

# Political ideology and diurnal associations

## *A dual-process motivated social cognition account*

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**ABSTRACT.** Social scientists have begun to uncover links between sleep and political attitudes and behaviors. This registered report considers how diurnal morning-night associations relate to political ideology using data from the Attitudes, Identities, and Individual Differences Study, a large-scale online data collection effort. Measures encompass perceived cultural attitudes and social pressures regarding diurnal preferences and explicit and implicit measures of both morning-night attitudes and morning-night self-concepts. Together, the analyses demonstrate a relationship between morning orientation and conservatism for explicit morning-night self-concepts and, to a lesser extent, explicit morning-night attitudes. This relationship is not present for implicit associations, and associations with perceived cultural attitudes and social pressure are also largely absent. This study reinforces the notion that morningness and eveningness as explicit identities are associated with political ideology.

Key words: Political ideology, Sleep, Implicit cognition, Motivated reasoning

There are long-standing cultural connotations with diurnal day-night cycles. In Western societies, nighttime carries negative associations as a domain fraught with danger from criminality and the supernatural, in contrast to the morning and daytime with its positive, safe associations (Koslofsky, 2011). At the same time, the night is not unambiguously undesirable, as it is also associated with socializing, particularly after the advent of widespread artificial lighting (Edensor, 2015; Koslofsky, 2011), whereas daytime and mornings may carry associations of unpleasant necessities, such as work and chores. These cultural associations speak to social norms and values regarding the proper use of time.

Recent work links sleep with political psychology. Social institutions structure time (Roenneberg et al., 2003), and they may have political consequences, intentional (Cohen, 2018) or otherwise. For example, time zones create time zone borders, a liminal space associated with sleep loss among residents of their eastern edge (Giuntella & Mazzonna, 2019), which reduces voter turnout (Holbein et al., 2019; see also Urbatsch, 2014, Urbatsch, 2017). Moreover, chronotype (individual time-of-sleep preference) is associated with political ideology; conservatives are more likely to be early risers

(Ksiazkiewicz, 2020). This relationship may share roots with diurnal associations.

From a motivated social cognition perspective (Jost et al., 2009), individuals who are predisposed to be morning types may develop relatively more positive attitudes toward morning than night, attitudes that are concordant with historical social norms and the status quo 9-to-5 social clock. Conventional diurnal attitudes may nudge these individuals to adopt other status quo orientations (e.g., political conservatism). By contrast, evening types, who experience sleep deprivation arising from the social clock (see work on social jetlag by Wittmann et al., 2006), may be nudged toward a more reformist politics (e.g., political liberalism). Alternatively, the causal arrow may point from ideology to chronotype. Conservatives may be motivated to adopt socially conventional diurnal attitudes (e.g., morning is good, night is bad), whereas political liberals may be motivated to hold more unconventional diurnal views. In either causal ordering, diurnal attitudes may help shed light on the relationship between sleep and ideology.

Whereas prior research has relied on either self-reported chronotype (Ksiazkiewicz, 2020), self-reported sleep behavior, or experiments (Holbein et al., 2019), this study uses a variety of measurement strategies to better understand orientations toward morning and night—explicit attitudes, explicit self-concepts, implicit attitudes, implicit self-concepts, and beliefs about societal orientations toward morning and night. This wider

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range of measurement approaches allows this study to shed new light on the nature of the relationships between political attitudes and sleep.

## Hypotheses

The source of the morningness-conservatism association is poorly understood (Ksiazkiewicz, 2020). In this exploratory stage of the sleep and politics literature, it is important to determine boundary conditions on this association. This article contributes to this endeavor in four ways: first, by broadening the scope of analysis to diurnal preference from sleep preference; second, by examining whether the morningness-conservatism link is replicable across other types of diurnal preference measures (self-concept and attitudinal, implicit and explicit) besides self-reported chronotype; third, by shedding light on the possibility that perceived social pressures play a role in the connection between diurnal preference and political ideology; and finally, by beginning to examine potential heterogeneities in these relationships (e.g., by age).

Chronotype, which captures time-of-day preferences surrounding sleep, has been measured using various question types (e.g., self-reported identity, self-reported behavior, hypothetical situations; Roenneberg et al., 2003). These extant measures are not available in the dataset used here, so I rely on diurnal attitudes and diurnal-self associations. These explicit morning-night attitudes and self-concepts are not identical to chronotype as they are not about sleep preferences, but they do assess a time-of-day preference that is related to chronotype on its face (e.g., it seems unlikely that night owls would strongly associate morningness with their self-concept, and they may have less positive attitudes toward the morning than early risers).

The same applies to implicit, automatic associations. Research using dual-process models of cognition (Evans, 2008) finds that explicit, conscious associations and implicit, automatic associations may be congruent or incongruent with variation across domains (Greenwald et al., 2009; Hofmann et al., 2005). Implicit and explicit measures are more likely to diverge, leading to lower correlations, in domains that are under social desirability pressures (e.g., racial attitudes) than in domains in which that pressure is low or absent (e.g., political candidate preference in developed democracies) (Greenwald et al., 2009; Hofmann et al., 2005). When implicit and explicit associations diverge, some scholars argue that implicit associations may reflect cultural messaging and

stereotypes (e.g., associating criminality with particular ethnic or racial groups) that may still be rejected at the explicit level in self-reports. In the case of these sleep associations, a divergence between explicit and implicit attitudes (particularly if implicit attitudes indicate a morning preference and explicit attitudes indicate an evening preference) could be indicative of implicit attitudes capturing an internalized social norm that is at odds with one's own preferences. Thus, it is worth examining both implicit and explicit diurnal-self associations and how they relate to political attitudes:

*H1a:* The strength of morning self-concept is associated with political conservatism.

*H1b:* The strength of night self-concept is associated with political liberalism.

*H1c:* Relatively stronger morning self-concept compared to night self-concept is associated with political conservatism.

*H1d:* Implicit morning-night self-concept is associated with political ideology, such that morning associations are more conservative and night associations are more liberal.

Morning-night attitudes (i.e., having a positive or negative evaluation of morning or night), whether explicit or implicit, are conceptually distinct from chronotype as an individual difference and from morning-night self-concept. These measures may capture whether individuals subscribe to the long-standing cultural associations with daytime and nighttime (Edensor, 2015; Koslofsky, 2011). Endorsing unconventional diurnal attitudes may correspond to a reformist political ideology, perhaps through a motivated social cognition process.

*H2a:* The strength of morning positivity is associated with political conservatism.

*H2b:* The strength of night positivity is associated with political liberalism.

*H2c:* Relatively stronger morning positivity compared to night positivity is associated with political conservatism.

*H2d:* Implicit morning-night positivity is associated with political ideology, such that morning associations are more conservative and night associations are more liberal.

Nonetheless, even if individuals personally endorse the view that morning is preferable to night, the degree to which individuals perceive that there are social desirability concerns regarding expressing a nighttime preference

(or not expressing a morning preference) is an open question. It would be beneficial to examine, first, whether people perceive cultural attitudes as favoring morning or night in general; second, whether people feel social pressure to express positive or negative attitudes toward morning or night; and, third, whether either of these perceptions is associated with political ideology.

