



Corrigendum

Corrigendum to “The nature of the relationship between personality traits and political attitudes” [Personal. Individ. Differ. 49 (2010): 306–316]☆



Brad Verhulst^a, Peter K. Hatemi^{b,*}, & Nicholas G. Martin^c

^a Virginia Commonwealth University, United States

^b Pennsylvania State University, United States

^c QIMR Berghofer Medical Research Institute, Australia

Accepted July 2, 2015

The authors regret that the coding of the attitude items in the manuscript “The nature of the relationship between personality traits and political attitudes” was exactly reversed. The codebook that we were working from for the original paper was opposite of the actual coding of the raw variables. As this paper was the first paper in a series of papers (Verhulst, Eaves & Hatemi, 2012; Verhulst & Estabrook, 2012; Hatemi & Verhulst, 2015), the coding error was present in each subsequent paper. As this paper was the first paper in a series of papers (Verhulst, Eaves & Hatemi, 2012; Verhulst & Estabrook, 2012; Hatemi & Verhulst, 2015), the coding error was present in each subsequent paper regarding the relationships between Eysenck’s personality traits and attitudes only. This reversal affects the interpretation of the within-person or phenotypic correlations such that when we stated that a personality trait was higher in one ideological group it is actually the reverse. The interpretation of these relationships is presented in Section 2.3: *Phenotypic correlations between personality traits and ideological dimensions*, and recapitulated in the discussion section. Readers should note that in the places where we interpreted the relationship between one of the personality variables and conservatism, we should have said liberalism and vice versa.

The primary personality trait that was discussed in the paper was Hans Eysenck’s Psychoticism (P). Several of the items – such as “Would you like other people to be afraid of you?”, “Do you enjoy co-operating with others?” (Reverse Coded), and “Do you try not to be rude to people” (Reverse Coded) – suggested a theoretical association with Authoritarianism, which is typically correlated with political conservatism. As such, the correlation did not appear to be theoretically inconsistent with the existing literature to us or to the reviewers for any of the papers that were published on this topic. We interpreted the data in accor-

dance with the codebook we believed was correct at the time.

Importantly, the main focus of the paper was agnostic about the direction of the phenotypic correlations. More specifically, the direction of the relationship between the personality traits was irrelevant for our research question and subsequent analyses, which rely on magnitude of the cross-twin cross-trait covariance. As such, the direction of the association has no implications for the primary conclusions we drew. Specifically, the goal of this paper was to decompose the covariation of the personality traits and the political attitude dimensions into additive genetic (A), shared environmental (C) and unique environmental (E) sources of covariance. This is very similar to decomposing the variance of a single phenotype into these three sources of variance. Like traditional genetic variance decomposition methods, the sign of the covariance (i.e. whether conservatives or liberals are correlated with higher levels of P), is irrelevant for the interpretation of the proportion of the covariance that can be attributed to A, C or E.

As such, the main conclusions of the paper are unaffected. Specifically, we conclude:

The finding that the majority of covariation between Psychoticism and attitudes is due to genetic variance provides strong evidence that a simple environmentally driven causal theory from personality to politics is not suitable for such a complex relationship (pg. 313).

This is the finding that is most often referenced when this paper is cited. Importantly, this conclusion does not depend on the direction of the association between the personality trait and any of the social attitude measures, but instead on the magnitude of the correlation. Accordingly, the conclusion that the primary source of the covariance between P and social attitudes is primarily a function of additive genetic covariance, while the covariance between social desirability and social attitudes is primarily a function of shared environmental covariance. As we initially concluded, this implies that pleiotropic genetic effects or an unmeasured third social variable drive the relationship between personality traits and political attitudes.

We would like to thank *the Journal of Personality and Social Psychology* for bringing the possibility of a coding error to our attention, which led us to finding the codebook error.

☆ This correction was accepted for publication on May 4, 2016 but due to production issues its appearance in print was accidentally delayed. Tony Vernon, Editor-in-Chief.

DOI of original article: <http://dx.doi.org/10.1016/j.paid.2009.11.013>.

* Corresponding author at: 307 Pond Lab, University Park, PA 16802, United States.
E-mail address: phatemi@gmail.com (P.K. Hatemi).

The authors apologise for any inconvenience caused.

Work Cited:

Verhulst, B., Hatemi, P.K. & Martin, N.G. (2010) The nature of the relationship between personality traits and political attitudes. *Personality and Individual Differences*, 49: 306–316.

Hatemi, P.K. & Verhulst, Brad. (2015) Political attitudes develop independently of personality traits. *PLoS One* 10(3): e0118106.

Verhulst, B., Hatemi, P.K. & Eaves, L.J. (2012) “Covariation not causation: The relationship between personality traits and political ideologies.” *The American Journal of Political Science* 56(1): 34–51.

Verhulst, B. & Estabrook, R. (2012) “Using genetic information to test causal relationships in cross-sectional data.” *The Journal of Theoretical Politics*, 24(3): 328–344.



Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

The nature of the relationship between personality traits and political attitudes

Brad Verhulst^a, Peter K. Hatemi^{b,c,*}, Nicholas G. Martin^b^a Department of Political Science Stony Brook University, Stony Brook, NY 11794-4392, USA^b Queensland Institute of Medical Research, Genetic Epidemiology 300 Herston Road, Q 4029, Australia^c Department of Political Science University of Iowa, 344 Schaeffer Hall, Iowa City, Iowa 52242-1498, USA

ARTICLE INFO

Article history:

Received 29 October 2009

Received in revised form 3 November 2009

Accepted 4 November 2009

Available online 9 December 2009

Keywords:

Personality
Ideology
Attitudes
Politics
Genes

ABSTRACT

Building upon a series of works by Thomas J. Bouchard, Lindon J. Eaves, Hans J. Eysenck and other contemporaries, we present strong evidence that the assumed causal relationship between personality and left–right ideology is too simplistic. We suggest the relationship is not predictive and instead is better understood by dividing the overarching left–right ideological spectrum into more meaningful attitude dimensions. In doing so, we find that Psychoticism is strongly related to conservative positions on Punishment, Religious, and Sex attitudes, whereas Social Desirability is related to liberal positions on the same attitudes. Furthermore, the nature of the covariance between Psychoticism and social attitudes is due to a common genetic influence, while covariance between Social Desirability and these attitudes in females is largely a function of common shared environmental covariance.

