# Implicit Ideologies: Do Right-Wing Authoritarianism and Social Dominance Orientation Predict Implicit Attitudes?

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Study design and online materials are openly available at the project’s Open Science Framework page (<https://osf.io/urq6m/>) and study materials for Project Implicit’s Ideology 2.0 datatset can be found at (<https://osf.io/2483h/>). Preregistered Stage 1 protocol: <https://osf.io/zv4jw> (date of in-principle acceptance: 22/10/2023). We gratefully acknowledge the data collected and provided by Project Implicit® as well as correspondence by Dr Kathleen Schmidt.

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# Abstract

Many social and political attitudes, beliefs and behaviours can be predicted by Right-Wing Authoritarianism (RWA; a preference for authority and tradition) and Social Dominance Orientation (SDO; a preference for social hierarchies and inequality). These two constructs have predominantly been studied in the context of self-reported (explicit) attitudes, so the usefulness of RWA and SDO to predict individuals’ implicit attitudes remains relatively unclear and understudied. The current research examines a large dataset collected as part of Project Implicit to test the predictive power of RWA and SDO for implicit and explicit attitudes toward topics relating to authority, tradition and hierarchies (i.e., concepts most relevant to RWA and SDO). The findings of the current study suggest that RWA and SDO are in fact predictive of some implicit attitudes that are in line with the RWA and SDO ideologies, as well as most corresponding explicit attitudes.

*Keywords:* right-wing authoritarianism, social dominance orientation, IAT, project implicit, political attitudes, implicit attitudes

# Implicit Ideologies: Do Right-Wing Authoritarianism and Social Dominance Orientation Predict Implicit Attitudes?

Psychologists have increasingly looked to understand the underpinnings of political ideology (Feldman & Johnston, 2014). As political polarization has increased in many nations (Dunlap et al., 2016; Wilson et al., 2020), we’ve seen stark examples of this growing divide playing out in recent major events such as the COVID-19 pandemic, where liberals and conservatives differ greatly in their support for public health measures and their willingness to endorse COVID-19 misinformation (Calvillo et al., 2020; Havey, 2020). Beyond pandemic-related behavior, a substantial body of research has demonstrated how political ideology can predict a diverse range of outcomes including racial attitudes, beliefs about the environment, attitudes towards immigration, the promotion or justification of violence, parenting styles, and dating preferences (Bronstein et al., 2017; Brooks et al., 2016; Eastwick et al., 2009; Leshin et al., 2022; McCright et al., 2016; Webber et al., 2020).

**Understanding Political Ideology: Right-Wing Authoritarianism and Social Dominance Orientation**

It is therefore important to understand what exactly underpins political ideology. Often, political ideology has been conceptualised as a unidimensional construct representing the political left-wing and right-wing (i.e., “liberal” and “conservative”) (Duckitt & Sibley, 2010). Empirical studies, however, have consistently found that socio-political ideology does not map onto a single dimension, but typically, onto two distinct and somewhat independent constructs (Ashton et al., 2005; Choma et al., 2010; Duckitt, 2001). Substantial research suggests that the first of these dimensions broadly represents economic conservatism, hierarchy, and inequality at one end versus social welfare, social concern and egalitarianism at the opposite end (Duckitt & Sibley, 2010; Eysenck, 2018). The second dimension represents authoritarianism, social conservatism, or traditionalism at one end versus openness, autonomy, and personal freedom at the other (Duckitt & Sibley, 2010; Altemeyer & Altemeyer, 1981; Altemeyer, 1998). Two scales have been developed to reliably capture these dimensions: the Social Dominance Orientation scale (SDO; Pratto et al., 1994; Ho et al., 2015) and the Right-Wing Authoritarianism scale (RWA; Altemeyer & Altemeyer, 1981; Duckitt et al., 2010), respectively.

Recent literature on SDO demonstrates the scale’s ability to measure an individual’s tolerance or support for inequality (i.e., hierarchy) between different social groups. People scoring higher in SDO are more likely to hold prejudiced beliefs against social groups such as immigrants, ethnic minorities, and sexual minorities (Asbrock et al., 2010; Costello & Hodson, 2011; Kteily et al., 2011); to describe themselves as politically conservative (Pratto et al., 1994; McFarland & Adelson, 1998); and to support policies that maintain the status quo (Gutiérrez & Unzueta, 2013). Similarly, RWA has been found to strongly predict support for many authoritarian phenomena such as ethnocentrism, intolerance of non-conformity, and fundamentalist religiosity, as well as right-wing versus left-wing political orientation (Duckitt, 2009; Ho et al., 2015; Altemeyer, 1998; Tartaglia et al., 2019; Zhao et al., 2020).

Both SDO and RWA are typically found to be strong predictors of political conservatism, but they are not necessarily synonymous with conservatism. In many western European nations, SDO and RWA correlate strongly and positively, and underlie a substantial amount of conservative ideology and identification (Duckitt & Sibley, 2010). However, in many eastern European nations, particularly amongst formerly communist states, SDO and RWA are found to be weakly negatively correlated. This is due in large part to the former communist governments in those nations espousing ideology that was both highly egalitarian (low SDO) and authoritarian (high RWA; de Regt et al., 2011; Roccato & Ricolfi, 2005). These patterns illustrate how SDO and RWA both contribute significantly to an individuals’ political orientation in ways that are often – but not always – aligned.