*H3a:* People perceive cultural attitudes as more positive toward morning than night.

*H3b:* People perceive more social pressure to express positive morning attitudes than positive night attitudes.

*H3c:* People who perceive cultural attitudes as more positive toward morning than night are more politically conservative.

*H3d:* People who perceive more social pressure to express positive morning attitudes than positive night attitudes are more politically conservative.

Although these hypotheses do not address the causal ordering of diurnal beliefs and political ideology (as the available data are neither experimental nor longitudinal), addressing them nonetheless makes several important contributions by broadening the scope of analysis to diurnal preferences, by considering both implicit and explicit associations, and by examining perceived social pressure. The exploratory analyses make a further contribution by examining the role of potential moderators, such as age, and examining heterogeneity among those who have similar attitudes toward morning and night (e.g., variation among those with uniformly positive, neutral, or negative attitudes resulting in no difference on the difference scores used to test *H1c* and *H2c*).

## Method

### *Participants*

Participants were drawn from the Attitudes, Identities, and Individual Differences (AIID) Study (Hussey & Hughes, 2018; Hussey et al., 2018), originally collected as Study 7 in Nosek and Hansen (2008). Data were collected online between 2004 and 2007 through opt-in on the Project Implicit website. The data have a planned missing data design with participants randomly assigned to a domain for testing their explicit and implicit associations (see Hussey et al., 2018, for more details); this study uses only AIID participants who completed measures of attitudes or identity toward the

binary morning-night (see Materials and Procedure). Approximately 2,000 participants completed the implicit attitude measures, and approximately 500 participants completed the implicit identity measures. Demographic information on the participants is available in the Results section (see Table 1).

### *Materials and procedure*

AIID participants (approximately 200,000) were randomly assigned to one of 95 topics in binaries (e.g., African Americans and European Americans), for which they completed explicit measures of attitudes, identity, cultural attitudes, and social pressure, as well as implicit measures of either attitudes (positive-negative valence) or identity (self-other). This article relies on data regarding the binary morning-night. Each participant completed measures of his or her orientations toward morning and night at both the implicit level (using the Implicit Association Test [IAT]; Greenwald et al., 1998) and the explicit level (self-report). Full question wording for all questions and IAT items can be found in the Appendix.

Explicit attitude measures relied on five questions that were completed by all participants. Two questions assessed attitudes toward morning (“gut attitude” and “actual attitude,” ranging from strongly negative to strongly positive) and two toward night. The two morning questions were averaged to create a measure of morning positivity, and the two night questions to create a measure of night positivity. The difference between these two composite measures indicates morning preference compared to night. This difference measure was rescaled and averaged with an explicit question about preference between morning and night. This averaged difference measure is the explicit attitudinal morning-night measure.

Explicit identity measures relied on two questions (one about morning self-concept and one about night self-concept) that were completed by all participants. There were two versions of these questions (see Appendix); participants were randomly assigned to receive the same version of the question about morning and about night. For each participant, a difference was calculated, such that higher values indicate a stronger association of the self with morning compared to night. This measure is the explicit identity morning-night measure. Conceptually, it is the closest to conventional measures of chronotype.

The implicit measures of both attitudes and identity followed the standard IAT format (Greenwald et al., 1998). Participants completed a timed sorting task in which they categorized words into two target categories

(morning and night) and one of two attribute categories (either good and bad or self and other). They constitute the implicit attitude subsample and the implicit identity subsample, respectively. Using the standard D-score calculation (Greenwald et al., 2003), which involves calculating a standardized difference in the latencies of responses across different response pairings, responses were compared across pairing conditions to calculate whether certain pairings (e.g., morning-good and night-bad) were faster than other pairings (e.g., morning-bad and night-good). Faster pairings are theorized to indicate a congruent association in memory (Greenwald et al., 1998). The D-score calculations were coded such that positive values indicate an association of morning with positivity or with the self, depending on which IAT was completed. Some participants were excluded from analysis based on noisy IAT data, including too many responses that are too fast (less than 300 milliseconds), too slow (more than 10,000 milliseconds), or with high error rates (greater than 30%–50% depending on the block of stimuli), following established criteria for exclusion in the literature (Hussey et al., 2018).<sup>1</sup> Of 2,448 respondents in the dataset, 648 respondents (28.8%) did not complete the IAT and were excluded from the IAT analysis. A majority of these respondents also did not complete the explicit measures and are excluded where their data is missing; where responses are available to explicit questions, they are included in the analysis. Of the remaining 1,800 respondents, 137 (7.6%) were excluded from the IAT analyses for low quality IAT data using the stricter standard detailed by the AIID codebook.

Participants also completed perceived cultural attitudes and social pressure measures related to morning and night (see the Appendix for full wording of all items). All questions were asked separately for morning and night beliefs. Perceived cultural attitudes were measured with one of six question types. A difference was calculated between the morning and night cultural attitudes questions, such that higher values indicate a stronger perception of positive cultural attitudes toward morning compared to night. Cultural pressure was measured with one of eight question types, as was pressure from others. A composite measure of social pressure was calculated

separately for morning and night by averaging responses to the cultural pressure and pressure from other questions. Then, a second difference was calculated for the composite social pressure measures, such that higher values indicate a stronger perception of social pressure surrounding morning attitude expression than night attitude expression. Together, these measures of cultural attitudes and social pressure focus on the perceived social desirability of expressing morning and night preference.

Participants also completed an array of demographic measures. The dependent variable in the following analyses is political ideology, measured on a 7-point scale from strongly liberal to strongly conservative. The measure is one of symbolic ideology (i.e., ideology as a social identity), rather than operational ideology (i.e., ideology as issue attitudes; see Ellis & Stimson 2011), and so it is named “political identity” in the dataset; this article uses the terms “political ideology” and “political identity” interchangeably to emphasize the symbolic nature of ideological identification in this measurement paradigm. Some models include controls for sex, age, income, and education to check for the robustness of the relationships being examined.

Finally, participants were randomly assigned to one of 20 individual difference measures (a full list of measures is available in the Online Appendix in the supplementary material online). The planned missingness resulting from this design greatly reduces the *N* for any analyses that utilize these individual difference measures (i.e., 1/20th of the full sample of about 2,500 or subsample, which even in the larger implicit attitudes subsample leaves only approximately 100 participants). The resulting analyses would be underpowered except for large effects, so these variables were used only in the exploratory analyses for the purpose of hypothesis generation for future research and not in the preregistered analyses.

### *Analysis strategy*

Power analyses were conducted using an a priori sample size calculator for multiple regression (Soper, 2019). The analyses vary in their number of predictors from 1 to 8. To detect a small effect size ( $f^2 = 0.02$ ) at 80% power with an alpha of 0.05, the minimal sample size needed for 1, 2, 5, 6, 7, or 8 predictors is 385, 478, 643, 684, 721, and 755, respectively. This means that the full sample models (i.e., those without implicit measures with *N* = 816 to 1,068; Models 1 to 4 in Tables 2 and 3 and Models 1 to 5 and 8 in Table 4) are adequately powered for small effect sizes. The implicit attitudes subsample is adequately powered for small effect sizes

<sup>1</sup>Specific criteria for exclusion are provided in the Online Appendix, taken from the codebook for the AIID dataset. They can be found at the link for Hussey et al. (2018) under the files tab in the file codebook\_processed\_data.xlsx under the variables exclude\_iat and exclude\_iat\_stricter.

for some models (Model 5 and 7 in Table 3). The implicit identity models (e.g.,  $N = 279$  in Table 2, Model 5) and the remaining implicit attitude models are only adequately powered for slightly larger effect sizes (at least  $f^2 = 0.08$ , where  $f^2 = 0.15$  is medium) in the remaining models (Models 5 to 8 in Table 2, Models 6 and 8 in Table 3, and Models 6, 7, 9, and 10 in Table 4).