© 2009 Elsevier Ltd. All rights reserved.

1. Introduction

Psychologists, geneticists, and political scientists have long attempted to identify and explain the associations between personality and political preferences (Adorno, Frenkel-Brunswick, Levinson, & Sanford, 1950; Eysenck, 1954; McCloskey, 1958). Most of these early attempts to link personality traits with political attitudes portrayed conservatism as a pathology and focused on connecting conservatives with negative personality traits (e.g. Adorno et al., 1950; Altemeyer, 1981; Altemeyer, 1996). Such a view is exemplified by McCloskey (1958), who labeled conservatives as:

“...social isolates, ... people who think poorly of themselves, who suffer personal disgruntlement and frustration, who are submissive, timid, and wanting in confidence, who lack a clear sense of direction and purpose, who are uncertain about their values, and who are generally bewildered by the alarming task of having to thread their way through a society which seems to them too complex to fathom” (37).

Focusing on the causal connection between negative personality traits and conservatism and positive traits with liberalism continues to dominate research in this area, though the language has become more subtle (see Block & Block, 2006; Jost, Glaser, Kruglanski, & Sulloway, 2003; Jost et al., 2008). For example, researchers have

worked very hard to demonstrate that the positively valued Openness to Experience dimension has a strong and consistent negative relationship with political conservatism (see Gosling, Rentfrow, & Swann, 2003; Jost, Federico, & Napier, 2009; McCrae, 1996; Mondak & Halperin, 2008; Van Hiel, Kossowska, & Mervielde, 2000; Van Hiel, Pandelaere, & Duriez, 2004). Recent work however, has also demonstrated that Neuroticism is positively associated with economic liberalism (Leeson & Heaven, 1999; Riemann, Grubich, Hempel, Mergl, & Richter, 1993), though these findings are often dismissed or downplayed in favor of a more positive view of liberalism and negative view of conservatism.

The connection between personality and politics historically rested on the assumption that causality runs from personality traits to political attitudes. This seems plausible as personality is widely understood as some combination of innate dispositions and personal experiences that, in general, guides behavior in a stable predictive manner (Bouchard, 1994; Cattell, 1957; Eysenck, 1990; Eysenck, 1991; Tellegen et al., 1988; Winter & Barenbaum, 1999). This is not to say behavior is predetermined by personality; rather, environmental circumstances provide the impetus for behaviors, and personality predispositions increase or decrease the probability of behavior only if the action is appropriate for a specific situation (Bandura, 2001; Caprara & Cervone, 2000; Mischel & Shoda, 1998). Political attitudes, on the other hand, have typically been viewed as much more capricious (Converse, 1964). Although a plethora of research on attitudes suggest that they can be quite stable over time, rather than being perceived as personal dispositions, political attitudes are typically portrayed as

* Corresponding author. Address: University of Iowa, 344 Schaeffer Hall, Iowa City, Iowa 52242-1498, USA. Tel.: +1 319 335 2347.

E-mail address: Peter.Hatemi@qimr.edu.au (P.K. Hatemi).

preferences related to the immediate social environment and are thus perceived as entirely context dependent.

Such a view of attitudes, combined with the widely held assumption that, unlike personality, parental-offspring correlations of attitudes were entirely functions of cultural transmission (e.g., Niemi & Jennings, 1991; for an exception see Martin et al., 1986), reinforced the belief that personality traits were causally prior to social and political attitudes. However, such an assumption was unfounded, as the heritability of social and political attitudes has been established and replicated across populations (Bouchard & McGue, 2003; Eaves, Eysenck, & Martin, 1989; Martin et al., 1986; Waller, Kojetin, & Bouchard, 1990).

Indeed, the genetic covariation between social attitudes and personality was explored over 30 years ago. Eaves and Eysenck (1974) identified a genetic relationship between personality and conservatism. Typical of a *Nature* Letter, however, while profound and novel, they offered only brief discussion on why this relationship existed. And, unfortunately, these findings went largely unaddressed for several decades, with the exception of a handful of scholars. Among these, Bouchard, Lykken, McGue, Segal, and Tellegen (1990) continued to pursue this question (e.g., Bouchard, 1997; Bouchard, 2009; Bouchard & McGue, 2003; Waller et al., 1990). This work has led to a paradigm shift in the connection between personality and politics.

Combining Religiousness, Authoritarian dispositions, and traditional Conservatism into a core attitude/world view system, Bouchard (2009, p. 36) drew on other contemporaries (e.g., Saucier, 2000), and synthesized a theory that more accurately integrated attitude dimensions and personality traits. Such a synthesis implies that whatever relationship exists between personality and political attitudes cannot be strictly causal; rather, it seems likely that the relationships among political attitudes and personality traits are in part expressions of the same underlying genetic liability. Verhulst, Hatemi, and Eaves (2009) provided strong support of such a position and offered the first replication of Eaves and Eysenck's (1974) findings presented some 35 years earlier. Using a large US twin sample (over 6000 pairs), they found that the vast majority of the covariance between Psychoticism and Militaristic/Defense attitudes was due to a common underlying genetic influence.

