.g., depression, anxiety). We administered 76 mental health and 41 political ideology items to a sample of 978 fairly representative American adults recruited via the Prolific data platform. Overall, we found that every aspect of mental health correlated negatively with overall leftism (r's for 18 diagnoses = -0.20, last 2 weeks symptoms = -0.14, MMPI-subset = -0.17, life satisfaction = -0.15, all p's < .001). Diagnoses were the primary predictor of leftism in multivariate models. This relationship was not explained by measurement bias, as invariance testing revealed only minimal, counter-balancing item bias. Furthermore, we expanded this network by incorporating behavioral markers, finding that body modifications (e.g., unnatural hair color, tattoos) showed weak-to-modest associations with both left-wing ideology and mental health diagnoses.

Keywords: political orientation, mental health, body modification, measurement invariance, IRT, DIF, MCV

Introduction

There is a wide spectrum of political opinions within American politics. This spectrum includes liberalism, conservatism, socialism, feminism, environmentalism, and multiculturalism (Heywood, 2021). These political thoughts are described and defined as follows:

Liberalism. This term was originally understood as classical liberalism, which emphasized reduced government intervention. It was later revised to give birth to modern liberalism, which argued for welfare provision and economic management.

Conservatism. This ideology is defined by the desire to conserve change. Yet conservatism encompasses a range of inclinations, including: traditional conservatism, (which emphasizes organic society, hierarchy, and gradual change), one-nation conservatism (which advocates paternalism and social reform to prevent class conflict and preserve national unity), the New Right (which combines neoliberal economics such as free markets, privatization, and deregulation – with neoconservative social values such as law and order, and moral traditionalism.

Socialism. This ideology is defined by social and economic equality. This ideology argues that collective ownership or regulation of resources is necessary to prevent exploitation.

Nationalism. This ideology asserts that people who share a common identity should form a political community. Types of nationalism include civic, ethic, liberal or conservative nationalism.

Anarchism. This ideology sees the state as inherently coercive and unnecessary, arguing that humans are naturally capable of self-organization without imposed authority. Anarchism also emphasizes absolute right to personal autonomy.

Feminism. This ideology seeks political, social, and economic equality between men and women, and its evolution can be understood as a series of three waves. The first-wave focused on legal and political rights, especially suffrage. The second-wave emphasized a broader agenda comprising workplace equality and reproductive rights. Third-wave feminism emphasized diversity and the experiences of women of color.

Environmentalism. This ideology focuses on managing resources in the face of finite resources, advocating for sustainable energy policies which could take the form of pollution control, conservation, preservation, and renewable energy.

Multiculturalism. This ideology emphasizes the capacity of culture to generate social and political cohesion. Multiculturalism is manifested in three models. Liberal multiculturalism emphasizes individual rights but accepts cultural identity as central to personal autonomy. Pluralist multiculturalism promotes the interests of marginalized or disadvantaged groups presumed to be oppressed by western culture. Cosmopolitan multiculturalism endorses hybridity, cultural exchange/mixing, and global citizenship.

Furthermore, it is crucial to acknowledge the significant heterogeneity within broad political labels such as leftism. The American political landscape is not a simple monolith, but a complex field where individuals can hold distinct combinations of social and economic views. For instance, one person might be economically liberal (favoring welfare programs) but socially conservative (holding traditional values). Similarly, another might be economically conservative (favoring free markets) but socially liberal (supporting progressive causes). This study focuses specifically on the

dimension of *social leftism*—defined by specific attitudes on issues such as gender, race, immigration, sexual orientation, and personal expression. This conceptualization is distinct from economic leftism, which concerns views on redistribution, market regulation, and social welfare.

Against this diverse ideological backdrop, a significant body of research has focused specifically on the psychological dimensions distinguishing the left-right political spectrum. There is a vast amount of research on the relationships between psychological variation and political opinions or ideology (Bakker et al., 2021; Brandt et al., 2021; de Vries et al., 2022; Jost, 2021). An interesting perspective is that political differences between the right and the left might be caused by a constellation of personality differences related to an open versus closed orientation to behavior and experience (Bakker et al., 2021; Jost et al., 2003). This leaves open the question of whether leftism might be related to having more experiences that deviate from the norm, resulting in stigma and impacting mental health. If leftism reflects greater openness to non-normative stimuli, this orientation might manifest not only in abstract attitudes but also in concrete, visible behaviors—such as body modifications. These visible markers can invite social stigma and potentially lead to adverse mental health outcomes. This, in turn, could exacerbate the mental health disparities already observed among leftists (Bernardi, 2020; Kirkegaard, 2020). In light of this, we propose that body modifications—specifically tattoos, piercings, and unnatural hair color—serve as concrete, visible manifestations of this psychological orientation. These acts are potent forms of self-expression that often deviate from mainstream aesthetic norms and can signal a rejection of traditional conformity. This possibility aligns with extensive evidence that body modification (tattoos, piercings, hair color) has a positive relationship with deviance, psychopathology and emotional distress (D'Ambrosio et al., 2013; Deschesnes et al., 2006; Dutton & Kirkegaard, 2022b; Khosla et al., 2010; King & Vidourek, 2013; Kirkegaard, 2023; Koch et al., 2010; Laumann & Derick, 2006; McCandlish & Pearson, 2023; Mortensen et al., 2019; Perrotta, 2021; Stirn et al., 2006). There is also evidence that visible tattoos carry significant stigma (Timming et al., 2017). One common interpretation considers body art as mere self-expression (Atkinson, 2003) and need for uniqueness (Koch et al., 2010). However, it is unclear whether body art such as tattooing is a marker of ideological rebellion or trendiness (Kosut, 2006).

These psychosocial risks may contribute to the documented relationship between leftism and poorer mental health. Indeed, several studies have found that positive aspects of mental health (e.g., life satisfaction) and negative aspects (e.g., depression, anxiety) are related to left-wing ideology, such that left-wingers (leftists) have worse mental health measured in a variety of ways (Bernardi, 2020; Kirkegaard, 2020). One study in particular gives a small hint about the possibility that depression leads to political orientations. However, this link may be driven by ideological/policy alignment rather than affective loyalty (Bernardi, 2020, p. 9). A question that needs to be addressed is whether leftism and body modification display a robust relationship. It is not known whether these relationships are causal and if so, in which way.

Critically, interpretations of these relationships depend on whether measurement bias along the dimension of political ideology may influence the results. The reason why it is important is because measurement equivalence between groups ensures that the questions do not have different connotations across groups. A recommended method used to assess group bias in a scale is to employ Item Response Theory (IRT) methods. This method computes the item parameter estimates within each group, and then calibrates the item parameters to put them on a common scale, then tests to see if the item parameters differ between the groups. A difference

in item parameters is taken as evidence of Differential Item Functioning (DIF). However, the DIFs may cancel out at the test-level if some items are biased against one and some other items are biased against the other group. If this occurs, its impact on composite total score or predictive validity is considered negligible (Roznowski & Reith, 1999). To illustrate, one large scale analysis of American and Dutch subjects across many psychological scales found the percentage of DIF varies greatly across psychological scales but that the impact on the test-level group gap estimates are rather minimal (Brandt et al., 2021). One study examined depression and anxiety scales in Finnish subjects and also found little bias (Dutton & Kirkegaard, 2024).

Objectives in the Present Study

The present study employs a comprehensive, correlational approach to investigate a network of relationships linking political ideology, mental health, and body modifications. The broader aim seeks to assess the plausibility of potential causal models. The study has three specific objectives:

> **Objective #1**: To assess the generality of the association between mental health and political ideology by examining relationships across a wide range of specific measures.
>
> **Objective #2**: To evaluate the degree to which measurement bias influences the observed associations between mental health and ideology.
>
> **Objective #3**: To investigate whether body modifications relate to leftism and psychopathology.

Methods

Participants

We recruited American participants from Prolific (https://www.prolific.com), an online research platform. Prolific allows researchers to recruit participants from diverse backgrounds (e.g., which include representatives from a variety of ethnic and gender groups). Only American and British subjects are available, and the American subjects were chosen. To ensure data quality, we administered a series of 4 attention check items, instructing the participant to pick a target word among a list of words (e.g., “Pick the word Tree”). The purpose is to distinguish between attentive and inattentive participants. If a participant does not pick the target word, this participant is ineligible and removed from the data. Only 2 participants failed any of the attention checks. The study had 2 waves of data collection. The first on February 16th, 2024 (n = 495), and the second on March 10th, 2025 (n = 483). The final sample was therefore relatively large (n = 978). The surveys in both cases were identical. The reason for collecting a second wave was that our analyses of the first wave indicated that key statistical model tests were underpowered with several inconclusive results (p-values near 0.05). The first wave was collected using the ‘representative for age, sex, race’ mode, while the second wave was collected using the ‘representative for age, sex, and political identification’ mode. This change was because online samples usually have a left-wing political skew, which lowers statistical power and may bias some analyses. Our results confirmed a slight bias as the second sample had lower score on leftism (d = 0.22) than the first.