For the exploratory interaction models (e.g., looking at age as a moderator of the sleep-ideology relationships), a priori power analysis was conducted using G\*Power software (Faul et al., 2007). To detect a small effect size in multiple regression (Cohen's  $f^2 = 0.02$ ) at 80% power with an interaction term (three total predictors), a sample size of 652 would be required. Thus, the full sample models (i.e., those without implicit measures) and the implicit attitudes subsample were adequately powered, but the analyses in the implicit identity subsample should be interpreted with caution.

As noted in the theory, the direction of causation between ideology and diurnal associations is unclear. To simplify the presentation of the results, the models presented here all have political ideology as the dependent variable. This is not meant to be a claim about the causal ordering of these variables, which cannot be determined in these data, as they are neither experimental nor longitudinal. Alternative model specifications with the diurnal variables as the dependent variable are available in the Online Appendix.

## Results

### *Descriptive statistics*

The primary variables of interest are political identity, implicit attitudes and identity toward morning and night, explicit morning and night positivity and their difference, explicit morning and night identity and their difference, perceptions of cultural attitudes toward morning and night and their difference, perceptions of social pressure surrounding morning and night attitudes and their difference, and the demographic controls (age, sex, income, and education). Descriptive statistics on these variables are reported in Table 1.

The sample is liberal leaning (the mean is “slightly liberal”), younger (30.8 on average),<sup>2</sup> more female

<sup>2</sup>Fifty-eight participants, roughly 1.5% of the sample for whom age is available, are under 18. They are included in all analyses, as specified in the registered report. Removing these participants does not substantively change most of the analyses. For  $H2c$ , the coefficient for the difference in explicit attitudes (Table 3, Model 2) moves from being

(65.3%), and educated (50.9% with a bachelor's degree or higher), with average income somewhat below the \$50,000 cutoff (at 0.5). A plurality (45.1%) reported U.S. residence, with a large minority (40.9%) not reporting country of residence; the second and third most common choices were the United Kingdom (3.4%) and Canada (3.3%).

Unexpectedly, explicit diurnal attitudes demonstrate greater night positivity on average than morning positivity. This difference is present, but smaller, when looking at explicit identity and perceived cultural attitudes. By contrast, implicit associations show stronger morning positivity and morning self-concept. Social pressure is seen to be slightly in a morning direction, though the substantive difference is very small and both morning and night social pressure values are low.

Explicit morning and night positivity are negatively correlated ( $r = -0.24$ ,  $p < .001$ ), as would be expected. Their difference is positively correlated with implicit morning-night attitudes ( $r = 0.26$ ,  $p < .001$ ), indicating some level of congruence despite the mean differences for explicit and implicit morning-night attitudes. In contrast to explicit morning and night positivity, the explicit self-concepts are highly positively correlated ( $r = 0.62$ ,  $p < .001$ ), indicating perhaps some individual difference for affiliating the self with times of day or not. Nonetheless, the difference in the self-concepts is positively correlated with implicit morning-night identity ( $r = 0.19$ ,  $p < .001$ ), which indicates that stronger explicit associations of morning with the self coincide somewhat with stronger implicit associations of morning with the self. As with attitudes, there is a slight preference for and self-identification with night at the explicit level (the difference is about one-third of a standard deviation away from the scale midpoint in the larger effect for explicit attitudes) paired with a much stronger morning implicit preference and self-concept (almost a full standard deviation in the case of the smaller effect for implicit identity).

Perceived morning and night cultural attitudes are negatively correlated ( $r = -0.26$ ,  $p < .001$ ), indicating that individuals perceive a directional preference for morning or night in the culture. For perceived cultural pressure and perceived pressure from others, morning and night perceptions were highly positively correlated ( $r = 0.72$  and  $0.83$ , respectively,  $p < .001$  for each), indicating that

significant ( $p = .043$ ;  $N = 816$ ) to not significant ( $p = .071$ ;  $N = 803$ ) when these participants are excluded.

Table 1. Descriptive statistics.

		N	M	SD	Min	Max
Political ideology		1,447	-0.32	0.52	-1	1
Implicit attitude		1,226	0.65	0.41	-0.90	1.52
Implicit identity		437	0.43	0.44	-0.89	1.43
Explicit attitude						
	Morning only	1,791	0.56	0.26	0	1
	Night only	1,792	0.70	0.20	0	1
	Difference	1,755	-0.16	0.49	-1	1
Explicit identity						
	Morning only	1,787	0.58	0.36	0	1
	Night only	1,785	0.64	0.34	0	1
	Difference	1,781	-0.05	0.30	-1	1
Perceived cultural attitudes						
	Morning only	1,788	0.54	0.24	0	1
	Night only	1,787	0.58	0.21	0	1
	Difference	1,785	-0.04	0.36	-1	1
Social pressure						
	Morning only	1,759	0.44	0.19	0	1
	Night only	1,760	0.43	0.18	0	1
	Difference	1,742	0.01	0.12	-0.75	0.65
Age		1,530	30.8	12.5	7	81
Female		1,520	65.3%			
Income		1,200	0.44	0.33	0	1
Education		1,428	0.64	0.27	0	1

Notes: IAT and difference variables scored so higher values indicate greater morningness. Differences may vary slightly due to rounding and missingness. IATs are D-scores. Other variables scaled 0 to 1, except age in years and political identity (-1, “strongly liberal,” to 1, “strongly conservative”). For education, 0.5 indicates “some college of associate’s degree” and 0.75 indicates “bachelor’s degree.” For income, 0.25 indicates income in the range “25,000–49,999” and 0.5 in the range “50,000–74,999.”

individuals generally perceived similar amounts of social pressure with regard to both morning and night attitudes.

### Preregistered regression analyses

The preregistered analyses rely on a series of regression models that were executed in the full sample (where possible) and the two implicit subsamples (identity and attitudes).

For the identity variables, there are eight models. Models 1 through 4 focus on the effect of explicit morning-night identity on political ideology in the full sample (using the difference measure with and without demographic controls, and using the separate morning and night measures with and without demographic controls; see Table 2 for standardized betas and Table A2 in the Online Appendix for unstandardized coefficients). Model 3 shows that morning identity is positively associated with conservatism ( $B = 0.14, \beta = 0.10, t(1065) = 2.47, p = .014$ ) and that evening identity is negatively associated with conservatism ( $B = -0.16, \beta = -0.10, t(1065) = -2.64, p = .009$ ), confirming *H1a* and *H1b*. These results are robust to controls for age, sex, education, and income (see Model 4). Model 1 considers the effect of the difference between morning and night self-concept on political ideology.