Building upon a series of works by Bouchard, Eaves, Eysenck and others, we examine the assumptions made in the existing literature regarding the causal connection between personality traits and political attitudes. Specifically, we estimated the genetic and environmental sources of covariation between personality traits and political attitudes and extended the findings of Verhulst et al. (2009) by focusing on specific attitudinal dimensions of political attitudes and personality traits in a very large sample of Australian Twins.

2. Methods and results

Data were collected from 1988 to 1990 by mailed surveys to two large cohorts of adult Australian twins enrolled in the volunteer Australian Twin Registry. Each participant completed a Health and Lifestyle Questionnaire (HLQ), which contained items on socio-political attitudes, personality traits, and wide variety of health-related and sociodemographic measures (Eaves et al., 1989; Eaves et al., 1999; Martin, 1987; Truett et al., 1994). Using only respondents who completed the political and personality measures, the sample consists of 20,559 individuals from 5402 families; this includes 7234 individual twins, comprising 3254 complete same sex pairs and 363 unlike sex pairs. The mean age of the entire sample was 38.6 (SD = 15.5), while the mean age of the twin respondents was 34.1 (SD = 14.0). Regarding sex, 57.7% were female in

the greater population, while in the twin sample 63.8% were female. For more details on the sample, including ascertainment and response rates, see Hatemi, Medland, Morley, Heath, and Martin (2007).

2.1. Measures

Personality traits were measured by the short form of the Revised version of the Eysenck Personality Questionnaire (EPQ-R-S, Eysenck & Eysenck, 1997; Eysenck, Eysenck, & Barrett, 1985) with sub-scales for Extraversion, Psychoticism, Neuroticism and Social Desirability.

Extraversion is comprised of two central components: *affiliation* or *sociability*, which includes valuing interpersonal bonds and being warm and affectionate, highly sociable and expressive, and *agency* or *impulsiveness*, which includes goal-oriented behavior, ambition, dogmatism, social dominance, leadership, aggression and assertiveness (Depue & Collins, 1999). *Psychoticism* is positively related to authoritarianism, risk taking, impulsivity, tough-mindedness, practicality, magical ideation, and religiosity and negatively related to openness to experience. A careful inspection of the items that comprise the Psychoticism scale used in this paper (as presented in Appendix 1) suggest that the factor is characterized by low levels of introspection and a preoccupation with rules and regulations. *Neuroticism* is associated with feelings of inferiority, unhappiness, anxiety, dependence, hypochondria, guilt, emotional instability, and obsessiveness (Eysenck & Eysenck, 1985). The additional sub-factor of Social Desirability (often dubbed the "lie" scale), was also included in the analyses and is characterized by social acquiescence or conformity and lack of self-insight (Francis, Brown, & Pearson, 1991).

To maximize the empirical validity of the personality dimensions, items were dropped from the personality scales if they were explicitly related to one of the attitude dimensions or if they did not contribute to the intended trait. The nature of the dimensions remained unchanged, however. The empirical validity problem is most evident with the Psychoticism scale. Although the Psychoticism sub-scale is established in the extant literature, in many recent cases it has less than ideal levels of inter-item reliability. This is most likely because the Psychoticism scale was developed in the 1950s, and then revised in the mid 1980s. Thus, the techniques available to assess reliability when the scales were created were impoverished. Retaining items that do not meaningfully contribute to the latent factor introduces error into the model. Therefore, dropping these specific items increased the precision with which we can estimate the trait and the confidence we have in our analyses.

Another common problem that plagues the study of personality and politics is the clear distinction between attitudinal items and personality items. The tautology problem is more common in other personality measures, like the NEO-PI-R Openness to Experience scale where several items explicitly tap political concepts (see Costa & McCrae, 1992). Remaining cognizant of this problem, we identified three items in the Psychoticism scale that had also the possibility of overlapping with attitudinal items. Specifically, the items "Would being in debt worry you?" and "Do you think people spend too much time safeguarding their future with savings and insurances?" potentially overlap with economic political attitudes, while "Do you think marriage is old-fashioned and should be done away with?" potentially overlaps with both social and religious political attitudes. Importantly, the factor loadings of these items are not overwhelming and measures of fit do not decline with the removal of these items. Removing potentially tautological items is not meant to fundamentally alter the concept, but rather ensure that the items that comprise the construct are not inherently political. In other words, this should ensure that the observed

relationship is between the traits and not a function of similar items.

Political and social attitudes were assessed utilizing a 50-item index of political and social issues contemporary at the time of the survey (see Posner, Baker, Heath, & Martin, 1996). In a Wilson and Patterson (1968) format, respondents indicated if they agreed, disagreed, or were uncertain about their attitudes towards a wide range of issues across several ideological dimensions (e.g., Death Penalty, Bible Truth, Legalized Prostitution, Immigration, Stiffer Jail Terms, etc.). Of these 50 items, 26 of the most explicitly political items were used to construct four political attitude dimensions: Religious, Sex, Out-groups and Punishment dimensions (see details below). To facilitate comparisons between this study and similar others, we also created a Liberal–Conservative ideology measure using all 50 items as the scale was intended and commonly found in the extant literature (see Wilson & Patterson, 1968). A complete list of the items can be found in Appendix 2.

Unlike personality, there is no consensual model or theory of socio-political attitudes. Although there is wide agreement on a general, abstract left–right spectrum, the attitudes that comprise this spectrum remain elusive and insofar as specific attitude facets go, they remain underdeveloped (see Bouchard, 2009; Eagly & Chaiken, 1993). As such, to identify the attitude factors, we relied heavily on the face validity of the scales and the empirical results.