Measures

Minnesota Multiphasic Personality Inventory – Second Edition (MMPI-2)

For measuring mental health and well-being, we chose a diverse set of items to maximize breadth in the construct of general psychopathology (p factor), as well as items measuring positive emotionality. While tendencies towards negative (depression, anxiety etc.) and positive thoughts (happiness, satisfaction etc.) correlate negatively and thus could be considered to measure the same overall aspect of personality (Dunkel et al., 2021), they are not generally considered unidimensional and thus may have different associations with political ideology. First, we chose 24 items from the Minnesota Multiphasic Personality Inventory-2 (MMPI-2), which were selected transdiagnostically from across the full spectrum of MMPI-2 scales, based solely on prior research demonstrating their strong loadings on the general p factor within the MMPI-2 item pool (Kirkegaard & Nyborg, 2021). The MMPI-2 is a widely used clinical instrument with numerous scales (e.g., anxiety, depression, bizarre mentation, fears, anger, family problems) designed to assess psychopathology, and it includes validity scales to detect malingering or random responding. While its reliability and validity are well-established, some specific scales have demonstrated lower retest reliability or internal consistency (Cox et al., 2009). Second, we created 23 items concerning people's negative feelings in the last 14 days (e.g., "Little interest or pleasure in doing things?"). These kinds of items are often found in mental health screeners, such as the Patient Health Questionnaire (PHQ-9) (Kroenke et al., 2001) and the Generalized Anxiety Disorder scale (GAD-7) (Spitzer et al., 2002), which also assess symptom frequency over a two-week period. Third, we created 11 items measuring better mental health, as opposed to worse mental health. These items concerned satisfaction with various aspects of life (e.g., "Life satisfaction", and "In most ways my life is close to my ideal." on a Likert 1-7 scale). Fourth, we asked about whether the subject had received a doctor's diagnosis of any of 18 of the most common diagnoses found in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) (Kessler et al., 2005).[1] In total, thus, we had 76 items covering mental health.

From this item pool, we constructed six distinct scales for analysis, each scored using the appropriate Item Response Theory (IRT) model (2PL for dichotomous items, graded for ordinal items). The scales, their composition, and psychometric properties are presented in Table 1.

Table 1. Psychometric properties of mental health scales.

Scale	Item Count	Rho	Reliability (r_{xx})
All items	76	0.91	0.97
Self-related symptoms	58	0.93	0.97
MMPI-2 items	24	0.97	0.85
Last 2 weeks	23	0.98	0.92
Life satisfaction	11	1.00	0.96
Diagnoses	18	0.89	0.60

Unidimensionality (rho) was relatively high for all scales, and higher for those with relatively similar items, as expected. The lowest value was for the 18 diagnoses, which is not surprising considering their heterogeneity and known complex factor structure (Kotov et al., 2021). Reliabilities for the self-rated scales were relatively high, while for diagnoses it was relatively poor. This is because 59% of subjects had 0 diagnoses and thus received the minimum score on the

[1] ADHD, alcoholism, substance abuse, autism spectrum, anti-social personality, bipolar, borderline personality, depression, general anxiety, obsessive compulse, panic, paranoia, social phobia, specific phobia, post-traumatic stress, schizophrenia, schizoid personality, and sleeping disorder(s).

construct (13% had 1, 11% had 2, 7% had 3, 5% had 4, and 4% had 5+). In this case, the internal reliability is a poor estimate of the retest reliability because if the subjects were asked again, they would very likely answer very or entirely similarly, demonstrating the high retest reliability. Each of the scales were scored. Scores on each scale were conceptualized as an imperfect measure of the general factor of psychopathology, or the p factor (Kotov et al., 2021; Watts et al., 2023). The self-report p gap between those without and with any diagnosis was 0.91 d (Pearson r = 0.47). The symptoms p score increased monotonically as a function of the number of diagnoses: 1.69 d between those with 0 and those with 5+, shown in Figure 1. The distribution of diagnoses in the sample are displayed in Figure 2.

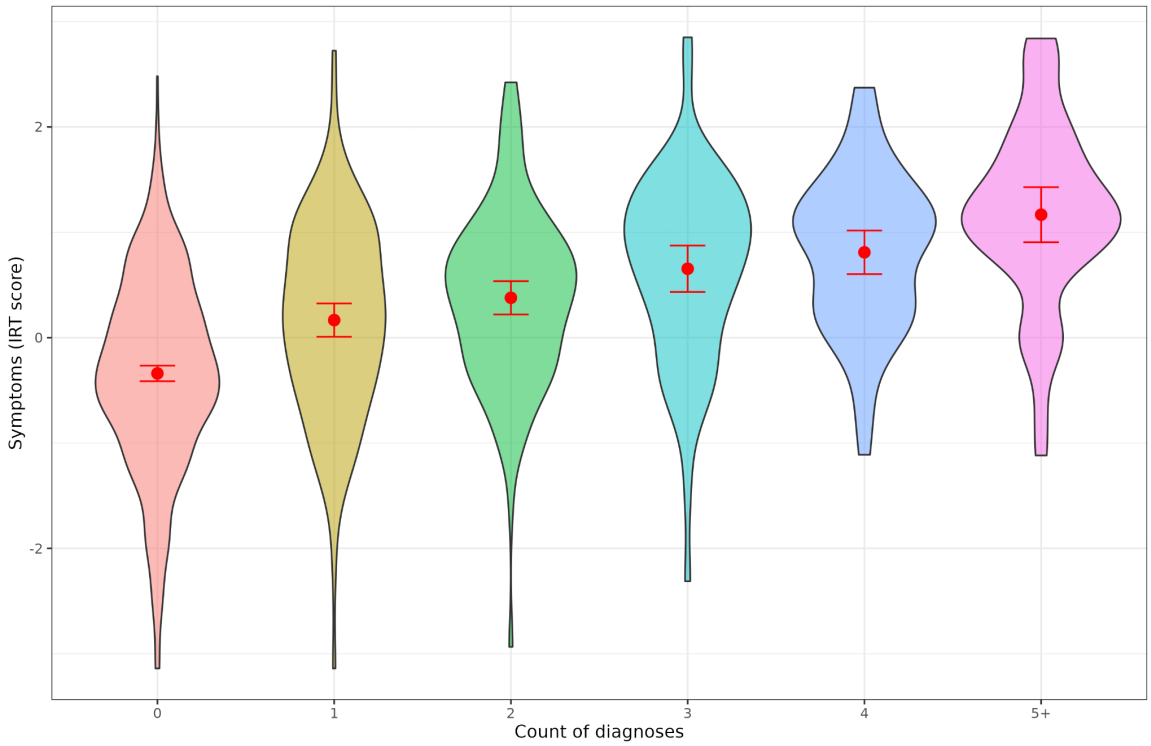

Figure 1. Psychopathology self-related symptoms (p factor scores based on IRT model of non-diagnoses items) as a function of the number of clinical diagnoses.