**Implicit Versus Explicit Attitudes**

Most of the research involving RWA and SDO, however, has used these variables to predict outcomes using measures of explicit (i.e., self-reported) attitudes, rather than implicit attitudes. Though we might expect an individual’s explicit and implicit attitudes about a given topic to be highly consistent, this is not always the case. In fact, psychologists have debated whether implicit attitudes, such as those measured by the Implicit Association Test (IAT; Greenwald et al., 1998), represent the same underlying construct thought to be measured by self-reported, explicit attitudes (Bergh et al. 2012). Specifically, the IAT measures how closely someone associates combinations of various categories (e.g., “Black people” or “White people) with attributes (e.g., “good” or “bad”). Participants’ response latencies when matching these stimuli are used to infer the relative strength of association between each category and attribute pair (e.g., “Black people” and “bad”) and are thought to represent implicit attitudes (e.g., implicit attitude held towards Black people). One advantage of measuring implicit attitudes is that they are not as susceptible to motivational biases (e.g., social desirability) that can affect explicitly measured attitudes (Greenwald & Banaji, 1995). Additionally, implicit measures can tap into attitudes that are “introspectively unidentified…or inaccurately identified” by individuals (Greenwald & Banaji, 1995). For these reasons, although implicit and explicit measures are often assumed to measure the same, underlying attitudes, they would not be expected to correlate perfectly (usually around *r* = 0.30). This is thought to represent the difference between the uncontrolled, spontaneous responses to implicit measures and the more deliberative, conscious responses to explicit measures (Wilson et al., 2000).

Having said that, certain researchers have argued that these associations might simply reflect greater familiarity as a result of common cultural associations, rather than implicitly endorsed beliefs and are therefore of little importance (Blanton & Jaccard, 2008). Contrastingly, other researchers have rebuked that even cultural associations stored in one’s memory are still likely to influence that individual’s behaviour regardless of personal endorsement, and are therefore still important (Nosek & Hansen, 2008).

In a recent review of the IAT’s validity, Schimmack (2021) highlighted how the measure’s validity in measuring attitudes differed greatly across the domain in question. For example, after adjusting for measurement error in Cunningham et al.’s (2001) study on racial preferences, only 20% of the variance in the IAT reflected actual racial preferences. Additionally, there was no evidence to support the idea that the IAT tapped into a construct that was distinct from explicit measures of racial preferences. Conversely, Schimmack (2021) cited a 2018 study by Bar-Anan and Vianello which used the IAT to predict political orientation, in which 64% of the IAT’s variance represented real differences in political orientation – the highest proportion of any of the domains reviewed. Furthermore, in reviewing Bar-Anan and Vianello’s (2018) study, Schimmack concluded once more that there was no evidence for distinct explicit and implicit attitudes. That is, that both explicit and implicit measures of political orientation appeared to be measuring the same underlying attitude.

**How Do RWA and SDO Predict Implicit Attitudes?**

Given the findings relating to the IAT and political orientation, we might expect RWA and SDO to predict implicit attitudes in a similar way to that of explicit attitudes. However, research employing RWA and SDO to predict implicit attitudes is relatively scarce and offers mixed findings. For example, Stern and Axt (2019) demonstrated that SDO predicted more negative attitudes towards African Americans on both explicit and implicit measures. Similarly, Kim et al.’s (2022) study of attitudes about autism in the US and South Korea found that SDO significantly predicted both explicit and implicit attitudes. Other studies have produced more mixed results, such as a recent paper by Estrada-Reynolds et al. (2022) finding that SDO was significantly correlated with implicit measures of prejudice, while RWA was not. On the other hand, Ivanski et al. (2021) found firstly, that self-identified conservatives expressed a preference for dogs as pets compared to cats. The authors then found that RWA significantly predicted an implicit preference for dogs over cats, while SDO did not. A study by Moor et al. (2019), meanwhile, used both RWA and SDO to predict explicit and implicit attitudes towards gay men and found that neither scale predicted implicit attitudes – only explicit attitudes. Overall, these inconsistent findings emphasise the lack of clarity that remains around the predictive power of RWA and SDO on implicit attitudes.

**The Present Study**

Given this lack of understanding of the relationship between RWA, SDO and implicit attitudes, the current study used a large multivariate dataset to test the relationship between RWA and SDO and explicit and implicit attitudes on a range of topics. The study used data from Project Implicit’s Ideology 2.0 dataset. This dataset included over 49,000 unique sessions in a planned missing data design including measures of RWA, SDO, as well as a selection of IATs and self-report items measuring attitudes towards topics related to RWA and SDO. As a significant body of research has shown SDO and RWA to relate to distinct explicit attitudes, it would be expected that SDO and RWA would also relate similarly to implicit measures of those same attitudes. For instance, it would be expected that higher SDO would relate positively to an implicit preference for group inequality and competition, much like explicit attitude measures. Similarly, it would be predicted that higher RWA would relate positively to a greater or deference to authority and tradition – again, mirroring explicit attitude measures. Examples of IAT topics that may be relevant for those scoring higher in SDO include the association of “good/bad” with pairs such as “equal/unequal”, “hierarchy/anarchy”, or the term “status quo”, etc. Examples of RWA relevant topics include the associations of “good/bad” with pairs such as “change/preserve”, “progress/restore”, “new/old”, amongst others. Certain IAT pairs such as “capitalism/socialism” would be expected to relate to *both* SDO and RWA, as a preference for a capitalist economy aligns with values of both competition/inequality and tradition. Therefore, firstly, we hypothesize that across a range of topics with relevance to SDO and RWA (i.e., preferences for hierarchy/inequality and traditionalism/authoritarianism, respectively) the two scales will predict explicit attitudes in ways that are consistent at face value with what each ideological scale is thought to measure. Secondly, it is hypothesised that SDO and RWA will also predict implicit attitudes in ways reflective of each ideological scale. The specific predicted relationships for these hypotheses are shown in Table 1. In addition to the predicted directions of each relationship, brief explanations are provided to highlight which theoretical aspects of SDO and RWA are thought to be relevant to each topic in question. If both explicit and implicit measures yield similar relationships with SDO and RWA, this would help elucidate whether SDO and RWA are predictive of implicit attitudes as expected based on research using explicit attitude measures. Furthermore, these predicted findings would support the idea that implicit and explicit measures are both useful ways of measuring the same underlying attitude.