2.2. Preliminary analysis

A confirmatory factor analysis (CFA) with missing data was conducted specifying the four personality factors and the four political ideology attitude factors identified above (see Appendices 1 and 2 for the specifics of the CFA). For the personality traits, higher scores indicated higher levels of the traits, and for the ideological dimensions higher scores indicated the liberal position. The model fit statistics for this class of Confirmatory Factor Models are impoverished, especially for relatively complex factor models such as those estimated in this paper. To compensate for this, we estimated a comparable non-nested model with list-wise deletion, where the factor loadings and the factor correlations were essentially unchanged. In this model the RMSEA was 0.044, the CFI was 0.870, and the TLI was 0.917. These fit indices suggest that the model fits the data very well. As such, we are confident in the factor structure we estimate.

2.3. Phenotypic correlations between personality traits and ideological dimensions

We limited our analyses to the relationships between personality traits and ideological dimensions to those relationships that had correlations greater than 0.20. This decision was based on the increased reliability of disentangling covariance between the phenotypic traits (Cohen, 1988). The first stage of our analysis focused on identifying the phenotypic relationships between the personality traits and the social attitudes (see Table 1). The correlations between our attitude dimensions and personality traits were much larger than those reported for correlations between overall Conservatism–Liberalism (ideology) and personality traits in other studies (see Carney, Jost, Gosling, & Potter, 2008; Verhulst et al., 2009). Further, the general ideology scale also was highly correlated with several personality dimensions.

As can be seen in Table 1, several relationships stand out. Most notably, Psychoticism was strongly related to more conservative Religious, Sex and Punishment attitudes in both sexes. This specific pattern of relationships was consistent with the original research on the Authoritarian personality (Adorno et al., 1950) and the magnitude is consistent with the relationship between

authoritarianism and general conservatism (Altemeyer, 1998; Stenner, 2005). We expected that Psychoticism, by virtue of its theoretical relationship with Authoritarianism, would be associated with Religious, Sex, and Punishment attitudes, as these attitudes are central to the concept of Authoritarianism (see Bouchard, 2009).

These same political attitudes were also correlated with Social Desirability in both sexes, although in the opposite (liberal) direction and to a lesser extent. Although the personality and politics literature has generally ignored the connection between Social Desirability and ideological or attitudinal dimensions, this is the second study to link Social Desirability with liberal social attitudes in very large genetically informative samples (see Verhulst et al., 2009). Thus, it appears that an empirical relationship exists, even though the theoretical justifications for this relationship are not yet resolved.

As a point of comparison with other personality and politics studies, we also examined the relationship between the additive 50-item general ideology scale and the four personality traits. The general ideology dimension was also highly related to Psychoticism and Social Desirability. The most interesting feature of the pattern of correlations between the general ideology dimension and the personality traits mirrored the Religious and Sex attitudes. Items along these dimensions comprised the majority of the items in the scale, and thus appeared to drive the relationships observed between the general ideology factor and the separate personality traits. Importantly, by narrowly focusing in the general ideology factor the relationships between extraversion and neuroticism and the political attitudes, which we discuss below, would be obscured.

The relationship between Neuroticism and liberal Out-group attitudes also corresponds with recent findings in the emerging literature within the personality and politics sub-field. Specifically, Neuroticism has been linked with liberal economic ideological attitudes in several samples and is consistent with Verhulst et al. (2009) analysis of US twins. Importantly, attitudes on immigration were part of the US economic ideology dimension in that study, but here in our Australian population they were part of the Out-group dimension.

Finally, we found a relationship between Extraversion and conservative Sex attitudes in these analyses. Very few contemporary studies in the personality and politics literature have found significant relationships between Extraversion and attitudinal or ideological predispositions. However, our finding is consistent with an older literature showing Extraversion to be positively related to Authoritarianism and Conservatism (Eysenck & Wilson, 1978; Pearson & Grotorex, 1981; Ray, 1980; for a recent replication see Carney et al., 2008). Subsequent analyses often failed to replicate these earlier findings. We believe part of the failure to replicate these relationships is due to the left–right generalization of attitude factors. However, greater Extraversion has been long established as a significant influence on sex drive, earlier age of first intercourse, promiscuity, orgasm, and other activities (Cooper, Agocha, & Sheldon, 2000; Eysenck, 1976; Miller et al., 2004; Schenk & Pfrang, 2005). Thus, regarding the relationship between Extraversion and the Sex attitudes factor, the direction of the correlation is in the opposite direction than expected. At first glance it appears for Australians, the relationship between Extraversion and attitudes on sex are quite different from the relationship between Extraversion and actual sexual behavior. Future studies are needed to replicate this finding.

2.4. Genetic analyses

Structural equation models incorporating genetic, shared and unique environmental sources of covariation allowed us to ex-

Table 1Phenotypic correlations between personality and attitude dimensions for male ($N = 3449$) and female ($N = 6066$) twins.

	Psychoticism	Extraversion	Neuroticism	Social Desirability
<i>Female twins</i>				
Religious attitudes	–.534	–.124	–.003	.273
Sex attitudes	–.601	–.266	–.049	.359
Out-group attitudes	–.106	–.080	.204	.211
Punishment attitudes	–.451	–.047	.094	.282
General ideology	–.566	–.177	.001	.357
<i>Male twins</i>				
Religious attitudes	–.496	–.035	.008	.237
Sex attitudes	–.570	–.196	–.033	.318
Out-group attitudes	–.004	–.010	.166	.100
Punishment attitudes	–.421	.047	.021	.231
General ideology	–.495	–.061	–.008	.261

Note: Higher scores on the Personality factors denoted higher levels of the traits. Higher scores on the attitude factors denote more liberal responses for all attitude dimensions. All relationships *except* that between Psychoticism and Out-group attitudes were statistically significant at .01 or better. However, conventional levels of statistical significance do not focus our attention on substantively meaningful relationships. Here we focus only on significant relationships where the effect size is medium or larger (correlations greater $\geq .20$ in bold; see Cohen, 1988).