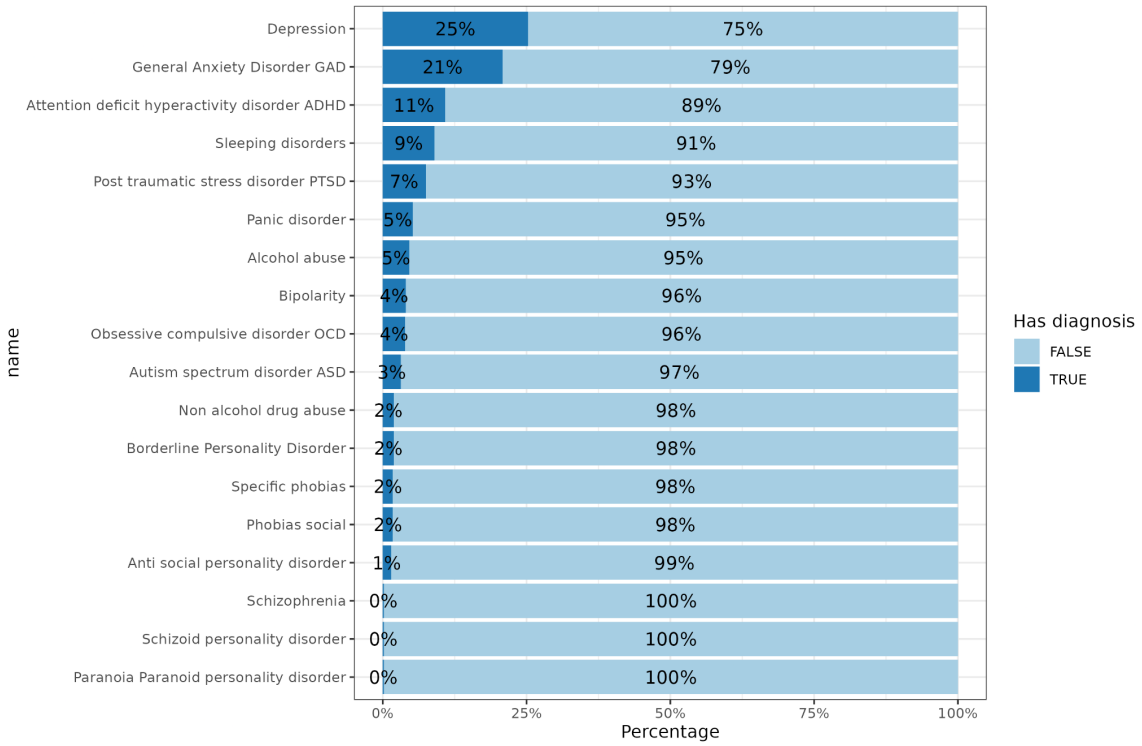

Figure 2. Distribution of self-reported diagnoses in the sample. Values rounded to the nearest percentage point.

The last 3 diagnoses were only seen in 2 individuals, hence 0.2% of the dataset. Despite the rarity of some diagnoses, 152 of the 153 correlations among the diagnoses were positive (mean latent correlation = 0.39), as shown in Figure S2. Thus, we replicated the positive manifold observed in prior research.

Political Ideology Items

For political ideology, we similarly wanted to measure the construct with breadth. For this purpose, we created a set of 41 items concerning typical political disagreements in the USA at the time of this survey. Item examples are: “The world is suffering from overpopulation.”, “Affirmative action is discrimination.”, “I support Israel against Hamas.”, and “Progressive taxation (higher tax rates for higher incomes) is the best way to structure a tax system.”. These items are measured on a 1-7 scale, going from strongly disagree to strongly agree.

We scored these items using a unidimensional graded IRT model (Chalmers et al., 2020). Most items loaded strongly on the general factor, which explained 42% of the variance. The median absolute factor loading was 0.65 and the lowest was 0.11 (“Homosexual behavior is fine when it is private and chaste”). The empirical reliability of this scale was estimated at 0.97, Cronbach’s alpha was 0.96. Unidimensionality was assessed with Revelle’s rho (congeneric), which was 0.95 (Revelle & Condon, 2025). This metric indicates the degree to which the item correlation matrix can be predicted from the model. For simulated data with a true unidimensional model, this value was 0.95-1.00 in their simulations (the average factor loading does not matter), while it was below 0.70 when multiple large factors were present. For real life personality scales (e.g., from the Big Five), rho was between 0.98-0.99, while for mixed personality items (Big Five all scales), the value was 0.69-0.79. Thus, while our collection of political questions were not strictly unidimensional,

they were relatively close to it. Factor scores from the model were saved for analysis. The resulting leftism scores were normally distributed (Figure S1). As a validation, we compared the scores to answers to the question "What is your party registration?", which showed that the gap between registered Democrats and Republicans was 1.75 d (this question was not used to generate the scores). In other words, 4-way party identification (Republican, Democrat, Independent, Other) could account for 33% of the variance in leftism.

Body Modification Items

Concerning body modification, we asked subjects about whether they had dyed their hair an unnatural color ("As an adult, have you ever dyed your hair with an unnatural hair color? (pink, green, blue, purple, yellow, etc)"), on which bodyparts they have tattoos ("choose all bodyparts that apply from: hand, arm, chest/stomach, back, neck, leg, feet, face/head, other"), and whether they had any piercings ("choose all bodyparts that apply from: ears, eyebrow, nose (non-septum), mouth area (inside), mouth area (outside), cheek, nipple, navel, genital, other"). For the tattoos and piercings, these were converted into total counts as the study was underpowered to investigate differential relationships for each type of tattoo or piercing.

Auxiliary Items

Auxiliary items included a question about age, gender, sexual orientation (choose one from heterosexual, homosexual, bisexual, asexual, other), transgender, race/ethnicity (choose any that apply from Asian, American Indian/Alaskan, Black, Hispanic/Latino, Jewish, White, Mixed, Hawaiian/Pacific Islander, Other), and immigration background (foreign born, second generation, third generation, older generation). Racial variables were combined into composite categories if multiple options were selected (e.g., White + Hispanic). The composite categories revealed that the standard US census coding was the most appropriate for this dataset, and the remaining options were collapsed into an Other category. After this classification, the sample consisted of 705 Whites (72%), 127 Blacks (13%), 58 Other (6%), 49 Hispanic (5%), and 40 Asians (4%). Thus, the numbers correspond fairly well to the US Census with the exception that Hispanics are under-represented.

Data Analysis

Analysis for objective 1: Generality of associations

To examine the breadth of relationships between political ideology and psychopathology, we validated measurement scales by assessing their unidimensionality and reliability, we established the core correlational network, and we tested the robustness of associations using multiple regression (controlling for age, sex, and race) while assessing causal directionality.

Analysis for objective 2: Assessment of measurement bias

To assess the influence of measurement bias, we investigated measurement invariance in mental health scales across political groups.

Analysis for objective 3: Network involving body modifications

To investigate the relationships between body modification, ideology, and psychopathology, we evaluated the impact of body modifications on political ideology and psychopathology, and we

conducted exploratory analyses examining diagnostic specificity and the predictive value of specific body modifications.

Results

Results for objective #1: Generality of the mental health-ideology association

Correlations among primary variables

Figure 3 shows the main correlations between variables. Latent correlations were applied when necessary using *hetcor*() from the **polycor** package (e.g., tetrachoric for binary pairs).

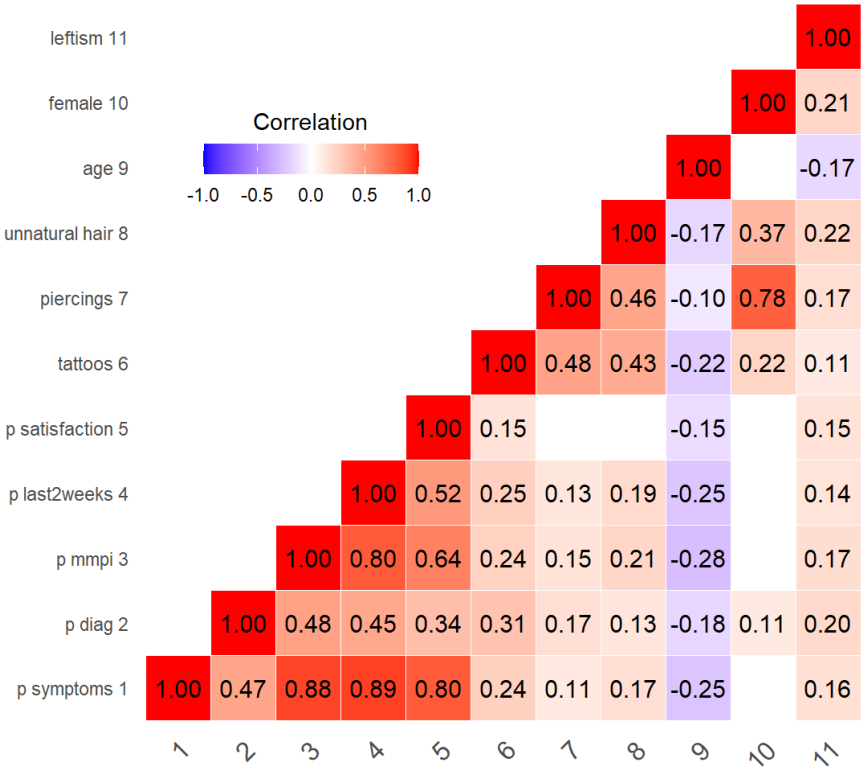

Figure 3. Correlation matrix between main variables in the study. Latent correlations used when necessary. Correlations at p > .01 are removed from the matrix.