It shows that those with a stronger morning identity relative to night identity are more politically conservative ( $B = 0.15, \beta = 0.09, t(1066) = 2.84, p = .005$ ), confirming *H1c*. This effect is robust to controls for demographic and implicit diurnal-self associations (see Models 2, 7, and 8).

Models 5 and 6 focus on the effect of implicit morning-night identity on political ideology in the implicit identity subsample (with and without demographic controls). Model 5 shows that implicit diurnal-self association are not associated with political ideology ( $B = 0.03, \beta = 0.03, t(277) = 0.43, p = .668$ ), disconfirming *H1d*. This conclusion is not affected by the inclusion of controls (see Models 6, 7, and 8).

For the attitudes variables, there are eight models that parallel those for the identity variables (see Table 3 and Table A3 in the Online Appendix). Models 1 through 4 focus on the effect of explicit morning-night attitudes on political ideology in the full sample (using the difference measure with and without demographic controls and using the separate morning and night measures with and without demographic controls). Models 3 and 4 show no effect of morning or night positivity on political ideology, disconfirming *H2a* and *H2b*. However, Model 2, which considers the effect of the difference between morning and night attitudes on political

**Table 2. Regression of political ideology on morning-night identity.**

	Model							
	1	2	3	4	5	6	7	8
Explicit identity (difference)	<b>0.087</b> [0.027, 0.146]	<b>0.109</b> [0.041, 0.176]					<b>0.140</b> [0.017, 0.262]	<b>0.157</b> [0.019, 0.295]
Explicit identity (morning only)			<b>0.095</b> [0.020, 0.171]	<b>0.123</b> [0.039, 0.208]				
Explicit identity (night only)			<b>-0.102</b> [-0.177, -0.026]	<b>-0.122</b> [-0.206, -0.037]				
Implicit identity					0.026 [-0.092, 0.144]	0.053 [-0.082, 0.188]	0.003 [-0.120, 0.125]	0.032 [-0.106, 0.169]
Age		-0.008 [-0.082, 0.066]		-0.008 [-0.082, 0.066]		0.114 [-0.031, 0.259]		0.092 [-0.059, 0.242]
Female		<b>-0.092</b> [-0.158, -0.025]		<b>-0.092</b> [-0.158, -0.025]		-0.031 [-0.163, 0.101]		-0.024 [-0.159, 0.112]
Education		<b>-0.184</b> [-0.256, -0.112]		<b>-0.184</b> [-0.256, -0.112]		<b>-0.211</b> [-0.352, -0.071]		<b>-0.199</b> [-0.345, -0.054]
Income		<b>0.090</b> [0.021, 0.160]		<b>0.090</b> [0.021, 0.160]		0.103 [-0.036, 0.242]		0.082 [-0.061, 0.225]
Constant	0.000 [-0.060, 0.060]	0.000 [-0.066, 0.066]	0.000 [-0.060, 0.060]	0.000 [-0.066, 0.066]	0.000 [-0.118, 0.118]	0.000 [-0.131, 0.131]	0.000 [-0.121, 0.121]	0.000 [-0.135, 0.135]
R <sup>2</sup>	0.007	0.055	0.008	0.055	0.001	0.054	0.020	0.068
N	1,068	829	1068	829	279	218	262	206

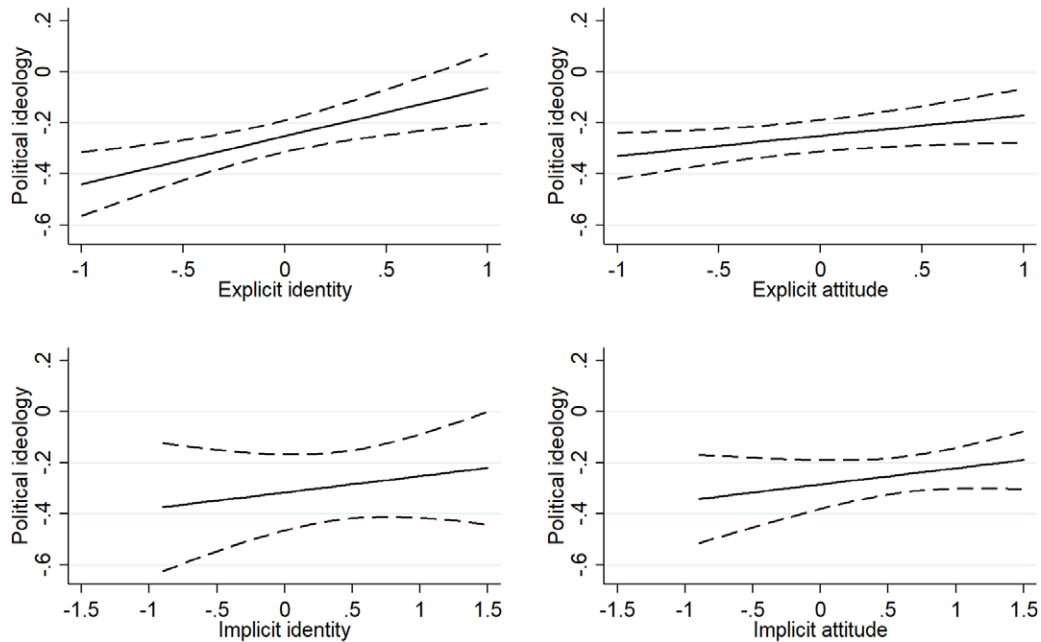
Notes: All coefficients are standardized betas. Values in brackets are 95% confidence intervals for two-tailed tests. Bold values are significant at  $p < .05$ . Higher values for political ideology are more conservative. Higher values for morning-night differences are toward morningness.

**Table 3. Regression of political ideology on morning-night attitudes.**

	Model							
	1	2	3	4	5	6	7	8
Explicit attitudes (difference)	0.046 [-0.014, 0.107]	<b>0.073</b> [0.002, 0.143]					0.043 [-0.036, 0.123]	0.057 [-0.034, 0.147]
Explicit attitudes (morning only)			0.049 [-0.013, 0.111]	0.053 [-0.020, 0.125]				
Explicit attitudes (night only)			-0.003 [-0.065, 0.059]	-0.038 [-0.108, 0.031]				
Implicit attitudes					0.017 [-0.055, 0.089]	0.049 [-0.031, 0.129]	-0.003 [-0.083, 0.076]	0.020 [-0.067, 0.108]
Age		-0.022 [-0.099, 0.054]		-0.027 [-0.104, 0.049]		-0.048 [-0.136, 0.040]		-0.050 [-0.144, 0.043]
Female		<b>-0.093</b> [-0.161, -0.026]		<b>-0.091</b> [-0.158, -0.023]		<b>-0.125</b> [-0.204, -0.045]		<b>-0.132</b> [-0.215, -0.048]
Education		<b>-0.176</b> [-0.249, -0.103]		<b>-0.181</b> [-0.254, -0.109]		<b>-0.168</b> [-0.255, -0.081]		<b>-0.171</b> [-0.262, -0.080]
Income		<b>0.099</b> [0.028, 0.169]		<b>0.109</b> [0.039, 0.179]		<b>0.090</b> [0.009, 0.172]		<b>0.090</b> [0.005, 0.176]
Constant	0.000 [-0.060, 0.060]	0.000 [-0.067, 0.067]	0.000 [-0.060, 0.060]	0.000 [-0.067, 0.067]	0.000 [-0.072, 0.072]	0.000 [-0.079, 0.079]	0.000 [-0.075, 0.075]	0.000 [-0.083, 0.083]
R <sup>2</sup>	0.002	0.046	0.002	0.050	0.000	0.053	0.002	0.055
N	1,053	816	1068	827	743	590	680	540

*Notes:* All coefficients are standardized betas. Values in brackets are 95% confidence intervals for two-tailed tests. Bold values are significant at  $p < .05$ . Higher values for political ideology are more conservative. Higher values for morning-night differences are toward morningness.