**Table 1**

*IAT Pairs/Single Items Associated with “good/bad”, and predicted relationships to SDO and RWA and* N *per IAT Task*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IAT pair/item** | ***SDO*** | ***RWA*** | ***SDO* N** | ***RWA* N** | ***Citation*** | ***Justification*** |
| 1. hierarchy/ anarchy | positive | – | 191 | 217 | Ho et al. (2015) | SDO defined as “a general orientation toward hierarchy” |
| 1. markets/ regulation | positive | – | 172 | 185 | Jedinger & Kaminski (2023) | “People scoring high in SDO appear to have a natural affinity for free-market arrangements because capitalist economies inherently foster intergroup competition and legitimize inequality” |
| 1. equal/ unequal | negative | – | 213 | 208 | “” | “” |
| 1. capitalism/ socialism | positive | positive | 201 | 185 | Jedinger & Kaminski (2023) | “Authoritarians support the status quo […] In this respect, they support the current economic system” |
| 1. status quo | positive | positive | 235 | 230 | Jedinger & Kaminski (2023); Sibley & Duckitt (2010) | “[Social dominance legitimises] social and political practices that promote and maintain the status quo and thus existing sociostructural inequalities” |
| 1. change/ preserve | – | negative | 198 | 174 | Sibley & Duckitt (2008) | “RWA…represents resistance to change” |
| 1. familiar/ novel | – | negative | 203 | 201 | Duckitt et al. (2010) | “[RWA] expresses the value and goal of maintaining traditional lifestyles […] and resisting modern lifestyles” |
| 1. new/old | – | negative | 194 | 195 | “” | “” |
| 1. progress/ restore | – | negative | 195 | 196 | “” | “” |
| 1. present/past | – | negative | 190 | 189 | Baldwin & Lammers (2016) | “Conservatives view the past as better than the present” |
| 1. future/ present | – | negative | 200 | 216 | Baldwin & Lammers (2016); Jost et al. (2003) | “Conservatives […] prefer the certainty of the past to the uncertainty of tomorrow” |
| 1. 2050/1950 | – | negative | 203 | 213 | “” | “” |

Note. Relationship indicates association between the first/sole item in each IAT pair (e.g., “hierarchy”) and the first descriptor word (e.g., “good"). In row 5, “status quo” is a single item IAT and therefore does not have an opposing counterpart (i.e., status quo associated with either “good” or “bad”)

# Method and Materials

**Design**

The overview, design and supplemental materials for Project Implicit’s Ideology 2.0 data collection are available on the Open Science Framework ([https://osf.io/2483h/.](https://osf.io/2483h/)). The total dataset contains more than 280,000 unique sessions collected between December 2007 and June 2012, though each participant completed only a subset of the measures. The study used a planned missingness design in which each participant completed a semi-random subset of the full list of measures. Participants were randomized to one of two data collection designs—Design A or Design B—in which they completed explicit and implicit measures for either one (Design A) or two topics (Design B) as well as items from either five (Design A) or two (Design B) individual-difference scales.

**RWA**

The short 10-item RWA scale validated by McFarland (2005) was used to measure RWA. Participants indicated how much they agreed with statements such as “Our country will be destroyed someday if we do not smash the perversions eating away at our moral fiber and traditional beliefs” using a 7-point Likert scale from -3 (*strongly disagree*) to 3 (*strongly agree*), with 0 used as a midpoint.

**SDO**

SDO was measured using the 16-item scale developed by Pratto et al. (1994). Participants indicated how much they agreed with statements such as “Some people are just inferior to others” using a 7-point Likert scale from -3 (*strongly disagree*) to 3 (*strongly agree*), with 0 used as a midpoint.

**Implicit Attitudes**

To measure implicit attitudes, respondents completed the Implicit Association Test (IAT; Greenwald et al., 1998), a speeded dual-categorisation task in which participants were asked to categorise concepts with positive or negative attributes. These concepts would often be dual-category, that is, categorised in complementary pairs such as “progress” versus “restore”. However, the concepts may also be single-category items, using a single term such as “status quo”. In both designs, participants would be asked to categorise these concepts with attribute pairs such as “bad” versus “good” as quickly as possible. As an example, for dual-category IATs, faster responses when "progress” and “good” (and “restore” and “bad”) required the same key press, as compared to the reverse, reflect more anti-progress (or pro-restoration) implicit attitudes (Greenwald et al., 2009). Similarly, for single-category IATs, faster responses when “status quo” required the same key press as “good”, as opposed to when it required the same key press as “bad”, reflect more pro-status quo implicit attitudes. IAT D-scores were computed as described in Greenwald et al. (2003).