It can be observed that leftism correlates positively with each variant of the p factor (variables 1-5), as well as with tattoos, piercings, unnatural hair color and being female, although these correlations range from weak to modest size, following effect size guidelines of 0.10, 0.20, and 0.30 as relatively small, typical, and relatively large (Gignac & Szodorai, 2016). On the other hand, leftism correlates negatively with age. Similarly, p factor variants correlate negatively with age (younger people higher in p), and slightly positively with being female. As such, it is likely that the correlations between mental health scales and leftism are confounded by age and sex. The three variables concerning body modifications were fairly strongly correlated, at around 0.45. One notable observation is the very high correlation between piercings and being female, mainly due to relatively common piercings in women: ears r = 0.77, navel 0.55, non-septum nose 0.50, and nipple 0.46. More than 80% of women had an ear piercing (earring).

Regression analyses

Our goal is to assess the nature of the relationship between various psychopathology scales and leftism using regressions. While causality cannot be cleanly determined with the present dataset, certain causal models can be ruled out, and effect sizes can be estimated based on assumed causal models. In the first case, it is assumed that psychopathology causes leftism along with covariates (in R notation: leftism ~ p + [controls]). Table 2 shows the regression results.

Table 2. Regression models predicting leftism score.

Predictor/Model	**1**	**2**	**3**	**4**	**5**	**6**
Intercept	0.00 (0.03, 1)	-0.01 (0.14, 0.97)	-0.01 (0.14, 0.94)	0.00 (0.14, 0.99)	0.01 (0.14, 0.93)	0.00 (0.14, 0.98)
p_{diag}	0.15 (0.04, <0.001***)	0.16 (0.03, <0.001***)				0.13 (0.04, <0.001***)
p_{mmpi}	0.08 (0.06, 0.17)		0.12 (0.03, <0.001***)			0.03 (0.06, 0.66)
$p_{last2weeks}$	-0.02 (0.05, 0.69)			0.10 (0.03, 0.001**)		-0.01 (0.05, 0.89)
$p_{satisfaction}$	0.06 (0.04, 0.16)				0.12 (0.03, <0.001***)	0.07 (0.04, 0.09)
age		-0.14 (0.03, <0.001***)	-0.14 (0.03, <0.001***)	-0.14 (0.03, <0.001***)	-0.15 (0.03, <0.001***)	-0.13 (0.03, <0.001***)
sex = Male		-0.32 (0.06, <0.001***)	-0.33 (0.06, <0.001***)	-0.34 (0.06, <0.001***)	-0.34 (0.06, <0.001***)	-0.32 (0.06, <0.001***)
US born		0.19 (0.14, 0.17)	0.21 (0.14, 0.13)	0.21 (0.14, 0.14)	0.19 (0.14, 0.16)	0.19 (0.14, 0.18)
race		(yes)	(yes)	(yes)	(yes)	(yes)
R2 adj.	0.04	0.08	0.07	0.07	0.07	0.09
N	978	973	973	973	973	973

Note: Standardized betas. Numbers in parentheses are standard errors and p values.
* = p < .01, ** = p < 0.005, *** = p < .001.

The table shows many results of interest. In model 1, all the p factor variants are included together to gauge relative predictive validity. However, only $p_{diagnoses}$ retains validity ($p < .001$). In models 2-5, models add demographic controls, showing that each scale of p retains validity, though reduced compared to the correlations in Figure 3 by about 25%. Finally, model 6 repeats model 1 but with demographic controls. Here, once again, $p_{diagnoses}$ predicts leftism ($p < .001$) whereas the other variants do not.

Alternatively, one might posit that leftism causes psychopathology instead. Since $p_{diagnoses}$ appeared to be the key variable, this was used as the outcome variable. Table 3 shows regression models based on this assumption.

Table 3. Regression models predicting diagnosis-based psychopathology score.

Predictor/Model	**1**	**2**
Intercept	0.66 (0.11***)	0.28 (0.01**)
leftism	0.16 (0.03***)	0.10 (0.03***)
age	-0.01 (0.002***)	0.00 (0.002)
male	-0.11 (0.06)	-0.07 (0.06)
race	(yes)	(yes)
p_{mmpi}		0.29 (0.05***)
$p_{last2weeks}$		0.17 (0.05***)
$p_{satisfaction}$		0.04 (0.03)
R2 adj.	0.09	0.28
N	976	976
Note: Standardized betas. Values in parentheses are standard errors; asterisks denote statistical significance (* = p < .01, ** = p < .005, *** = p < .001).		

The results show that net of demographic controls, leftism still predicts having more diagnoses (beta = 0.16), and this is also true even controlling for self-reported symptom scales (beta = 0.10). These results are thus consistent with bidirectional causal effects.

Generalization across psychopathology items

It is also possible to investigate whether the psychopathology items with stronger factor loadings showed larger gaps between the political groups (Jensen's Method of Correlated Vector, MCV; explained in Jensen, 1998, Appendix B). If the variation among items' associations is caused by differences in the latent trait of interest, then items with stronger factor loadings should relate more strongly to the criterion variable, in this case, leftism. Though it should be noted that sampling error in item parameter estimates will cause a bias towards 0 (Dutton & Kirkegaard, 2022a). Given the large effects of age and sex on leftism (cf. Table 2), it seems important to control for this confounding. Thus two approaches were used. First, the latent correlation between each item and leftism was calculated (standard Jensen method). Second, to control for demographics, two linear models were fit to predict leftism as a function of the demographics alone and demographics plus the index item (expanded Jensen method). The incremental validity of the item was computed from the models in multiple R units. Results are shown in Figure 4.

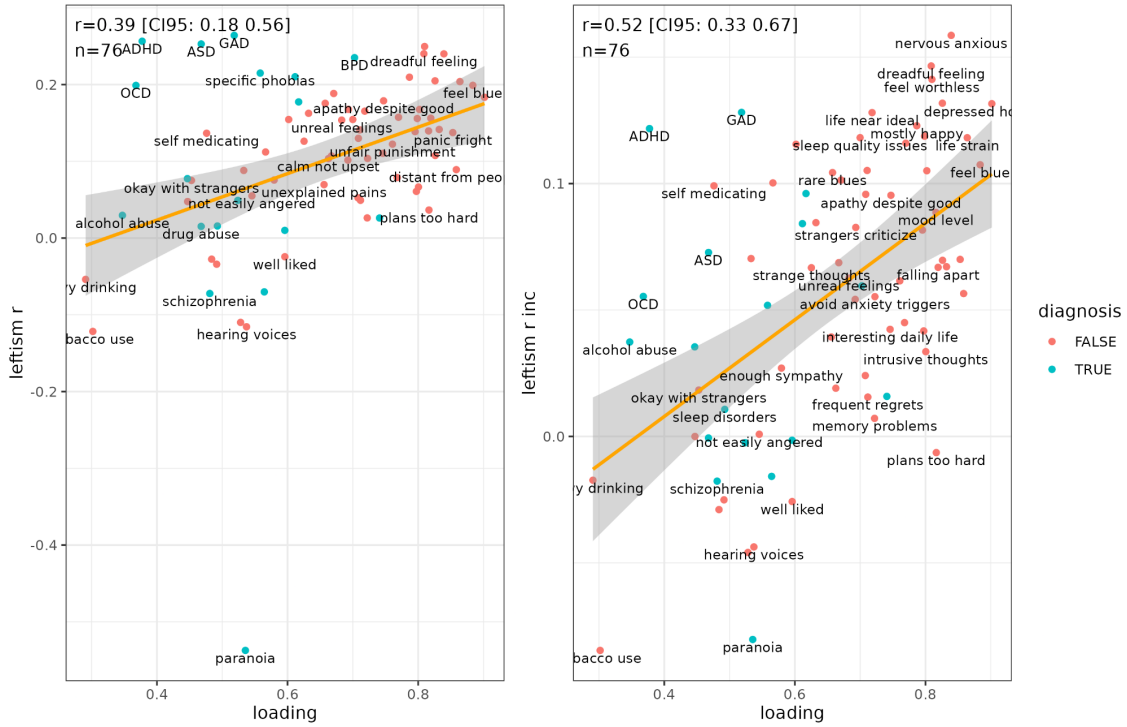

Figure 4. Jensen's method applied to the psychopathology items for political ideology. The left plot shows the latent correlations between each item and leftism, and the second plot shows incremental validity of each item net of demographics (multiple R increment).