**Figure 1.** Effect of Diurnal (Morning-Night) Associations on Political Ideology.

*Notes:* Predicted values with 95% confidence intervals for two-tailed tests across the range of observed diurnal association from Models 2 (explicit) and 6 (implicit) in each of Tables 2 (identity) and 3 (attitudes). Estimates are for men with age, education, and income set at sample means for each model. Ideology values range from  $-1$  to  $1$ ; higher values indicate greater conservatism. Explicit values range from  $-1$  to  $1$  and implicit values are  $d$ -scores; higher values indicate greater morning preference or identity. The explicit slopes are statistically significant, and the implicit slopes are not.

ideology with controls, shows that those with a more positive view of morning relative to night are more politically conservative ( $B = 0.08$ ,  $\beta = 0.07$ ,  $t(810) = 2.03$ ,  $p = .043$ ), confirming *H2c*. This effect is not robust to controlling for implicit diurnal-self associations (see Model 8), although this may also be affected by the reduced sample size in Model 8.

Models 5 and 6 focus on the effect of implicit morning-night attitudes on political ideology in the implicit attitudes subsample (with and without demographic controls). Model 5 shows that implicit diurnal-self association are not associated with political ideology ( $B = 0.02$ ,  $\beta = 0.02$ ,  $t(588) = 0.45$ ,  $p = .650$ ), disconfirming *H2d*. This conclusion is not affected by the inclusion of controls (see Models 6, 7, and 8).

The main effects of both implicit and explicit morning-night identity and attitudes on political ideology, as presented in Models 2 and 6 in each of Tables 2 and 3, are summarized in Figure 1.

Finally, I turn to the direct effects of perceived cultural attitudes and social pressure regarding morning-night

preferences on political ideology. A paired  $t$ -test comparing the means of morning and night cultural attitudes shows less perceived positivity toward morning than night, though with a very small effect size (morning<sub>mean</sub> =  $0.54$ , night<sub>mean</sub> =  $0.58$ ,  $B = -0.04$ ,  $t(1784) = -4.2$ ,  $p < .001$ , Cohen's  $d = 0.10$ ). This result contradicts *H3a*. However, people do report experiencing more social pressure to express morning positivity than night positivity (morning<sub>mean</sub> =  $0.44$ , night<sub>mean</sub> =  $0.43$ ,  $B = 0.01$ ,  $t(1741) = 4.0$ ,  $p < .001$ , Cohen's  $d = 0.09$ ), supporting *H3b*.

The regressions in Table 4 examine the relationship between these variables and political ideology (see also Table A4 in the Online Appendix). The only significant result that emerges is the effect of positive night cultural attitudes on political ideology in Model 3 ( $B = 0.21$ ,  $\beta = 0.08$ ,  $t(1033) = 2.50$ ,  $p = .013$ ), which is in the opposite direction of what was hypothesized in *H3c*. In sum, these results disconfirm *H3c* and *H3d* by suggesting that there is no relationship between political ideology and people's perceptions of cultural morning and night positivity or people's perceptions of social pressure to express

**Table 4. Regression of political ideology on perceived cultural attitudes and social pressure.**

	Model									
	1	2	3	4	5	6	7	8	9	10
Cultural attitudes (difference)	-0.045 [-0.106, 0.017]	-0.001 [-0.071, 0.068]			0.003 [-0.068, 0.073]	-0.003 [-0.089, 0.082]	-0.013 [-0.101, 0.074]	0.001 [-0.068, 0.071]	0.004 [-0.141, 0.149]	-0.002 [-0.145, 0.141]
Cultural attitudes (morning only)			0.018 [-0.045, 0.081]	0.024 [-0.048, 0.096]						
Cultural attitudes (night only)			<b>0.080</b> [0.017, 0.143]	0.030 [-0.041, 0.101]						
Social Pressure (difference)	-0.017 [-0.078, 0.044]	-0.011 [-0.080, 0.057]			-0.026 [-0.095, 0.044]	-0.017 [-0.100, 0.067]	-0.037 [-0.122, 0.049]	0.006 [-0.062, 0.075]	0.039 [-0.101, 0.179]	0.075 [-0.067, 0.217]
Social Pressure (morning only)			-0.036 [-0.136, 0.064]	-0.038 [-0.150, 0.074]						
Social Pressure (night only)			0.006 [-0.094, 0.106]	-0.007 [-0.119, 0.104]						
Explicit attitudes (difference)					<b>0.078</b> [0.006, 0.149]		0.061 [-0.031, 0.153]			
Implicit attitudes						0.054 [-0.029, 0.138]	0.029 [-0.059, 0.118]			
Explicit identity (difference)								<b>0.115</b> [0.046, 0.184]		<b>0.174</b> [0.030, 0.318]
Implicit identity									0.044 [-0.099, 0.187]	0.027 [-0.115, 0.169]
Age		0.002 [-0.074, 0.077]		-0.001 [-0.076, 0.075]	-0.024 [-0.103, 0.054]	-0.032 [-0.124, 0.060]	-0.049 [-0.144, 0.047]	-0.009 [-0.084, 0.067]	0.101 [-0.058, 0.261]	0.085 [-0.073, 0.243]
Female		<b>-0.096</b> [-0.164, -0.028]		<b>-0.098</b> [-0.167, -0.030]	<b>-0.095</b> [-0.164, -0.026]	<b>-0.135</b> [-0.219, -0.052]	<b>-0.131</b> [-0.216, -0.046]	<b>-0.092</b> [-0.159, -0.024]	-0.023 [-0.162, 0.117]	-0.023 [-0.161, 0.115]
Education		<b>-0.182</b> [-0.255, -0.110]		<b>-0.182</b> [-0.254, -0.109]	<b>-0.183</b> [-0.257, -0.109]	<b>-0.189</b> [-0.279, -0.099]	<b>-0.187</b> [-0.279, -0.095]	<b>-0.189</b> [-0.261, -0.116]	<b>-0.183</b> [-0.333, -0.033]	<b>-0.189</b> [-0.338, -0.041]
Income		<b>0.110</b> [0.039, 0.181]		<b>0.107</b> [0.036, 0.178]	<b>0.113</b> [0.041, 0.185]	<b>0.094</b> [0.008, 0.180]	<b>0.104</b> [0.016, 0.191]	<b>0.104</b> [0.034, 0.175]	0.104 [-0.043, 0.252]	0.088 [-0.059, 0.234]
Constant	0.000 [-0.061, 0.061]	0.000 [-0.068, 0.068]	0.000 [-0.061, 0.061]	0.000 [-0.068, 0.068]	0.000 [-0.069, 0.069]	0.000 [-0.083, 0.083]	0.000 [-0.084, 0.084]	0.000 [-0.067, 0.067]	0.000 [-0.138, 0.138]	0.000 [-0.137, 0.137]
R <sup>2</sup>	0.002	0.047	0.007	0.050	0.052	0.060	0.063	0.060	0.043	0.071
N	1,038	808	1038	808	785	537	522	804	202	201

Notes: All coefficients are standardized betas. Values in brackets are 95% confidence intervals for two-tailed tests. Bold values are significant at  $p < .05$ . Higher values for political ideology are more conservative. Higher values for morning-night differences are toward morningness.

morning or night positivity, or if there is a relationship, it is conservatives who perceive cultural attitudes as supporting eveningness.