Table 2

Between co-twin correlations by zygosity.

	MZM	MZF	DZM	DZF	DZOS
<i>Personality traits</i>					
Psychoticism	.536	.615	.381	.414	.370
Extraversion	.516	.488	.193	.212	.211
Neuroticism	.367	.438	.142	.213	.085
Social Desirability	.383	.520	.318	.394	.267
<i>Social attitudes</i>					
Religious	.592	.632	.506	.513	.536
Sex	.592	.668	.452	.558	.505
Out-groups	.600	.559	.482	.402	.361
Punishment	.567	.587	.407	.339	.433
General ideology	.631	.675	.517	.552	.524
N (twin pairs)	646	1385	384	839	363

explore the nature of the relationships among personality and attitudes dimensions. Table 2 provides the twin correlations separated by zygosity and sex for the personality traits and socio-political attitude dimensions. The correlations between MZ twins were substantially larger than the correlations between same-sex DZ twins, providing initial support for the presence of genetic influences and reason to explore structural models to quantify those influences. However, the MZ–DZ correlation differences were much greater for most personality dimensions than for the political attitude sub-factors, suggesting significant shared environmental influences on the attitude dimensions. For completeness we also tabulate the correlations for the DZ opposite-sex pairs. For most variables the correlations for opposite-sex DZ twins were similar to the correlations for same-sex DZ twins, but for Social Desirability and attitudes to Out-groups the DZOS correlation was a bit lower, suggesting that familial effects on these scales were somewhat different in males and females for these constructs. For simplicity we therefore present results of separate analyses of male and female twins, omitting the opposite-sex pairs.

Results of estimating the genetic and shared and non-shared environmental variance components for each measure alone, using maximum likelihood estimation in Mx (Neale, Boker, Xie, & Maes, 2003), are presented in Table 3. Components of variance due to Additive Genetic (A), Common environmental (C), and Unique Environmental (E) influence are tabulated (for detailed explanations of the methodology and theory, along with limitations and recent criticisms see Medland & Hatemi, 2009; Neale & Cardon, 1992).

The results were largely consistent with the expectations based on the twin correlations and the long-standing personality literature. Specifically, Psychoticism, Extraversion, and Neuroticism were characterized by large additive genetic and unique environmental components, while the common environmental component was not significant. For Social Desirability, the common environment variance was statistically significant but the additive genetic component for males was not. In contrast, in both sexes, the additive genetic, shared and unique environmental variance components for almost all the attitude scales were significant. The shared environment variance accounted for large portions of the variance in social attitudes. Importantly, the variance components of the general ideology scale are very similar to those of both the Sex and the Religious factors. The only attitude that differed from this trend was Punishment attitudes, where the common environment variance was not significant for females.

2.5. Cholesky decomposition

The preceding steps were necessary to examine the complex relationships between personality traits and political attitude dimensions. Several of the personality dimensions were correlated with different attitude dimensions at the phenotypic level. Our main interest, however, lay in exploring the nature of the phenotypic relationships. As such, we undertook a series of bivariate Cholesky decompositions (see Fig. 1) to evaluate the sources of covariation. The constraints and model specifications are explained in detail in Medland and Hatemi (2009). Since we wished to know how much of the variance in attitudes could be explained by personality, we put the personality factors first in our analyses.

Tables 4 and 5 display the standardized path coefficients from the Cholesky analyses for females and males, respectively. Cells with dashes indicate that the paths were constrained to zero. This was done where the univariate variance decomposition models described in the previous section did not account for a statistically reliable portion of the variance in the trait. These constraints prevented model instability arising from very small sources of shared variance.

As is shown in Table 4 for males and Table 5 for females, the relationships between Psychoticism and Religious, Sex, and Punishment attitudes were largely due to additive genetic covariation. Performing a simple algebraic transformation of the path coefficients, we found that the majorities of the covariation between Psychoticism and Punishment, Sex, and Religious attitudes was due to genetic covariance.

Table 3
Estimated variance components for personality and ideology dimensions, separately by variable.

	Males			Females		
	<i>a</i> ²	<i>c</i> ²	<i>e</i> ²	<i>a</i> ²	<i>c</i> ²	<i>e</i> ²
Psychoticism	.559 (.51, .60)	–	.441 (.39, .49)	.602 (.57, .63)	–	.399 (.37, .43)
Extraversion	.503 (.45, .55)	–	.497 (.45, .55)	.474 (.44, .51)	–	.526 (.49, .56)
Neuroticism	.362 (.30, .42)	–	.638 (.58, .70)	.438 (.40, .48)	–	.562 (.52, .60)
Social Desirability	.141 (.00, .36)	.230 (.03, .29)	.629 (.57, .70)	.368 (.23, .51)	.141 (.01, .27)	.490 (.46, .53)
Religious attitudes	.151 (.00, .32)	.435 (.28, .57)	.415 (.37, .46)	.226 (.12, .34)	.393 (.29, .49)	.381 (.35, .41)
Sex attitudes	.271 (.11, .45)	.316 (.15, .46)	.413 (.37, .46)	.212 (.11, .32)	.443 (.34, .53)	.346 (.32, .37)
Out-group attitudes	.268 (.11, .44)	.336 (.18, .47)	.395 (.35, .44)	.311 (.19, .44)	.244 (.13, .35)	.445 (.41, .48)
Punishment attitudes	.285 (.11, .47)	.277 (.10, .43)	.438 (.39, .61)	.491 (.36, .61)	.089 (.00, .21)	.420 (.39, .45)
General ideology	.212 (.06, .37)	.408 (.29, .54)	.380 (.35, .42)	.244 (.15, .31)	.420 (.34, .51)	.335 (.31, .36)

Note: Estimates in italics are not significant.