It can be observed that items with stronger loadings on the p factor showed more positive associations with leftism. This was true without (r = 0.39) and with controls (r = 0.52), though it was stronger after controls. This comparison suggests that the pattern was distorted by the demographic variables, not enhanced by them (paired correlation test, p = .01). The plots also reveal that diagnoses show stronger associations with leftism than would be expected from their factor loadings in the total item-pool. Item-level regressions are shown in Table 4.

Table 4. Item-level regressions using Jensen's method.

Outcome:	*Correlations*			*Incremental R*		
Predictor	1	2	3	1	2	3
(Intercept)	-0.10 (0.056, 0.086)	-0.13 (0.068, 0.069)	-0.17 (0.072, 0.02)	-0.07 (0.024, 0.006*)	-0.08 (0.030, 0.011)	-0.11 (0.031, <0.001***)
loading	0.30 (0.084, <0.001***)	0.34 (0.096, <0.001***)	0.40 (0.103, <0.001***)	0.19 (0.036, <0.001***)	0.20 (0.042, <0.001***)	0.25 (0.044, <0.001***)
diagnosis		0.02 (0.034, 0.469)	0.28 (0.150, 0.069)		0.01 (0.015, 0.589)	0.17 (0.064, 0.01)
loading:diagnosis			-0.46 (0.267, 0.088)			-0.29 (0.113, 0.012)
R2 adj.	0.138	0.132	0.155	0.261	0.254	0.307
N	76	76	76	76	76	76

Note: Unstandardized slopes. Numbers in parentheses are standard errors and p values. * = p < .01, ** = p < 0.005, *** = p < .001.

The regression models showed that a hypothetical item with loading = 1 would show a leftism gap of 0.21 d (0.34-0.13) and 0.12 d (0.20-0.08) for the models without interactions. The interactions between being a diagnosis and factor loading were borderline significant (p = 0.09 and p = 0.01), suggesting that, in the pooled-item set, loadings among diagnosis items were perhaps not related to items' association strength with leftism (the interaction slope is roughly the same as the slope for the loading, thus producing roughly a slope of 0 for diagnoses questions).

Alternatively, one might approach the question from the other perspective and ask: does it matter how leftism is measured? Here, the analysis is reversed such that factor loadings for political ideology items are used instead and the outcome variable is psychopathology. Figure 5 shows the results.

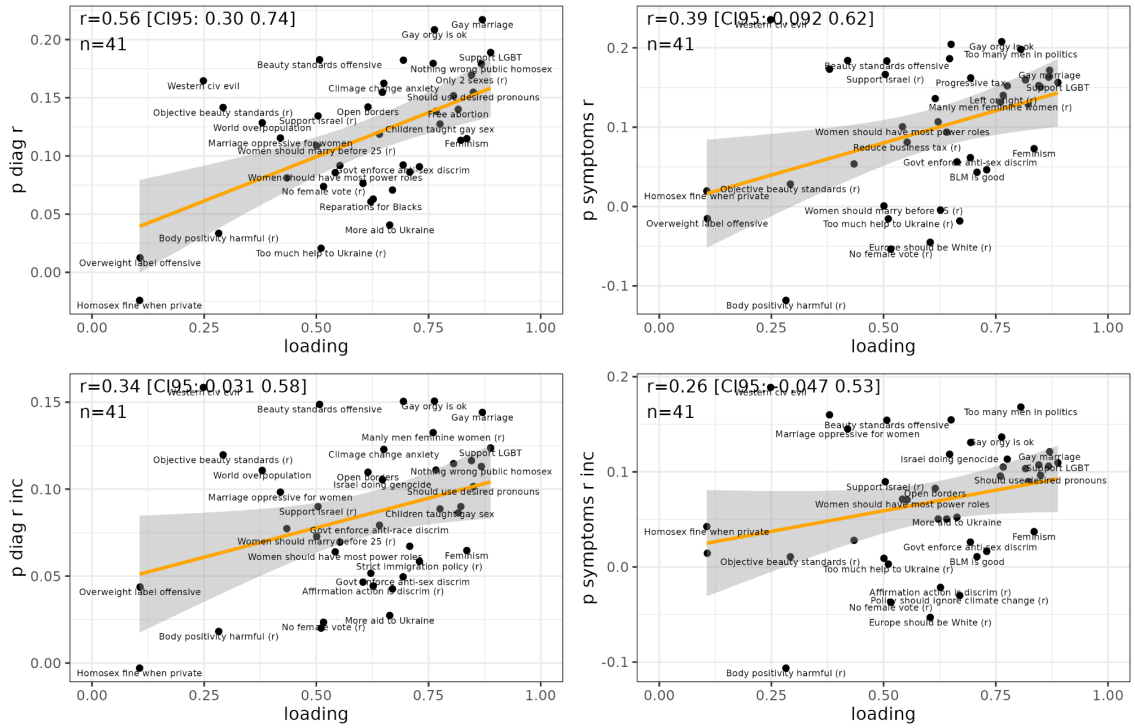

Figure 5. Jensen's method applied to the political ideology items for psychopathology. The top plots show the latent correlations (each item's association with psychopathology, p), the bottom plots show their incremental validity net of demographics. (r) indicates the item was reversed.

The results show a consistent pattern. The more a given question measures leftism (or negatively rightism), the more it is associated with psychopathology. This was true whether this was measured using diagnoses or symptoms (though the correlation had p > .05 for incremental validity for the symptoms scale). Table 5 shows the political items most and least correlated with psychopathology.

Table 5. Political ideology items most and least associated with psychopathology.

Item	Factor loading	mean r with psychopathology
Body positivity harmful (r)	0.28	-0.04
No female vote (r)	0.52	0
Europe should be White (r)	0.6	0.01
Too much help to Ukraine (r)	0.51	0.01
Homosex fine when private	0.11	0.01
Climate change anxiety	0.65	0.16
Gay marriage	0.87	0.16
Beauty standards offensive	0.51	0.17
Gay orgy is ok	0.76	0.18
Western civ evil	0.25	0.19
Note: Factor loadings are for the political factor of leftism. (r) indicates the item was reversed.		

Differential validity by diagnosis

It is possible that different aspects of diagnosed psychopathology predict political orientation to different degrees. To examine this question, models were fit for each diagnosis alone plus the demographic controls (16 models), as well as a joint model. Moreover, the 3 diagnoses concerning schizoid-like problems were merged given their very low case counts and similarity (each n_{cases} = 2, combined n_{cases} = 4). Figure 6 shows the results.

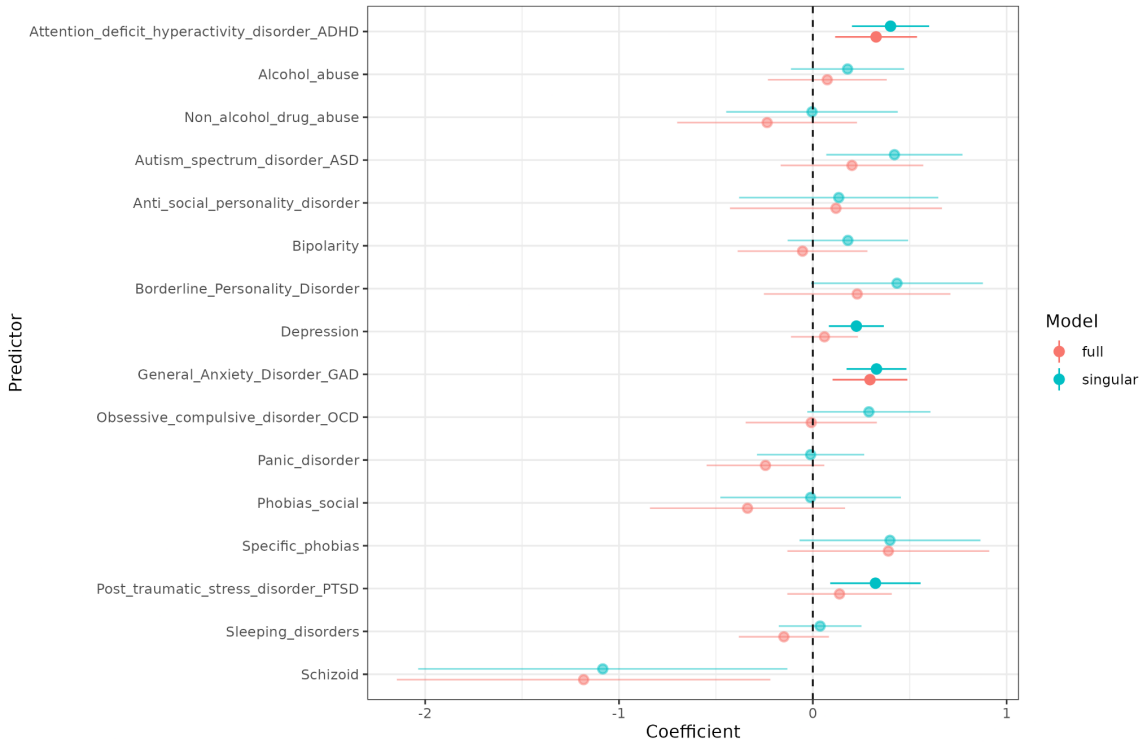

Figure 6. Regression models predicting leftism by diagnosis. Control variables are age, sex, and race. Highlighted coefficients have p < .05 false discovery rate adjusted p values. 95% confidence intervals.