**Explicit Attitudes**

All participants completed a single-item preference measure. Participants assigned to a paired IAT indicated whether they preferred *x* or *y* (where *x* and *y* refer to the IAT paired stimuli) on a scale from -3 (*strong preference for y*) to 3 (*strong preference for x*). Participants assigned to a single-category IAT indicated how much they liked *x* (where *x* referred to the IAT target stimulus) on a scale from 1 (*Strongly dislike x*) to 7 (*Strongly like x*).

**Participants**

The study was available internationally, but most respondents (77%) were U.S. residents. Scales often show measurement non-equivalence across countries, which can bias estimates (Davidoff et al., 2014), so we restrict our analyses to U.S. residents only. For the measurement models (see below), this resulted in n = 19,275 for RWA and n = 19,193 for SDO. For the path models, we selected only those participants who had also completed one of the 12 IATs of interest, and who passed the IAT exclusion criteria suggested by the Ideology 2.0 study organizers.[[1]](#footnote-1) Across all 12 IATs of interest, this yielded 2,409 participants who completed RWA items and 2,395 who completed SDO items. Per-IAT participant counts for RWA and SDO are shown in Table 1; these vary somewhat due to random assignment and range from n = 172 to n = 235.

**Analysis Pipeline**

**Measurement Models**

Both the RWA and SDO scales were administered using a planned missingness design. Planned missingness is typically used to shorten surveys and reduce participant fatigue (Zhang & Yu, 2022). For example, participants might be given 50% of the scale items at random, reducing scale length by half. In a planned missingness design, the missing data are “missing completely at random” (MCAR), meaning that the probability of missingness is not related to any attributes of the data (Rubin, 1976). If data are MCAR, missingness is considered “ignorable,” and techniques including multiple imputation (Graham & Hofer, 2000) and maximum likelihood estimation can be used to produce unbiased estimates despite the missing data (Enders & Bandalos, 2001).

In the Ideology 2.0 dataset, if a participant was randomly assigned to the RWA or SDO scales, they completed four randomly-chosen items from it. Thus, participants who were assigned the RWA scale saw only 40% of the items (4/10), and participants who were assigned the SDO scale saw only 25% of the items (4/16). Simulation studies evaluating measurement model estimates with high rates of MCAR data demonstrate that in large samples (N = 1,000 or greater) unbiased latent factor scores can be estimated with full-information maximum likelihood (FIML; Zhang & Yu, 2022). In the current data, 19,275 participants were assigned to see a subset of items from the RWA scale, and 19,193 participants were assigned to see a subset of items from the SDO scale. We therefore fit measurement models using FIML estimation (using the lavaan package in R; Rosseel, 2012) separately for RWA and SDO using data from all participants who saw that scale. We then estimated a single factor score for each scale and then used the regression method (as implemented by lavaan’s “lavPredict()” function) to compute estimated values for each participant. These estimated values were then treated as observed variables in subsequent path models.[[2]](#footnote-2)

**Model fit assessment.** For each measurement model, we report the following fit statistics: chi-square, SRMR (standardized root mean squared residual), RMSEA (root mean square error of approximation), and CFI (comparative fit index). The standard approach to assessing model fit uses the cutoffs for SRMR, RMSEA, and CFI proposed in Hu and Bentler (1999). However, methodologists have pointed out that the use of a single-set of cutoffs is invalid, because these were derived by simulations that might not match the data structure of the models being tested. Thus, it is more appropriate to report dynamic fit index cutoffs that are computed for the current model and data (McNeish & Wolf, 2023). For each measurement model, we report dynamic cutoffs for small, medium, and large misspecification as computed by the “dynamic” package in R (Wolf & McNeish, 2022).

We report fit statistics and dynamic cutoffs in order to inform readers about how well models fit the data, to facilitate future research on the measurement validity of widely-used psychological instruments. However, we do not use the fit statistics as a decision-making contingency. That is, we proceed with subsequent analyses even if models do not fit well. The RWA and SDO scales are extremely widely used despite substantial evidence of model misfit (Kandler et al., 2016; Kehn et al., 2022; Perez-Arche & Miller, 2021; Wagoner et al., 2023). To maximize comparability to past research, we therefore do not make data-based adjustments to the measurement models here, even if they do not fit well.

**Positive Controls**

Both RWA and SDO are consistently associated with self-reported political ideology. As a positive control, we report the correlation between estimated RWA/SDO scores and self-reported political ideology (7-point scale ranging from -3 = “Strongly Conservative” to 3 = “Strongly Liberal”). Again, we do not use the size of this correlation as a decision-making contingency, but we will report it to aid readers in interpreting the subsequent results.

## Path Models

Because very few participants (n=258) completed both RWA and SDO items, we fit separate path models for RWA and SDO for each topic (see Figure 1 for a diagram of the model for SDO). Because we have 12 topics and we are fitting separate models for RWA and SDO, we estimate 24 models in all. For each topic, we specify that both explicit ratings and IAT D-scores are predicted by RWA/SDO. We also estimate a covariance between explicit ratings and IAT D-scores. Thus, these models are fully saturated (all possible paths estimated). For each model, the path coefficients between RWA/SDO and explicit ratings/D-scores test our predictions (see Table 1 for predicted relationships between each topic and RWA/SDO).