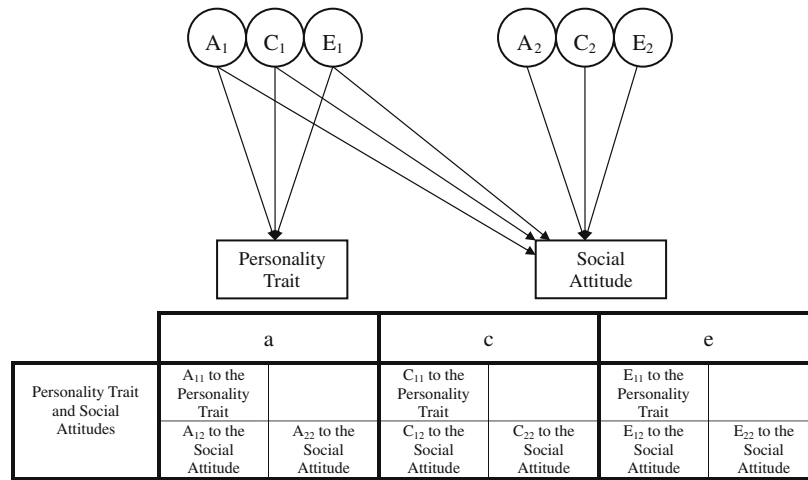


Fig. 1. General Cholesky model.

Table 4
Bivariate cholesky results for personality traits and social attitudes for males.

	a	c	e
Psychoticism and Religious Attitudes	.758 (.72, .79) –.476 (–.52, –.43)	.615 (.58, .65)	.653 (.62, .69) –.201 (–.24, –.16)
Psychoticism and Sex Attitudes	.757 (.72, .79) –.539 (–.58, –.49)	.562 (.52, .60)	.654 (.62, .69) –.249 (–.29, –.21)
Psychoticism and Punishment Attitudes	.760 (.73, .79) –.332 (–.39, –.28)	.680 (.65, .71)	.650 (.61, .69) –.260 (–.31, –.22)
Psychoticism & Ideology	.756 (.72, .78) –.486 (–.53, –.44)	.632 (.59, .67)	.655 (.62, .69) –.192 (–.24, –.15)
Extraversion and Sex Attitudes	.715 (.67, .75) –.182 (–.24, –.12)	.757 (.73, .78)	.700 (.66, .74) –.108 (–.15, –.06)
Neuroticism and Out–Group Attitudes	.610 (.55, .66) .183 (.11, .26)	.764 (.73, .79)	.792 (.75, .83) .061 (.02, .11)
Social Desirability and Religious Attitudes	.386 (.08, .60) .362 (.03, .56)	.138 (.00, .49)	.778 (.74, .82) .055 (.01, .10)
		.495 (.23, .62) .106 (–.16, .36)	.651 (.52, .72)
			.642 (.61, .68)

Table 4 (continued)

	a		c		e	
Social Desirability and Sex Attitudes	.384 (.10, .60)		.497 (.24, .62)		.778 (.74, .82)	
	.445 (.11, .67)	.274 (.00, .49)	.137 (-.16, .38)	.548 (.39, .65)	.104 (.06, .15)	.631 (.60, .67)
Social Desirability and Punishment Attitudes	.399 (.00, .61)		.484 (.21, .63)		.779 (.74, .82)	
	.035 (-.64, .65)	.543 (.00, .70)	.299 (.04, .60)	.416 (.00, .60)	.086 (.04, .14)	.659 (.62, .70)
Social Desirability and Ideology	.397 (.00, .61)		.486 (.21, .63)		.779 (.74, .82)	
	.179 (-.53, .58)	.427 (.00, .59)	.323 (.09, .68)	.549 (.00, .68)	.066 (.02, .11)	-.612 (-.65, -.58)

Note: Estimates in italics were not significant. To solve estimation problems in a limited number of models we bounded the parameters to have a lower confidence bound of zero. Thus, parameters with a lower confidence bound of zero should be interpreted as not statistically significant.

Table 5

Bivariate cholesky results for personality traits and social attitudes for females.