While many diagnoses predicted politics at the 5% level when controlling for demographics (ADHD, ASD, DEP, GAD, PTSD, Schizoid-like), only 2 predicted leftism when other diagnoses were included and multiple testing adjusted p-values were used: ADHD and GAD. Given the case counts for many of these diagnoses, this analysis probably had relatively low power, however. This is especially the case for the schizoid-like diagnosis (n=4 cases).

Results for objective #2: Measurement invariance in mental health scales

One chief worry based on prior research is whether subjects high and low in leftism answer mental health questions similarly (that is, whether the items function the same way for people varying in leftism). In other words, there is a question of whether measurement invariance holds and to what extent violations of this affect the observed relationships. For this reason, we used differential item functioning (DIF) testing on the mental health scales. We used the leave-one-out approach, whereby the other items are used as anchors and the target item is tested for intercept/threshold and slope differences (Chalmers, 2015a, 2015b). Thus, for each item, a p-value was calculated for whether the item differs in the parameters, and these p-values were then adjusted for multiple testing using the Bonferroni method. Finally, to calculate the practical importance of the detected deviations from measurement invariance, an effect size was calculated (Meade, 2010; Nye & Drasgow, 2011). In this approach, the scores on the scale are calculated using the joint invariant fit and again for the partially invariant fit, and the differences in the score gaps are compared to produce a Cohen's d effect of the deviation from measurement invariance. Results are presented in Table 6.

Table 6. Effect sizes of deviations from measurement invariance across scales.

Scale	d	Effect size of the bias (strict)	Effect size of the bias (lenient)	Number of biased items (strict)	Number of biased items (lenient)	Item count
All items	0.29	0.02	0.02	4 vs. 4	16 vs. 17	76
Non-diagnoses	0.29	0.01	0.01	3 vs. 4	15 vs. 14	58
Diagnoses	0.34	0	0	0 vs. 0	0 vs. 1	18
MMPI	0.3	-0.02	0.01	0 vs. 3	3 vs. 4	24
Last 2 weeks	0.2	0.01	0.02	0 vs. 0	1 vs. 2	23
Satisfaction	0.34	0.01	0.02	0 vs. 0	1 vs. 0	11
Note: Positive values means higher scores for the low-leftism group. The terms strict and lenient refer to the threshold used for designating items as biased, that is, whether a nominal (lenient) or Bonferroni (strict) p<5% was used.						

Many items were found to have some bias (in the combined model, 33/76 items showed bias at $p < .05$), but overall, the impact of the biased items on the scale scores was relatively minor, following Cohen's guideline (Nye & Drasgow, 2011), because the biases were small and counter-balanced. Overall biases tended to be in the 'wrong' direction, as they generally had the effect of making the low-leftism group attain slightly higher scores on the scale, thus making the observed gaps corrected for bias slightly larger (e.g., d = 0.29 for the all items naive gap, d = 0.31 for the corrected gap).

Results for objective #3: Relationships involving body modifications

The association between piercings, tattoos, and unnatural hair colors with both leftism and psychopathology are shown in Fig. 3. This suggests that perhaps these features would be useful visual cues to judging the psychology of a person at distance. However, given that they also correlated with age and sex, which are usually easier to observe, this might fail if they do not have incremental validity. For this reason, we sought to see whether they had incremental validity to predict leftism and psychopathology beyond demographic variables. These results are shown in Table 7.

Table 7. Visual cues to leftism and psychopathology from piercings, tattoos, and unnatural hair color.

Predictor	Outcome					
	Leftism			*p diagnoses*		
Intercept	-0.15 (0.04, <0.001***)	0.60 (0.12, <0.001***)	0.52 (0.12, <0.001***)	-0.18 (0.04, <0.001***)	0.46 (0.12, <0.001***)	0.37 (0.12, 0.002**)
tattoo count	0.04 (0.03, 0.24)	0.03 (0.03, 0.39)	-0.01 (0.03, 0.85)	0.23 (0.03, <0.001***)	0.20 (0.03, <0.001***)	0.20 (0.03, <0.001***)
piercing count	0.09 (0.04, 0.03)	-0.01 (0.05, 0.77)	-0.02 (0.05, 0.75)	0.03 (0.04, 0.44)	0.01 (0.05, 0.88)	0.01 (0.05, 0.84)

unnatural hair	0.29 (0.08, <0.001***)	0.24 (0.08, 0.003**)	0.23 (0.08, 0.003**)	0.05 (0.08, 0.53)	0.03 (0.08, 0.67)	0.00 (0.08, 0.98)
age		-0.01 (0.002, <0.001***)	-0.01 (0.002, <0.001***)		-0.01 (0.002, <0.001***)	-0.01 (0.002, <0.001***)
male		-0.31 (0.07, <0.001***)	-0.30 (0.07, <0.001***)		-0.07 (0.07, 0.32)	-0.03 (0.07, 0.70)
race		(yes)	(yes)		(yes)	(yes)
p diag			0.15 (0.03, <0.001***)			
leftism						0.15 (0.03, <0.001***)
R2 adj.	0.03	0.07	0.09	0.08	0.12	0.14
N	978	976	976	978	976	976
Note: Unstandardized betas. Numbers in parentheses are standard errors and p values. * = p < .01, ** = p < 0.005, *** = p < .001.						

Distinct predictive patterns were observed. For predicting leftism, unnatural hair color (0.24 z) in addition to being younger (-0.01) and female (0.30) were significant. And these associations hold when controlling for p_{diag}. For predicting p_{diag}, tattoos (each tattoo adds 0.20 z) as well as being younger (-0.01) were significant.

In addition to the whole body counts of tattoos and piercings, one might wonder if various types of body modifications have different validities. To examine this, two further regression models were fit using each specific type of tattoo and piercing as a predictor. The results were too large to be presented in full here, but the predictors with beyond chance level results ($p < .01$) were as follows. For predicting leftism, we have septum piercing (1.02), genital piercing (1.37), unnatural hair (0.23). For predicting p_{diag}, we have arm tattoo (0.41), other/uncommon tattoo (0.63), and piercing outside the mouth area (1.08). Due to the rarity of some specific tattoos and piercings, a larger sample size would no doubt find more useful cues. However, these cues are quite large in effect size (e.g., a person with a septum and genital piercing with unnatural hair color would have an expected leftism of 2.62 z above the mean).

Discussion

The present study confirmed many prior findings from the literature. We found that measures of mental health were moderately related to leftism political ideology, such that worse mental health was related to leftism views. This is in line with most research on the topic (Bernardi, 2020; Dutton & Kirkegaard, 2022b). The better a given question measured mental health, the more strongly it associated with leftism. Similarly, the better a given question measured leftism, the more it is associated with psychopathology. We also observed that mental health diagnoses were stronger predictors of leftism than self-reported symptoms. In fact, when controlling for diagnoses, symptoms no longer predicted leftism.