**Figure 1**

*Diagram of path model for Social Dominance Orientation (SDO).*

A diagram of a network

Description automatically generated

**Type I Error Control**

We have 12 topics of interest, and, for each topic, we fit separate models for RWA and SDO, each of which will have two path coefficients of interest. This means that we conduct 48 statistical tests in total (12 x 2 x 2). Without correction for multiple testing, conducting this many tests would increase the total Type I error rate dramatically. One approach to error control would be to designate all 48 tests as a single family, and to control the family-wise Type I error rate using a Bonferroni correction or similar adjustment. However, this entails a severe loss of statistical power as the number of tests increases (Anderson, 2021). An alternative approach that is commonly used when the number of tests is large and many non-null relationships are expected is false-discovery rate (FDR) control (Benjamini & Hochberg, 1995). Rather than specifying a family-wise error rate, FDR adjustments require researchers to choose a false-discovery rate, which is defined as the expected ratio of (erroneously) rejected nulls to total rejections (Anderson, 2021). So, for example, a FDR of .1 would correspond to one erroneously rejected null for every 10 null rejections.

The choice of FDR is at the researcher’s discretion and requires balancing the costs of Type I vs. Type II errors. In this case, we are examining a relatively large number of topics and we expect that relationships for which we reject the null will suggest areas for follow-up research (meaning that non-null results would be replicated in future research). We therefore use a more liberal FDR of .20, meaning that of every 10 rejected nulls, two would be expected to be false-positives. We implement the FDR adjustment with the widely-used Benjamini-Hochberg (1995) procedure. In this procedure, *p*-values are ranked from smallest to largest, and each is compared to a critical value based on its rank, the total number of tests, and the FDR. The null is rejected for the largest *p*-value smaller than its critical value, and for all smaller *p*-values.

**Power Analysis**

In addition to the FDR-adjusted tests of significance, we also report point estimates and 95% confidence intervals for each coefficient. We therefore also performed a sensitivity analysis to determine the statistical power of each test individually (i.e., what is the power to detect that a path coefficient differs from zero?). We determined a minimum standardized effect size of interest (see Bloom, 1995) of .15 (i.e., a small effect; Cohen, 1998) for the path coefficient of interest. We then used the “SSpower()” function provided by the “semTools” package in R (Jorgensen et al., 2022) to implement the Satorra and Saris (1985) chi-squared method for power analysis assuming this effect size. This method requires the user to supply values for all variances and covariances in the model; these were estimated empirically from the exploratory data. It also requires the user to specify a sample size; this was set to n = 171 as this was the smallest per-topic sample size. This procedure showed a power of at least .98 to detect a standardized path coefficient >= .15 for every test.

**Table 2**

*Study Design Table*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Question | Hypothesis | Sampling plan | Analysis Plan | Rationale for deciding the sensitivity of the test for confirming or disconfirming the hypothesis | Interpretation given different outcomes | Theory that could be shown wrong by the outcomes | Summary of observed outcomes |
| Do RWA and SDO predict implicit attitudes? | RWA and SDO will predict implicit attitudes in line with explicit attitudes toward a range of relevant topics. | Data already collected online through Project Implicit. Actual sample sizes will vary per variable due to the nature of data collection, but will make use of extremely large sample, with most variables at least reaching rule of thumb suggestions of between N = 150-200. | SEM using FIML for planned missingness data design. | FIML path analysis robustly allows for imputing missing values based on data collected. | If hypothesised results observed: demonstrates that RWA and SDO can predict implicit attitudes and that this corresponds as expected with explicit attitudes.  If not observed: identifies a disconnect between RWA/SDO and implicit attitudes. Highlights inconsistency with implicit and explicit measures. | Will help to identify whether RWA and SDO map onto implicit measures of attitudes or whether these differ from explicit measures.  Will look to test both the validity of RWA and SDO (do they measure implicit attitudes that we would expect?) as well as IAT (are implicit attitudes consistent with explicit?). | RWA and SDO are predictive of some implicit attitudes in line with each ideology, as well as corresponding explicit attitudes.  In some cases, RWA and SDO were predictive of explicit, but not, implicit, attitudes which may reflect more generalised and explicit conservative attitudes. |

# Results

**Measurement Models**

Recall that measurement models were estimated separately for RWA and SDO using data from all participants who saw that scale (NRWA = 19,275; NSDO = 19,193). Using the cut-off values suggested by Hu and Bentler (1999), the model fit indices did not generally indicate good fit for the SDO model (*X*2 [104] = 3255.19, *p* < .001; RMSEA = 0.04; SRMR = 0.11; CFI = 0.79) or RWA model (*X*2 [35] = 3275.63, *p* < .001; RMSEA = 0.07; SRMR = 0.11; CFI = 0.80). Dynamic fit cut-offs (as suggested by McNeish & Wolf, 2023) for both models are shown in Table 3. For both SDO and RWA models, SRMR and CFI both exceeded the threshold for “Large” misspecification (note that higher SRMR and lower CFI values indicate worse fit). RMSEA was equal to the “Small” threshold for RWA, and between the “Medium” and “Large” thresholds for SDO (note that higher RMSEA indicates worse fit). Overall, like the Hu & Bentler (1999) cut-offs, the dyamic fit indices indicated that neither model fit well. However, as planned, we did not make data-based adjustments to the models in order to maximize comparability to past research.