	a		c		e	
Psychoticism & Religious Attitudes	.783 (.76, .80)		–		.622 (.60, .65)	
	–.508 (-.54, -.48)	.615 (.59, .64)	–	–	–.209 (-.24, -.18)	.567 (.55, .59)
Psychoticism & Sex Attitudes	.783 (.76, .80)		–		.623 (.60, .65)	
	–.564 (-.59, -.53)	.594 (.57, .62)	–	–	–.246 (-.27, -.22)	.518 (.50, .54)
Psychoticism & Punishment	.787 (.77, .80)		–		.617 (.59, .64)	
	–.390 (-.43, -.35)	.658 (.63, .68)	–	–	–.231 (-.26, -.20)	.601 (.58, .62)
Psychoticism & Ideology	.783 (.76, .80)		–		.623 (.60, .65)	
	–.580 (-.61, -.55)	.586 (.56, .61)	–	–	–.170 (-.20, -.14)	.540 (.52, .56)
Extraversion and Sex Attitudes	.691 (.66, .72)		–		.723 (.70, .75)	
	–.265 (-.31, -.22)	.776 (.76, .79)	–	–	–.109 (-.14, .08)	.562 (.54, .58)
Neuroticism and Out-Group Attitudes	.664 (.63, .69)		–		.748 (.72, .77)	
	.204 (.16, .25)	.726 (.70, .75)	–	–	.094 (.06, .13)	.650 (.63, .67)
Social Desirability and Religious Attitudes	.498 (.35, .61)		.520 (.40, .61)		.694 (.67, .72)	
	.117 (-.05, .28)	.428 (.28, .54)	.339 (.20, .50)	.555 (.41, .65)	.051 (.02, .08)	.614 (.59, .64)
Social Desirability and Sex Attitudes	.502 (.36, .62)		.518 (.39, .61)		.693 (.67, .72)	
	.123 (-.03, .28)	.405 (.27, .51)	.435 (.30, .60)	.539 (.35, .63)	.095 (.07, .13)	.577 (.55, .60)
Social Desirability and Punishment Attitudes	.504 (.37, .61)		.517 (.40, .61)		.692 (.67, .72)	
	.057 (-.11, .21)	.671 (.59, .72)	.355 (.22, .47)	.000 (-.31, .31)	.096 (.06, .13)	.642 (.62, .66)
Social Desirability and Out-Group Attitudes	.517 (.38, .63)		.505 (.37, .60)		.691 (.67, .72)	
	.011 (-.17, .18)	.563 (.44, .67)	.290 (.13, .47)	.393 (.00, .53)	.080 (.05, .11)	.662 (.64, .69)
Social Desirability and Ideology	.515 (.38, .63)		.506 (.38, .60)		.692 (.67, .72)	
	.096 (-.06, .25)	.450 (.33, .55)	.504 (.36, .69)	.450 (.00, .58)	.070 (.04, .10)	.572 (.55, .60)

Note: Estimates in italics were not significant. Again, parameters with a lower confidence bound of zero should be interpreted as not statistically significant.

Importantly, although the paths from Psychoticism to the attitude dimensions (A_{12}) were quite strong for each attitude dimension, these paths were still smaller than the paths accounting for the unique influence (A_{22}) on the attitude dimensions. Thus, although there was a strong relationship between Psychoticism and each attitude dimension, the majority of the additive genetic variance in the attitude dimensions was not ac-

counted for by the genetic influences on Psychoticism. The variance shared between the unique environmental component of Psychoticism and the attitude dimensions were minimal (paths E_{12}), while the residual unique environmental variance in the attitude dimensions were uniformly high (paths E_{22}), which is not surprising since they include measurement error. This pattern of results did not vary substantially by sex. Again, the pat-

tern of relationships for the general ideology scale mimicked the relationships for the Religious and Sex attitudes with Psychoticism. Specifically, the phenotypic relationship between general ideology and Psychoticism appeared to be driven by the additive genetic influence.

Similar relationships existed between Extraversion and Sex attitudes as well as between Neuroticism and Out-group attitudes. In both cases, the connections between the personality traits and the attitude dimensions were primarily accounted for by the additive genetic covariance between the constructs rather than by any environmental covariance. Again, this pattern of results was remarkably consistent across sexes. In both cases, the phenotypic relationships were much smaller than the relationships observed between Psychoticism and the attitude dimensions. As such, there were correspondingly smaller paths A_{12} in these models.

The relationship between Social Desirability and each attitude dimension (Sex, Punishment, and Out-groups) deviated slightly from the pattern of relationships identified for the other personality traits. Specifically, for females both the additive genetic and common environment variance components were significant for Social Desirability. Thus, this necessitated estimating Cholesky models with common environmental pathways. To ensure that the male model was broadly comparable with the female model, we estimated the same parameters even though the additive genetic variance in Social Desirability was not statistically significant when it was measured alone in males.

The Cholesky results for Social Desirability were generally consistent across sexes. Specifically, the relationships between Social Desirability and the attitude dimensions rested primarily in the common environmental covariances. For females, the common environmental covariations (paths C_{12}) between Social Desirability and the attitude dimensions were substantively large and statistically significant for all political attitudes. Furthermore, the additive genetic covariances (paths A_{12}) were substantively small and statistically not significant for all political attitudes. The pattern for males was only slightly different. For the Religious and Punishment attitude dimensions, the common environmental covariances (paths C_{12}) were statistically significant and substantively large. For Sex attitudes, however, the common environmental covariance was much smaller and not statistically significant. Furthermore, for Religious and Sex attitudes, the additive genetic covariances with Social Desirability were statistically significant. Remember, however, that the additive genetic component was not statistically significant for Social Desirability in the univariate models for males. Furthermore, we had many more female than male twins, giving us greater power to detect significant results in the female sample.

While single population based results should be accepted with caution, the current results are broadly consistent with analyses on data from an equally large US twin sample (see Verhulst et al., 2009). Specifically, the current study replicated the findings from a completely separate population of twins in a different country, and therefore increases generalizability of the effects. Finally, as with the other personality traits, the result for the general ideology factor mirrored the Religious attitude factor. Specifically, for both males and females, the primary source of covariance between Social Desirability and any of the attitude factors was common environmental covariance rather than additive genetic covariance.

3. Discussion

The results in this paper offer a more fine grained explanation for the relationship between personality traits and social atti-

tudes than that captured by looking only at the Conservatism–Liberalism super factor (ideology). Specifically, ideology was strongly and negatively correlated with Psychoticism and positively correlated with Social Desirability. These same relationships were also seen with the Religious, Sex, and Punishment attitude sub-factors but not with the attitudes toward Out-groups, where the correlation with Psychoticism was negligible. In addition we also saw a modest (~ -0.2) negative correlation between Extraversion and liberal attitudes to sex and a positive correlation (~ 0.2) between Neuroticism and liberal attitudes to Out-groups. All these correlations were remarkably consistent between sexes.