### *Exploratory analyses*

The purpose of these analyses is not to test hypotheses, but to uncover new relationships that could inform hypotheses for future work. The first set of exploratory analyses focused on alternative model specifications for the political ideology models, including interactions between the perceived cultural attitudes or social pressure questions and implicit or explicit associations and, at the suggestion of a reviewer, interactions with age. None of the interaction effects were significant. This suggests that, insofar as diurnal identities and attitudes are related to political ideology, these effects seem to be consistent across individuals.

Mean differences in diurnal identities and attitudes do exist across demographic groups. These differences were examined using linear regressions of explicit and implicit diurnal identities and attitudes on age, sex, education, and income controlling for political ideology (see Tables A5–A9 in the Online Appendix). The models generally show a greater morning orientation among older participants, and sometimes among higher-income and more educated participants, though which variables are statistically significant varies by the dependent variable. No sex difference is observed. Older participants see diurnal cultural attitudes as more morning oriented, while higher-income participants see them as more night oriented; there are no demographic differences in perceived social pressure. In short, future research should continue to examine how diurnal attitudes develop over the life course and vary by social class and the consequences of these sources of variation for political attitudes and behaviors.

Each participant was randomly assigned to one of 20 individual difference measures (see the Online Appendix for the full list). Due to the small *N*s for complete measures (all below 100) and the multiple testing involved in this type of exploratory analysis, researchers should not generalize from these results, but instead should use them as a starting point for better-powered analyses. Nonetheless, they may provide hints for future lines of research (see Table A1 in the Online Appendix). For greater morning identity than night identity, significant correlations were found with Bayesian Racism, the Order and Ambiguity items from Need for Cognitive Closure, and the Personal Efficacy items from Spheres of

Control. More positive morning attitudes compared to night attitudes were associated with higher conscientiousness (but Ksiazkiewicz, 2020, suggests that the relationships of ideology and morningness with conscientiousness are distinct). Surprisingly, given their positive associations with conservatism in the literature, less Belief in a Just World and lower Right-Wing Authoritarianism are associated with more positive night attitudes. Given the strong relationship between Right-Wing Authoritarianism and ideology, untangling these conflicting effects may be a particularly promising direction for future political science research. In addition, Personal Need for Structure is associated with greater conservatism and marginally with both morning-night identity and attitudes; this may be a good candidate for future research to target.

Finally, at the suggestion of a reviewer, I examined the distributions of the difference variables and whether the models that use the explicit difference variables are affected by heterogeneity among those who show zero difference (e.g., those with positive attitudes toward both morning and night, or negative attitudes toward both, or neutral attitudes toward both). No significant differences were found between these subgroups with regard to the relationship between diurnal attitudes and political ideology. There is some evidence that individuals who identify at least somewhat with both morning and night show a stronger relationship between diurnal identity (whether they nonetheless identify more strongly with morning or night) and political ideology.

In sum, the exploratory models suggest several potential lines of research, including the effects of demographics and psychological individual differences on diurnal associations. Future work should also consider subnational differences, including regional, urban/rural, and racial or ethnic effects, cross-national differences, and intersectional approaches (e.g., at the intersection of parental status and gender).

### **Deviations from registered report**

After approval of the registered report, but prior to requesting access to the full dataset, two changes were made to the manuscript. First, at the request of a reviewer, the exploratory analysis section was updated to include the intention to consider heterogeneity among those who show no difference in morning-night explicit associations (e.g., both positive, both neutral, both

**Table 5. Summary of hypotheses and results**

Hypothesis	Prediction	Model	Result
H1a	The strength of morning self-concept is associated with political conservatism.	Table 2 Model 4	Confirmed
H1b	The strength of night self-concept is associated with political liberalism.	Table 2 Model 4	Confirmed
H1c	Relatively stronger morning self-concept compared to night self-concept is associated with political conservatism.	Table 2 Model 2	Confirmed
H1d	Implicit morning-night self-concepts is associated with political ideology, such that morning associations are more conservative and night associations are more liberal.	Table 2 Model 6	Disconfirmed
H2a	The strength of morning positivity is associated with political conservatism.	Table 3 Model 4	Disconfirmed
H2b	The strength of night positivity is associated with political liberalism.	Table 3 Model 4	Disconfirmed
H2c	Relatively stronger morning positivity compared to night positivity is associated with political conservatism.	Table 3 Model 2	Confirmed
H2d	Implicit morning-night positivity is associated with political ideology, such that morning associations are more conservative and night associations are more liberal.	Table 3 Model 6	Disconfirmed
H3a	People perceive cultural attitudes as more positive toward morning than night.	Table 1	Disconfirmed
H3b	People perceive more social pressure to express positive morning attitudes than positive night attitudes.	Table 1	Confirmed
H3c	People who perceive cultural attitudes as more positive toward morning than night are more politically conservative.	Table 4 Model 2	Disconfirmed
H3d	People who perceive more social pressure to express positive morning attitudes than positive night attitudes are more politically conservative.	Table 4 Model 2	Disconfirmed

negative). Second, an error was corrected regarding the sample size, which in actuality is larger for the explicit analyses than proposed in the initially approved registered report. Correct sample sizes have been updated throughout the manuscript, including the power analysis, which now accurately reflect missingness on some variables in the data.

In presenting the results of the preregistered analyses, one change was made, which is the inclusion of Figure 1 to summarize the main results from Tables 2 and 3.

In preparing the final manuscript, the description of the explicit identity, cultural attitude, and social pressure measures was updated to more accurately describe the structure of the data in the AIID study. The analyses in Tables 1, 4, and A4 were updated to use the composite social pressure variable rather than the cultural pressure variable (which is a component of the social pressure variable) to align with the preregistered hypotheses. These changes did not substantively affect any of the results or conclusions of the study.

## Discussion

This article examined how morning and night attitudes and identities at the explicit and implicit levels are associated with liberal-conservative political ideology. The results (summarized in Table 5) suggest that although implicit diurnal associations do show the expected morningness-bias on average, they are not

predictive of (or predicted by) political attitudes. For explicit attitudes, there was an unexpected eveningness bias on average, with some evidence for an explicit preference for morning over night being associated with political conservatism (Table 3, Model 2). Explicit identities have a much more consistent relationship with political ideology. Morning identity is associated with conservatism, evening identity with liberalism, and their difference also indicates an association between morningness and conservatism (Table 2). Finally, I examined the perceived cultural attitudes and social pressure toward morning and night and found limited evidence that conservatives may perceive more night-positive cultural attitudes than liberals.