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*Cut-Offs for RWA and SDO models.*

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| RWA Model | | | |
| Small(Level 1) |  |  |  |
| (Level 2) |  |  |  |
| Large (Level 3) |  |  |  |
| SDO Model | | | |
| Small (Level 1) | 0.03 | 0.04 | 0.97 |
| Medium (Level 2) | 0.04 | 0.06 | 0.93 |
| Large (Level 3) | 0.05 | 0.08 | 0.89 |

*Note.* “Small,” “Medium” and “Large” thresholds correspond to the level of misfit expected for these models if: about 1/3 of items have omitted residual correlations with other items (“Small”); about 2/3 of items have omitted residual correlations (“Medium”); all items (or, in the case of an odd number of items, all but one) have omitted residual correlations (“Large”). More details on these thresholds are given in McNeish & Wolf (2023, p. 80).



**Positive Control**

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**Path Models**

The results of all 24 path models are shown in Table 4*.* The path estimates deemed statistically significant by this procedure are shown in bold in Table 4, and their *p*-values and B-H critical values are shown in Table S1.

all hadand/or sComparing explicit and implicit attitudes, ten71, and 286Comparing RWA and SDO, 77%(15/18) were for RWA, with70%(7/10) of the

**Table 4**

*Implicit and Explicit Item/Pair Associations with RWA and SDO.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Item/Pair and Measure Type** |  | **RWA [95% CI] (predicted direction)** | **SDO [95% CI] (predicted direction)** |
| 1. Anarchy/hierarchy |  |  |  |
|  | IAT | -0.07 [-0.20, 0.07] | **-0.14 [-0.28, 0.00] (-)** |
|  | Explicit | **-0.20 [-0.33, -0.07]** | **-0.11 [-0.25, 0.03] (-)** |
| 2. Regulation/markets |  |  |  |
|  | IAT | 0.04 [-0.11, 0.18] | **-0.15 [-0.29, 0.00] (-)** |
| [[3]](#footnote-3) | Explicit | **-0.16 [-0.30, -0.02]** | **-0.20 [-0.34, -0.05] (-)** |
| 3. Equal/unequal |  |  |  |
|  | IAT | -0.03 [-0.17, 0.10] | 0.07 [0.07, 0.20] (-) |
|  | Explicit | **-0.28 [-0.40, -0.16]** | **-0.45 [-0.56, -0.35] (-)** |
| 4. Socialism/capitalism |  |  |  |
|  | IAT | **-0.18 [-0.32, -0.04] (-)** | **-0.18 [-0.31, -0.04] (-)** |
|  | Explicit | **-0.31 [-0.43, -0.18] (-)** | **-0.21 [-0.34, -0.07] (-)** |
| 5. Status quo |  |  |  |
|  | IAT | **0.10 [-0.03, 0.23] (+)** | -0.01 [-0.14, 0.12] (+) |
|  | Explicit | **0.21 [0.09, 0.34] (+)** | 0.07 [-0.06, 0.20] (+) |
| 6. Change/preserve |  |  |  |
|  | IAT | **-0.38 [-0.50, -0.26] (-)** | **-0.17 [-0.30, -0.03]** |
|  | Explicit | **-0.38 [-0.50, -0.26] (-)** | **-0.22 [-0.35, -0.09]** |
| 7. Novel/familiar |  |  |  |
|  | IAT | **-0.29 [-0.42, -0.17] (-)** | -0.03 [-0.17, 0.11] |
|  | Explicit | **-0.33 [-0.45, -0.21] (-)** | -0.05 [-0.18, 0.09] |
| 8. New/old |  |  |  |
|  | IAT | -0.07 [-0.21, 0.07] (-) | -0.01 [-0.15, 0.13] |
|  | Explicit | **-0.16 [-0.30, -0.03] (-)** | -0.07 [-0.21, 0.07] |
| 9. Progress/restore |  |  |  |
|  | IAT | **-0.31 [-0.43, -0.19] (-)** | 0.07 [-0.07, 0.21] |
|  | Explicit | **-0.33 [-0.45, -0.21] (-)** | **-0.17 [-0.30, -0.03]** |
| 10. Present/past |  |  |  |
|  | IAT | -0.02 [-0.16, 0.12] (-) | 0.04 [-0.10, 0.19] |
|  | Explicit | **-0.13 [-0.27, 0.01] (-)** | **-0.14 [-0.28, 0.00]** |
| 11. Future/present |  |  |  |
|  | IAT | **-0.16 [-0.29, -0.03] (-)** | 0.03 [-0.17, 0.11] |
|  | Explicit | -0.03 [-0.17, 0.10] (-) | -0.09 [-0.23, 0.04] |
| 12. 2050/1950 |  |  |  |
|  | IAT | **-0.23 [-0.36, -0.11] (-)** | 0.04 [-0.10, 0.18] |
|  | Explicit | **-0.21 [-0.34, -0.08] (-)** | 0.04 [-0.10, 0.17] |

*Note.* CI = 95% confidence interval. The predicted direction of relationship is indicated in parentheses where (+) represents a predicted positive relationship and (-) represents a predicted negative relationship. Values in bold are statistically significant according to the Benjamini-Hochberg procedure with a false-discovery rate of 20%.