The results are open to multiple interpretations. In our favored interpretation, other-report measures are better measures in general and show stronger predictive validities and heritabilities across different traits (Connelly & Ones, 2010; Faraone & Larsson, 2019; Kendler et al., 1993; Riemann et al., 1997; Riemann & Kandler, 2010; Willems et al., 2019). Thus, it is expected that

diagnoses are more valid predictors of leftism because they are simply better measures of psychopathology. Another interpretation is that people with left-wing views are more favorable to psychiatry and may value getting a diagnosis for a variety of reasons such as sympathy, economic benefits. If so, left-wing individuals may accumulate more diagnoses than their right-wing counterparts, not due to greater psychopathology, but because of differential help-seeking or diagnostic bias. There is indeed strong evidence of liberal bias in the profession (Redding, 2020). This is the result of the Social Justice Counseling (SJC) framework which trains therapists to diagnose clients through the lens of systemic oppression. This framework trains practitioners to see clients as either privileged or marginalized, and thus corresponds to the political views of psychologists (Redding & Satel, 2023). The present study could not rule out this interpretation based on the available data. A third option is that the measurement scales are psychometrically biased such that leftists are more likely to rate themselves higher. Our measurement invariance analyses, however, did not find much bias, and the small biases pointed in the opposite direction (the scales were slightly biased in favor of leftists). This relative lack of bias in scales across political groups confirms prior research.

In the analysis of differential validity of the different diagnosis for predicting leftism, it was found that anxiety and ADHD were the most reliable predictors. The first finding mirrors a previous study which found that anxiety symptoms were a stronger predictor of leftism than depression symptoms (Dutton & Kirkegaard, 2024). There was a possible signal of schizoid-like disorder predicting rightism, but because there were only 4 cases of this, this is only a suggestive finding. If true, it may confirm patterns that in the current American political climate, conservatives tend to attract people prone to conspiracy thinking, which is common among schizophrenics (Enders et al., 2022).

We found that body modifications predict both leftism and psychopathology, though the effects depended on the specific body modification (hair color, piercing location, tattoo location) and which psychological trait was predicted. Prior research similarly found a substantial correlation between body modification such as tattoos/piercing and various psychopathological measures such as self-injurious behaviors, use of substances, negative quality of life, reduced social interaction, emotional distress (D'Ambrosio et al., 2013; Deschesnes et al., 2006; King & Vidourek, 2013; Koch et al., 2010; Stirn et al., 2006). Too little research investigated the relationship between political orientation and body modification. One study found that Democrats (left-leaning) are more likely than Republicans (right-leaning) to ever had a tattoo, a body piercing, or both (Laumann & Derick 2006, Table 1), whereas another study found no difference between Democrats and Republicans in the likelihood of having a tattoo (Schaeffer & Dinesh, 2023). Both of these results however did not adjust for potential confounders such as demographics. More research is still needed on this matter.

A philosophical commentary on this work by a reviewer offers a macro-level framework that can expand upon our findings. On one hand, conservatism's association with better mental health may stem from its alignment with a worldview of objective morality, natural law, and traditional values. This framework fosters self-control through virtue ethics and strengthens social cohesion through loyalty and authority. On the other hand, the moral relativism and subjectivism associated with progressivism may lead to the normative disorientation that our study documents. From this perspective, the higher prevalence of psychopathological markers among leftists is not merely a result of stigma but a plausible psychological consequence of a worldview

that lacks a fixed moral compass. Similarly, body modifications can be seen not just as acts of self-expression that invite stigma, but as outward signals that reject traditional norms in favor of subjective truth. All in all, this means the psychological patterns we observe empirically may stem from fundamental differences in how political groups (especially left-wing political groups) perceive reality.

Limitations

This study has a number of limitations. First, being a survey study based on paid subjects, it has the same sampling bias as other such research. Since the hourly wage of survey subjects is close to the minimum wage in the USA, this presumably results in selection bias for who spends their time participating. We are not aware of any particular problems this would cause for the present study, but neither can they be ruled out.

Second, our measures of political ideology likely include different ideological dimensions, such as leftism (e.g., progressive taxation), sociocultural leftism (e.g., affirmative action, overpopulation as an environmental issue), geopolitical ideology or even cultural alignment (e.g., supporting Israel versus Hamas). Although such a criticism is on point, the unidimensionality estimate based on Revelle's rho is high (0.95). This still provides a strong rationale for the use of the general factor. Although we retain the general factor for parsimony, we caution that it can mask nuanced ideological differences.

Third, for both political ideology and mental health, we deliberately employed broad, multi-item measures rather than relying solely on established, standardized scales. While it was meant to capture a wider range of experiences and attitudes, a replication using well established scales is needed.

Fourth, given that our model regression R-squared was typically small (e.g., often below 0.20), one might conclude that these models poorly explain the data. However, the R-squared in a regression analysis is highly influenced by several statistical artefacts such as sample variance and variances of the independent variables (Figueiredo Filho et al., 2011). Other nonsensical results have been reported, with the R-squared value being close to 1 when the model is wrong, or decreasing when model assumptions are better fulfilled, or being the same when the independent and dependent variables are reversed (Dunn, 2021; Ford, 2015; Shalizi, 2015). Besides, it was recently established that a "R-squared that is between 0.10 and 0.50 is good provided that some or most of the explanatory variables are statistically significant" (Ozili, 2023). Generally, the R-squared is not an appropriate effect-size measure (Del Giudice; 2021; Funder & Ozer, 2019).

Fifth, since we relied mainly on self-report, the research is beset with the problems common to self-report measurements (such as over-reporting bias due to awareness or stigma or errors due to mental instability). As we discussed above, self-report measurements tend to be worse than other-report or objectively scored measurements (cognitive tests).

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Appendix

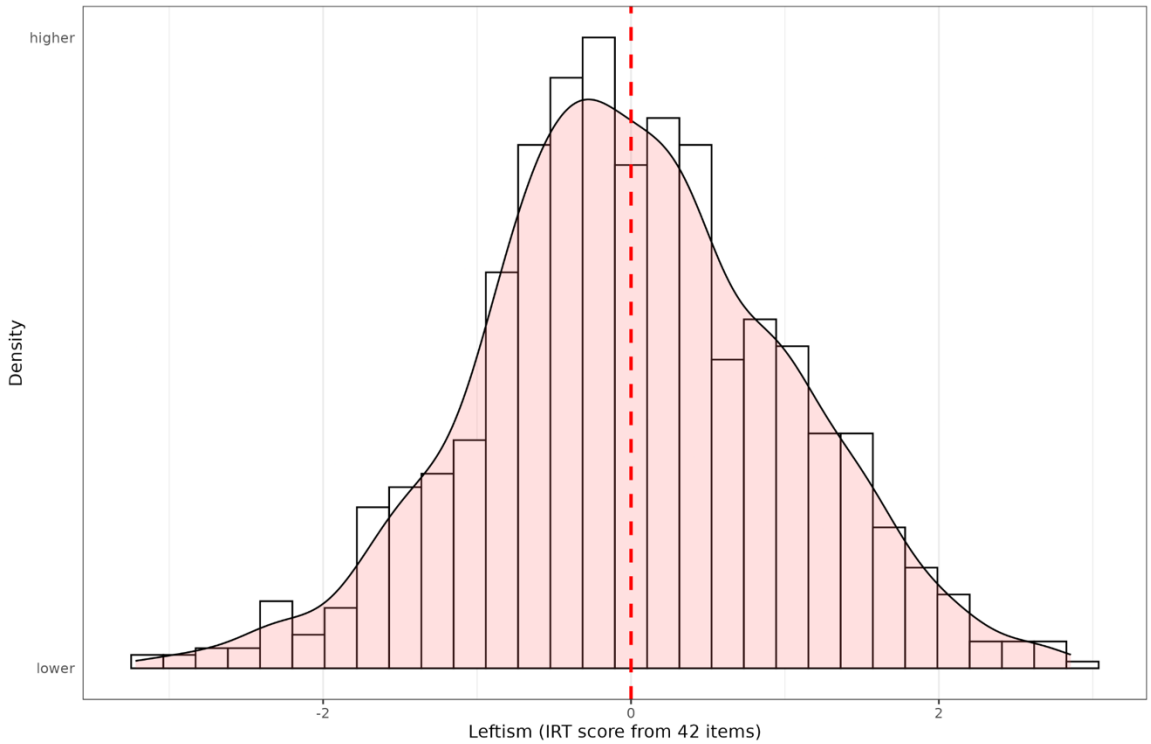

Figure S1. Distribution of political leftism based on 42 items.