These results make four important contributions. First, by broadening the scope of analysis to diurnal preferences from sleep preference, they corroborate evidence from other studies of sleep and politics at the explicit level. The strongest and most consistent relationships with political ideology in the study are the links with explicit identity-based diurnal orientations, in keeping with past research that has found a connection between sleep preferences and political ideology (Książkiewicz, 2020). By examining not only diurnal identities but also diurnal attitudes, the results demonstrate that these are not equivalent; while the connection between diurnal identity and ideology is strong, there is weaker evidence for links between diurnal attitudes and political orientations. Taken together, the growing evidence for the connection between sleep and politics may

carry broader implications, for instance for how we understand the links between health and politics (as evening types generally have worse outcomes; see Fabbian et al., 2016) and the targeting of campaign messages to different times of day.

Second, the article provides the first examination of implicit diurnal associations through the lens of politics. Although there were no ideological differences in the implicit diurnal associations, it is notable that while explicit attitudes and identities were roughly balanced between morning and night (or slightly night oriented), the average for both implicit attitudes and implicit identity had a decided morning bias. Future research should examine this incongruency and explore its implications for politics. For example, moving beyond an identity-based measure of political ideology, these associations may be tied to beliefs about industriousness, deservingness, and tolerance for inequality and the assumptions that people make about the socially desirable use of time.

Third, this study goes beyond existing research on the explicit level by looking at perceived cultural attitudes and social pressure. Although the data show few, if any, differences by ideology here, there are systematic differences by demographic characteristics and there remains considerable heterogeneity in the public with regard to these perceptions. Whether perceived cultural attitudes and social pressure matter for public opinion on specific policy positions (e.g., school start times, labor rights with regard to workplace flexibility, support for eliminating daylight saving time) or for political participation remains to be seen.

Finally, the exploratory analyses scratch the surface on explaining the heterogeneity in diurnal associations and their associations with other politically relevant variables. Of particular note are the effects of age on greater morning identity, more positive morning attitudes, and perceived morning cultural attitudes, education on positive morning attitudes, income on perceived night cultural attitudes, and the absence of gender effects. The association between Need for Cognitive Closure and morning identity comports with how these variables align with political ideology (Ksiazkiewicz et al., 2016), while the relationship between positive night attitudes and Right-Wing Authoritarianism presents an interesting puzzle. In short, much work remains to be done at the intersection of political identity, sleep, and demographic variables and other psychological individual differences.

In addition to the new directions for future research outlined in the preceding paragraphs, the generalizability of these results remains to be established through better sampling and exploring alternative measurement strategies. The AIID study is from an opt-in online sample (Hussey & Hughes, 2018; Hussey et al., 2018); thus, caution should be exercised in extrapolating from these data; replications in representative datasets are needed. Another limitation of the present study is that it did not have a conventional measure of chronotype, which limits its ability to make direct comparisons to the existing literature. Future work should examine how chronotype measures (e.g., those on the Munich Chronotype Questionnaire; Roenneberg et al., 2003) are associated with the diurnal attitudes and identities examined in this study. In particular, one of the potential explanations for the relationship between chronotype and political ideology is that it may arise as a result of a motivated social cognitive process (Ksiazkiewicz, 2020). Examining whether the questions used here attenuate the relationship between chronotype and ideology is one avenue for addressing that hypothesis. The results suggest that while some individuals hold strong diurnal identities (e.g., identifying much more strongly with morning than night), there are many individuals who identify strongly with both morning and night and some who identify with neither. Understanding how these identities relate to actual sleep patterns may help political scientists to determine if the relationships between diurnal identity and chronotype are part of the same process or distinct, and whether these identities play a role in a motivated process. Moreover, the results here suggest that a relationship between diurnal attitudes and political ideology may be present (which could be indicative of a motivated process), but that it is weaker than the relationship between diurnal identity and political ideology.

Another avenue for future research is to further examine heterogeneity in the relationship between diurnal attitudes and identities (and chronotype) and ideology. For instance, although this dataset did not find an interactive effect between age and diurnal orientations, it is possible that other variables play a moderating role (e.g., employment status and hours of work, commute times, marital status, parental status). A multi-method approach could also shed light on whether the effects of diurnal orientations (or cultural understandings of diurnal orientations) vary across identities, across subnational regions, or

across countries. An intersectional approach (e.g., at the intersection of class and race, or parental status and gender) would be invaluable for examining how dominant conceptions of time may have differential political effects in different contexts and potentially serve to reinforce social inequalities.

A fourth open question is whether diurnal orientations relate only to particular aspects of political ideology. This study relies on a single-item, unidimensional measure of political ideology. Single-item measures have considerable measurement error, potentially attenuating meaningful effects. Future work should look at multi-item measures of ideology to determine whether they show stronger relationships to diurnal orientations, as well as to examine whether there are different effects on subdimensions of political ideology (e.g., social and economic), on symbolic and operational ideology (compare Study 4 in Ksiazkiewicz, 2020), or related concepts (e.g., right-wing authoritarianism and social dominance orientation).

Finally, future work should consider how the same diurnal domain may carry different connotations in different contexts. For example, morning may carry positive connotations in the domain of work and productivity, but not in the domain of socialization, whereas night may have the opposite associations.

This study advances our understanding of the relationship between diurnal orientations and political attitudes. It reaffirms a relationship between conservatism and morning identity, while uncovering that those relationships are absent at the implicit level and seemingly unrelated to views about social pressures. It also points the way forward for future work to consider how diurnal measures relate to chronotype, how they interact with various identities, conceptualizations of political ideology, and contextual factors, and whether they are associated with other political outcomes that are affected by sleep, such as voter turnout (Holbein et al., 2019; Urbatsch, 2014).

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## Supplementary Materials

To view supplementary material for this article, please visit <http://dx.doi.org/10.1017/pls.2021.4>.

## References

- Cohen, E. F. (2018). *The political value of time: Citizenship, duration, and democratic justice*. Cambridge University Press.
- Edensor, T. (2015). The gloomy city: Rethinking the relationship between light and dark. *Urban Studies*, 52(3), 422–438. <https://doi.org/10.1177/0042098013504009>
- Ellis, C., & Stimson, J. A. (2011). Pathways to conservative identification. In P. M. Sniderman & B. Highton (Eds.), *Facing the challenge of democracy: Explorations in the analysis of public opinion and political participation* (pp. 120–148). Princeton University Press.
- Evans, J. (2008). Dual-processing accounts of reasoning, judgment, and social cognition. *Annual Review of Psychology*, 59, 255–278.
- Fabbian, F., Zucchi, B., De Giorgi, A., Tiseo, R., Boari, B., Salmi, R., Cappadona, R., Gianesini, G., Bassi, E., Signani, F., Raparelli, V., Basili, S., and Manfredini, R. (2016). Chronotype, gender and general health. *Chronobiology International*, 33(7), 863–882. <https://doi.org/10.1080/07420528.2016.1176927>
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G\*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39, 175–191.
- Giuntella, O., & Mazzonna, F. (2019). Sunset time and the economic effects of social jetlag: Evidence from US time zone borders. *Journal of Health Economics*, 65, 210–226. <https://doi.org/10.1016/j.jhealeco.2019.03.007>
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology*, 74(6), 1464–1480.
- Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology*, 85(2), 197–216.
- Greenwald, A. G., Poehlman, T. A., Uhlmann, E. L., & Banaji, M. R. (2009). Understanding and using the Implicit Association Test: III. Meta-analysis of predictive validity. *Journal of Personality and Social Psychology*, 97(1), 17–41. <https://doi.org/10.1037/a0015575>