**General Discussion**

The current study examined how well RWA and SDO predicted implicit and explicit attitudes. We hypothesised that RWA and SDO would predict implicit and explicit attitudes towards word pairs in ways that would be consistent at face value with the two respective ideologies. Results consistent with these predictions would support the idea that RWA and SDO can be used to predict implicit attitudes – a hypothesis that currently has only mixed support. Furthermore, if RWA and SDO predict explicit and implicit attitudes in a similar manner, it would further support the claim that implicit and explicit attitude measures are capturing the same underlying constructs.

**Summary of Word Pairings and Ideologies**

Overall, the results of the present study showed mixed support for the hypotheses. Most (22/28; 79%) of predicted relationships between RWA and SDO and relevant word pairings were significant, but so were 35% of the *unpredicted* relationships (see below). Given the large number of hypotheses and somewhat indirect link between word pairings and ideologies, the mixed results are perhaps unsurprising.

**Overlap between relationships with RWA and SDO.** Some word pairings were expected to relate to both RWA and SDO. One example is the predicted more positive association with “capitalism” vs. “socialism.” This was expected for RWA as well as SDO because “capitalism” is related to competition and inequality (consistent with SDO) but also to maintaining the status quo and tradition in Western nations such as the United States (consistent with RWA). The results of the current study supported this hypothesis: Implicit and explicit attitudes towards capitalism vs. socialism were significantly associated with both RWA and SDO. (Those scoring higher in RWA or SDO had more positive associations with capitalism as compared to socialism). However, some unexpected overlap also occurred. In total, there were seven unpredicted significant associations out of 20 total predicted null results (i.e., 35% of predicted nulls). As an example, while attitudes towards “change” vs. “preserve” were expected to be associated with RWA (and this was supported by the data) we had no a priori hypotheses for associations with SDO. Unexpectedly, attitudes towards “change” vs. “preserve” were also significantly associated with SDO in the same way as for RWA (i.e., people scoring higher in SDO had more positive associations with “preserve” vs. “change”).

One reason for these unpredicted positive relationships may be that in setting our statistical significance threshold, we specified a false-discovery rate of 20%. This means that of the 29 statistically significant results, we would expect 20% (about 6) to be false positives. However, we can also think of two substantive reasons for these unpredicted relationships. The first is that both SDO and RWA are conceptualized broadly enough that many associations may be theoretically justifiable (at least post-hoc) even if they do not seem to tap core elements of SDO or RWA. For example, it could be argued that since Americans live in a capitalist country that currently accepts some amount of group inequality and hierarchy, it is plausible that those high in SDO would have more positive associations with “preserve” vs. change. That is, the idea of preservation may be conceptualised broadly as preserving a society that endorses SDO ideology. Second, SDO and RWA are generally moderately positively correlated in the U.S. (de Regt et al., 2011; Duckitt & Sibley, 2010), and were correlated at *r* = .36 in the current data. Thus, some of the unpredicted relationships may reflect shared variance between the two constructs (because so few participants in the Ideology 2.0 dataset completed both scales, we were not able to model the simultaneous effects of SDO and RWA). Of course, both these explanations are speculative, but they do offer possibilities for future research and theoretical refinement. Clarifying the theoretical scope of SDO and RWA will allow future research to make more specific predictions about which attitudes should be expected to be associated with each of these constructs. We hope that the current results will be one step in this theoretical refinement.

**Implicit versus Explicit Attitudes**

Because many of the significant relationships between word associations and ideologies were consistent with our predictions and existing theoretical understanding of SDO and RWA, we can also compare the similarities and differences between implicit and explicit measures of attitudes. In general, implicit and explicit attitudes were moderately correlated (average *r* = .29), though the size of the relationship varied widely, from *r* = .49 (“socialism/capitalism”) to *r* = .06 (“equal/unequal”). Correlations for each pair of implicit and explicit measures are shown in Table S2 in the Supplemental material.

Overall, nearly every significant relationship between SDO/RWA and an implicit attitude was matched by a significant relationship between SDO/RWA and the corresponding explicit attitude in the same direction. Generally, relationships with implicit attitudes were somewhat weaker than with explicit attitudes, although still of similar magnitudes. There was only one instance of a significant implicit attitude observed without a significant corresponding explicit attitude.[[4]](#footnote-4) In no instances did the predicted implicit attitudes contradict any explicit attitudes, suggesting a good deal of consistency.

On the other hand, there were several explicit attitudes that were statistically significantly related to RWA/SDO even without any corresponding implicit attitudes (“anarchy/hierarchy”, “regulation/markets”, “equal/unequal”, “new/old”, “present/past”). Of these, three were unpredicted (RWA and anarchy/hierarchy, equal/unequal, and regulation/markets; SDO and present/past). This could be explained by the nature of implicit versus explicit attitudes as well as the RWA and SDO ideologies. Despite RWA and SDO reflecting certain different core values, they are both often consistent with modern political conservatism. Therefore, we may expect to see some overlap between ideologies and explicit attitudes via association. For example, even if we would expect the words “equal/unequal” to be more inherently relevant to SDO, those scoring high in RWA may also see these words as being relevant to political conservatism generally, and therefore express an explicit attitude towards this word pair. To probe this idea further, we conducted an exploratory analysis to compare the implicit and explicit attitudes predicted by self-reported political orientation (liberal vs. conservative) with the attitudes predicted by RWA and SDO. The results of this analysis (Table S3 in Supplementary Material) provided some support for our speculation; the explicit attitudes predicted by political orientation often had very similar coefficients to explicit attitudes predicted by RWA and SDO, even those that were not a priori predicted.