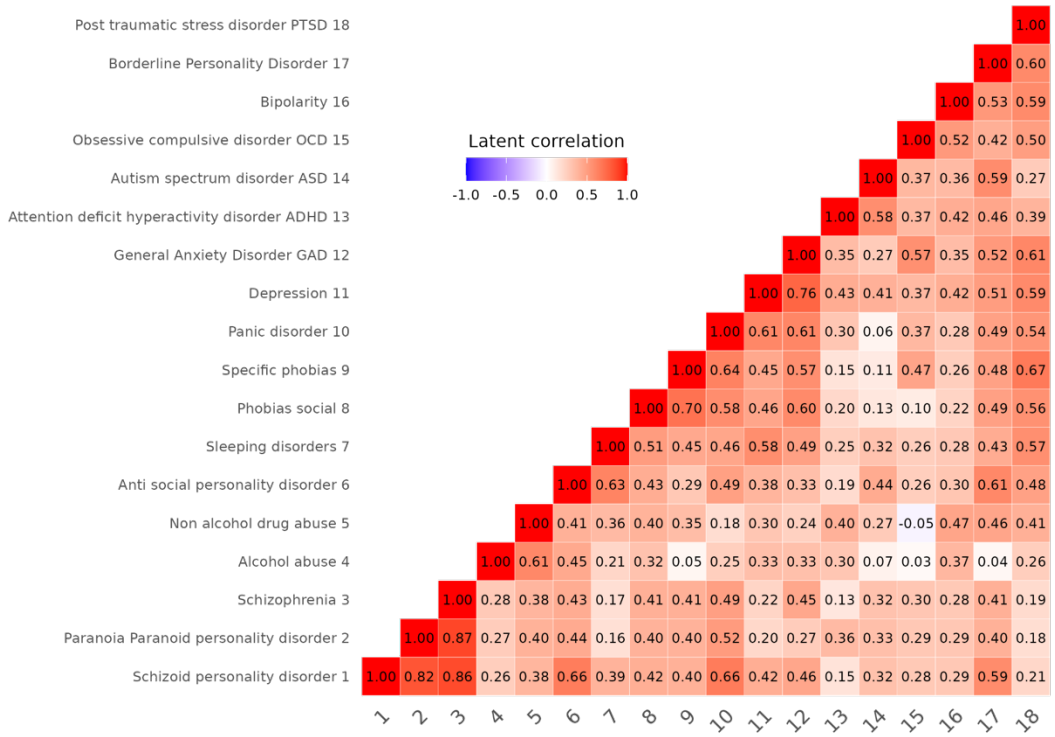

Figure S2. Correlation matrix for mental health diagnoses (latent correlation, i.e., tetrachoric).

Table S1. List of items for the mental health scale, along with their factor loading.

Items	Loading
Several times a week I feel as if something dreadful is about to happen.	0.84
Most of the time I feel blue.	0.90
I often feel as if things were not real.	0.67
I sometimes feel that I am about to go to pieces.	0.85
Even when I am with people I feel lonely much of the time.	0.84
I feel that I have often been punished without cause.	0.77
Life is a strain for me much of the time.	0.88
I have strange and peculiar thoughts.	0.66
My plans have frequently seemed so full of difficulties that I have had to give them up.	0.81
Often even though everything is going fine for me I feel that I don't care about anything.	0.81
I do many things which I regret afterwards I regret things more or more often than others seem to.	0.74
At times I think I am no good at all.	0.82

I have often felt that strangers were looking at me critically.	0.69
I am happy most of the time.	0.78
I very seldom have spells of the blues.	0.64
During the past few years I have been well most of the time.	0.63
My daily life is full of things that keep me interested.	0.72
I am usually calm and not easily upset.	0.65
I believe that my home life is as pleasant as that of most people I know.	0.64
Most nights I go to sleep without thoughts or ideas bothering me.	0.62
I am liked by most people who know me.	0.59
I am not easily angered.	0.56
I do not mind meeting strangers.	0.45
I get all the sympathy I should.	0.58
Little interest or pleasure in doing things.	0.82
Feeling down depressed or hopeless.	0.90

Feeling more irritated grouchy or angry than usual.	0.80
Sleeping less than usual but still have a lot of energy.	0.54
Starting lots more projects than usual or doing more risky things than usual.	0.50
Feeling nervous anxious frightened worried or on edge.	0.83
Feeling panic or being frightened.	0.85
Avoiding situations that make you anxious.	0.74
Unexplained aches and pains, e.g. head back joints abdomen legs.	0.64
Feeling that your illnesses are not being taken seriously enough.	0.79
Thoughts of actually hurting yourself.	0.79
Hearing things other people couldn't hear such as voices even when no one was around.	0.53
Feeling that someone could hear your thoughts or that you could hear what another person was thinking.	0.51
Problems with sleep that affected your sleep quality over all.	0.70
Problems with memory, e.g. learning new information or with location e g finding your way home.	0.75
Unpleasant thoughts urges or images that repeatedly enter your mind.	0.82

Feeling driven to perform certain behaviors or mental acts over and over again.	0.72
Feeling detached or distant from yourself, your body, your physical surroundings or your memories.	0.78
Not knowing who you really are or what you want out of life.	0.83
Not feeling close to other people or enjoying your relationships with them.	0.87
Drinking at least 4 drinks of any kind of alcohol in a single day.	0.27
Smoking any cigarettes a cigar or pipe or using snuff or chewing tobacco.	0.24
Using any of the following medicines ON YOUR OWN.	0.44
Life satisfaction.	0.81
Job satisfaction.	0.59
Social satisfaction.	0.72
Romantic satisfaction.	0.53
Mood higher means better mood.	0.81
Anxiety levels higher means less anxious.	0.50
In most ways my life is close to my ideal.	0.74

The conditions of my life are excellent.	0.73
I am satisfied with my life.	0.78
So far I have gotten the important things I want in life.	0.68
If I could live my life over I would change almost nothing.	0.56
Attention deficit hyperactivity disorder ADHD.	0.49
Alcohol abuse.	0.33
Non alcohol drug abuse.	0.47
Autism spectrum disorder ASD.	0.37
Anti social personality disorder.	0.73
Bipolarity.	0.41
Borderline Personality Disorder.	0.64
Depression.	0.62
General Anxiety Disorder GAD.	0.47
Obsessive compulsive disorder OCD.	0.36

Panic disorder.	0.47
Paranoia Paranoid personality disorder.	0.59
Phobias social.	0.61
Phobias specific for example agoraphobia and claustrophobia.	0.59
Post traumatic stress disorder PTSD.	0.63
Schizophrenia.	0.46
Schizoid personality disorder.	0.55
Sleeping disorders.	0.60

Table S2. List of items for the political views scale, along with their factor loading.

Items	Loading
There are objective measures of beauty.	-0.29
The label overweight is offensive.	0.11
Beauty standards are oppressive.	0.51
Body positivity is harmful	-0.28
I support the LGBT community.	0.89
Homosexual behavior is fine when it is private and chaste.	0.11
There is nothing wrong with public depictions of homosexual relationships.	0.87
I support gay marriage.	0.87

There is nothing wrong with attending a gay orgy.	0.76
Children should be taught about gay sex in sex education classes.	0.78
There are only two genders.	-0.85
Everyone be addressed by their desired pronouns.	0.85
I support feminism.	0.84
The country would be better if women couldn't vote.	-0.52
Women should try to be married by the age of 25.	-0.50
The government should help ensure sexual equality by making sure women are not discriminated against in private hiring.	0.69
Women should hold the majority of the positions of power in society.	0.54
Marriage is oppressive for women and monogamy should be moved away from.	0.42
Men should be masculine and women should be feminine.	-0.76
Politics suffers from male overrepresentation.	0.81
Abortion should be available to women for use for any reason.	0.82
I support sending more aid to Ukraine.	0.66
The Western response to the Russian invasion of Ukraine went too far.	-0.51
Progressive taxation where the rich are taxed at a higher rate is the best way to structure a tax system.	0.69
Reducing taxes for businesses can stimulate economic growth.	-0.55
I support Israel against Hamas.	-0.50
Israel is commiting genocide in Gaza.	0.65
Black Lives Matter is a virtuous organization.	0.71
Europe would be best if it remained all white.	-0.60
Immigration policy should be strict and heavily meritorious.	-0.73
The government should ensure racial equality by prohibiting racial discrimination in private business dealings such as hiring.	0.64
Black people deserve reparations for the legacy of slavery.	0.62

I support open borders.	0.62
Politics suffers from white overrepresentation	0.82
Affirmative action is discrimination.	-0.63
Compared to other civilizations Western civilization is uniquely evil.	0.25
Racial diversity is more important than viewpoint diversity.	0.43
The world is suffering from overpopulation.	0.38
I feel overwhelmed or anxious by climate change.	0.65
Public policy changes do not need to be made to deal with climate change.	-0.67
Are you politically left wing or right wing?	-0.77