- Hofmann, W., Gawronski, B., Gschwendner, T., Le, H., & Schmitt, M. (2005). A meta-analysis on the correlation between the Implicit Association Test and explicit self-report Measures. *Personality and Social Psychology Bulletin*, 31(10), 1369–1385. <https://doi.org/10.1177/0146167205275613>
- Holbein, J. B., Schafer, J. P., & Dickinson, D. L. (2019). Insufficient sleep reduces voting and other prosocial behaviours. *Nature Human Behaviour*, 3, 492–500.
- Hussey, I., & Hughes, S. (2018). *Hidden invalidity among fifteen commonly used measures in social and personality psychology*. PsyArXiv. <https://doi.org/10.31234/osf.io/7rbfb>
- Hussey, I., Hughes, S., & Nosek, B. A. (2018). *The implicit and explicit Attitudes, Identities, and Individual Differences (AIID) dataset*. <https://osf.io/pcjwf/>
- Jost, J. T., Federico, C. M., and Napier, J. L. (2009). Political ideology: Its structure, functions, and elective affinities. *Annual Review of Psychology*, 60, 307–337. <https://doi.org/10.1146/annurev.psych.60.110707.163600>
- Koslofsky, C. (2011). *Evening's empire: A history of the night in early modern Europe*. Cambridge University Press.
- Ksiazkiewicz, A. (2020). Conservative larks, liberal owls: The relationship between chronotype and political ideology. *Journal of Politics*, 82(1), 367–371. <https://doi.org/10.1086/705927>
- Ksiazkiewicz, A., Ludeke, S., & Krueger, R. (2016). The role of cognitive style in the link between genes and political ideology. *Political Psychology*, 37(6), 761–776.
- Nosek, B. A., & Hansen, J. J. (2008). The associations in our heads belong to us: Searching for attitudes and knowledge in implicit evaluation. *Cognition and Emotion*, 22(4), 553–594. <https://doi.org/10.1080/02699930701438186>
- Roenneberg, T., Wirz-Justice, A., & Mellow, M. (2003). Life between clocks: Daily temporal patterns of human chronotypes. *Journal of Biological Rhythms*, 18(1), 80–90. <https://doi.org/10.1177/0748730402239679>
- Soper, D. S. (2019). *Effect size calculator for multiple regression* [Software]. <http://www.danielsoper.com/statcalc>
- Urbatsch, R. (2014). Time regulations as electoral policy. *American Politics Research*, 42(5), 841–855.
- Urbatsch, R. (2017). Youthful hours: Shifting poll-opening times manipulates voter demographics. *Research and Politics*, 4(3), 2053168017720590. <https://doi.org/10.1177/2053168017720590>
- Wittmann, M., Dinich, J., Mellow, M., & Roenneberg, T. (2006). Social jetlag: Misalignment of biological and social time. *Chronobiology International*, 23(1/2), 497–509.

## Appendix

### Explicit attitude measures

#### “Gut” attitude

People’s gut reactions about a topic can be different from their feelings after they have had time to think about it. For example, someone who is trying to quit smoking might have a very positive gut reaction, but negative actual feelings toward smoking. Rate your gut reactions and actual feelings toward the topics below:”

“Gut reactions toward Morning”

“Gut reactions toward Night”

1 = Strongly negative

2 to 9 unlabeled

10 = Strongly positive

#### “Actual” attitude

People’s gut reactions about a topic can be different from their feelings after they have had time to think about it. For example, someone who is trying to quit smoking might have a very positive gut reaction, but negative actual feelings toward smoking. Rate your gut reactions and actual feelings toward the topics below:”

“Actual feelings toward Morning”

“Actual feelings toward Night”

1 = Strongly negative

2 to 9 unlabeled

10 = Strongly positive

### Explicit preference

Which do you prefer, Night or Morning?

1. Strongly prefer Night to Morning
2. Somewhat prefer Night to Morning
3. Slightly prefer Night to Morning
4. Morning and Night are equally liked
5. Slightly prefer Morning to Night
6. Somewhat prefer Morning to Night
7. Strongly prefer Morning to Night

For the explicit identity, cultural attitudes, cultural pressure, and social pressure measures, each participant was randomly assigned to one item about either morning or night (substituted for X).

### Explicit identity measures

Being rejecting of X is inconsistent with my self-concept.

Being accepting of X is inconsistent with my self-concept.

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Slightly disagree
- 4 = Slightly agree
- 5 = Agree
- 6 = Strongly agree

### **Cultural attitudes measures**

How warm or cold does the average person feel toward X?

How warm or cold is society toward X?

- 1 = Cold
- 2 to 9 unlabeled
- 10 = Warm

How much does the average person like or dislike X?

How much does the culture you live in like or dislike X?

- 1 = Strongly dislike
- 2 to 9 unlabeled
- 10 = Strongly like

How positive or negative does the average person feel toward X?

How positive or negative is society toward X?

- 1 = Strongly negative
- 2 to 9 unlabeled
- 10 = Strongly positive

### **Cultural pressure measures**

How motivated is the average person to conceal negative feelings about X?

How motivated is the average person to conceal positive feelings about X?

How motivated is the average person to express negative feelings about X?

How motivated is the average person to express positive feelings about X?

- 1 = Not at all motivated
- 2 to 5 unlabeled
- 6 = Strongly motivated

There is cultural pressure to think positive things about X.

There is cultural pressure to think negative things about X.

No one gets upset if people say bad things about X.  
No one gets upset if people say good things about X.

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Slightly disagree
- 4 = Slightly agree
- 5 = Agree
- 6 = Strongly agree

### **Others pressure items**

I try to hide unfavorable thoughts about X to avoid negative reactions from others.

I attempt to appear accepting of X to gain approval from others.

I try to hide favorable thoughts about X to avoid negative reactions from others.

I attempt to appear rejecting of X to gain approval from others.

I try to express unfavorable thoughts about X to avoid negative reactions from others.

I attempt to appear rejecting of X to avoid disapproval from others.

I try to express favorable thoughts about X to avoid negative reactions from others.

I attempt to appear accepting of X to avoid disapproval from others.

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Slightly disagree
- 4 = Slightly agree
- 5 = Agree
- 6 = Strongly agree

### **Implicit measures**

Morning items: Morning, A.M., Sun, Daylight, Dawn, Sunrise

Night items: Night, P.M., Evening, Moon, Midnight, Sunset

Good / Positive / Pleasant items: Affectionate, Cherish, Excellent, Glad, Joyous, Spectacular

Bad / Negative / Unpleasant items: Angry, Detest, Ghastly, Horrible, Negative, Ugly

Self items: I, Me, Mine, Myself, Self

Other items: Other, They, Them, Their, Theirs