Another interpretation of this analysis, though, is that some of the word pairs tested represent constructs that are unfamiliar to participants or that they have not spent much time thinking about. If this were the case, it would be expected to lower the reliability of IAT scores (Cummins, Hussey, & Spruyt, 2022), which in turn would reduce power to detect any effects. For explicit measures, where conscious deliberation has room to operate (Wilson et al., 2000), unfamiliarity may be less problematic. Distinguishing between these two possibilities is an important question for future research.

Despite some discrepancies between explicit and implicit attitudes, our findings largely support the conclusion that both implicit and explicit measures are measures of the same underlying ideological constructs. Implicit evaluations for various SDO and RWA values appear to match self-reported, explicit endorsement in consistent ways, though it is possible that explicit measures capture these ideologies more reliably (at the cost, perhaps, of also capturing broader attitudes such as more general political conservatism).

**Theoretical and Practical Implications**

Our results could be seen as conveying an optimistic or a pessimistic message for the measurement of ideological constructs using the IAT. On the optimistic side, the general consistency between predicted relationships between implicit attitudes and RWA/SDO is evidence in favor of the validity of the IAT to measure these beliefs. On the pessimistic side, a critic might argue that the consistency between explicit and implicit measures only shows that the IAT is a less reliable and more difficult to way measure what can be measured more simply and cost-effectively using explicit measures (e.g., Schimmack, 2021). An IAT proponent might point to the greater specificity of the IAT (i.e., there were fewer unpredicted relationships with IAT scores than explicit attitudes in our analysis), but the evidence for this is only suggestive.

There are also important implications of our results for measurement of RWA and SDO. Like previous researchers (e.g., Kandler et al., 2016; Kehn et al., 2022; Perez-Arche & Miller, 2021; Wagoner et al., 2023), we found that neither measure fit the data well; in fact, fit was in the “poor” range for both. The fact that these measures are so widely-used despite not fitting the data well are concerning, as mis-specified measurement models can indicate conceptual problems with the measure that may severely bias estimates (Rhemtulla et al., 2020). On the other hand, some researchers have argued that many personality measures are practically useful despite sub-standard fit (Hopwood & Donnellan, 2010). At the very least, we think the current results suggest that more work is needed to better understand the measurement properties of SDO and RWA (see, e.g., Funke, 2005; Ho et al., 2012). We hope that the openly-available data accompanying this article will further this effort by allowing researchers to test and evaluate alternative measurement models for the measures we used.

**Limitations and Future Directions**

The primary limitation of the current study lies in the fact that all data was collected as part of Project Implicit – a large-scale data collection project with no specific hypotheses in mind. As such, the current study used the pre-selected word pairs/items that most closely aligned with RWA and SDO ideologies, but these were not perfect stimuli. Although the selected word pairs/items offered some good approximations of each ideology, further research could assess topics more directly drawn from – and in line with – RWA and SDO ideologies.

Additionally, of the two ideologies, high scores in SDO are relatively less common in the general public (and this was true for the current dataset, as well). This asymmetry between ideologies might explain why RWA had stronger predictive power than SDO. Therefore, future research might want to further explore the predictive power of SDO in implicit attitudes by capturing a wider range of SDO scores in future sampling.

Finally, the current data did not allow us to measure relationships between RWA and attitudes controlling for SDO, and vice versa. Given the overlap between these two ideologies (in particular, their shared variance with overall left-right ideology), fshould

**Conclusion**

Altogether, the current study suggests that in addition to explicit attitudes, RWA and SDO can predict implicit attitudes towards a range of topics that relate to each respective ideology. These predicted implicit attitudes appear to be consistent with explicit attitudes and further support the idea that implicit and explicit measures tap into a single, unified construct, even if they do not always reflect the same output.

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1. Respondents were excluded if they met any of the following criteria: sub-300 ms response times for more than 10% of trials on critical blocks; greater than 40% error rate on any one critical block; greater than 30% error rate across all critical blocks. [↑](#footnote-ref-1)
2. A two-stage approach (Yuan & Lu, 2008) is preferable for the Ideology 2.0 data because participants who completed *both* an IAT of interest *and* either RWA or SDO items are a smaller subset of the data (Ns = 250-300, see Table 1). These samples are small enough that FIML estimates of scale scores could have non-negligible error, or models might not converge at all. We therefore estimate factor scores first, using all available data. [↑](#footnote-ref-2)
3. [↑](#footnote-ref-3)
4. This was the association between evaluations of “future” vs. “present” and RWA; those scoring higher in RWA had more positive associations with “present” vs. “future”, but did not rate “present” significantly more positively than “future” on the corresponding explicit measure. Note, though, that attitudes towards a similar stimulus pair (“2050/1950”) were significantly associated with RWA both implicitly and explicitly (perhaps because this stimulus pair contrasted past with future, rather than present with future). [↑](#footnote-ref-4)