Consistent with the existing literature, we showed that individual differences in both personality traits and political attitudes could be decomposed into genetic and environmental variance components. For personality traits environmental influences were overwhelmingly unique to the individual, except for Social Desirability where there was an important component of shared environmental influence. For attitudes, on the other hand, we saw substantial genetic influences, but large components of shared environmental variance as well. However, the common environmental covariance is likely to be confounded in some part by assortative mating (see Eaves et al., 1999; Eaves & Hatemi, 2008). Indeed, the spousal correlations for Social Desirability was 0.25 and ranged from 0.45 to 0.65 for the attitudinal dimensions ($p < .001$, $N = 3535$). Finally, using a multivariate genetic model, we demonstrated that the phenotypic relationships between personality and attitudes were primarily functions of a single source of covariance, genetic in the case of the correlations of Psychoticism, Neuroticism, and Extraversion with attitude dimensions in both males and females, and shared environment for correlations between Social Desirability and attitudes.

In line with our expectations, Psychoticism was strongly related to more conservative positions on Religious, Sex, and Punishment attitude dimensions. This finding is consistent with previous theorizing that suggests these attitude dimensions should be central to Authoritarian concerns, and that Authoritarianism, Traditional Conservatism, and Psychoticism are intertwined (Adorno et al., 1950; Bouchard, 2009).

The correlations between Psychoticism and the attitudinal dimensions we demonstrate in this paper are larger than those presented in other similar papers using other omnibus personality theories; however, the reported relationships are consistent with the theoretical relationship between Psychoticism and various measures of Authoritarianism, like Adorno et al.'s (1950) F scale, Altemeyer's (1981, 1996) RWA scale, and Feldman's (2003) Social Conformity–Autonomy Scale. Notably, both the F and the RWA scales have been strongly criticized for including explicit political content in the measurement of Authoritarianism, while the development of the Social Conformity–Autonomy scale goes to great lengths to remove any explicitly political content from the measurement of authoritarianism, and thus avoid confounding the personality trait with attitudinal preferences. Therefore, the magnitude of the relationships between the attitudinal variables and Psychoticism are not unexpected.

A similar, but substantially weaker relationship existed between Extraversion and more conservative attitudes on the Sex attitude dimension. This finding is opposite to what might be expected based on Extraversion's relationship to more liberal sexual behavior (see Cooper et al., 2000). However, such a finding is in line with older studies of conservatism and personality (see Eysenck & Wilson, 1978; Pearson & Grotorex, 1981; Ray, 1980). We see two possible explanations for this relationship. First, there was a reasonably large correlation between Psychoticism and Extraversion ($r = 0.37$). As such, the relationship between Extraversion and Sex attitudes that we observed may have been a function of the very

strong relationship between Psychoticism and Sex attitudes. Alternatively, as noted above, Extraversion has two sub-factors: affiliation/sociability and agency/impulsiveness. Thus, the phenotypic relationship may have been driven by the agency/impulsiveness sub-factor. We leave it to future research to disentangle these possibilities.

On the other hand, the more Neurotic our twins were, the more “liberal” their attitudes toward Out-groups (e.g. immigration, multiculturalism). This echoed the relationship found between Neuroticism and more liberal attitudes on economic issues in a large US sample, as the Australia Out-group dimension and the US Economic dimension shared one important item in particular – attitudes to immigration (see Verhulst et al., 2009).

One of the most interesting, but least explored, personality traits in the context of political attitudes is Social Desirability. The higher respondents scored on this dimension, the more likely they were to support liberal positions on Religious, Sex, and Punishment attitudes. Overall the relationships between attitudes and Social Desirability were the opposite of the relationships between Psychoticism and attitudes, though substantially weaker. In this study, as in Verhulst et al. (2009), Social Desirability correlated with more liberal social attitudes.

In sum, the relationships between Psychoticism, Extraversion, and Neuroticism and all attitude dimensions (Sex, Punishment, and Religious) were largely driven by common genetic influences. For Social Desirability the pattern that emerged was the vast majority of covariation between Social Desirability and each attitude dimension was due to the similarity in shared environment, though this effect was less consistent in males. Regardless of the source of covariance between personality and attitude dimensions, the overwhelming portion of individual differences remained unique to each trait, with one exception – Psychoticism and Sex attitudes shared some 40% of their covariance.

Of central importance to our findings, the relationships between personality traits and political ideologies were not simple or uniform: different attitude dimensions correlated with different personality traits to varying degrees. Importantly, if we had focused only on the relationship between the general ideology factor and the personality traits we would have missed several key relationships, including the relationship between Neuroticism and more liberal attitudes, which seemed to be restricted to economic or group competition attitude dimensions. Furthermore, the intriguing relationship between Extraversion and Sex attitudes would also have gone unnoticed. Recent research on personality and politics has missed these findings because it focused only on the general ideological factor.

Our analysis has brought together the foundational contributions of H.J. Eysenck to personality and attitudes dimensionality, and the genetic studies of attitudes initiated by L.J. Eaves and N.G. Martin and further developed by T.J. Bouchard. Bouchard's (2009) argument that combining Authoritarianism, Religiousness and Conservatism implies that whatever relationship exists between personality and attitudes, is not that one predicts the other, but that both traits contain elements that are simply different representations of the same constructs. Such a position is supported by the results we show here.

The finding that the majority of covariation between Psychoticism and attitudes is due to genetic variance provides strong evidence that a simple environmentally driven causal theory from personality to politics is not suitable for such a complex relationship. It is important to keep in mind that genes are multifaceted: there is no specific gene for a personality trait or for a political attitude, even if individual genes can be associated with specific attitudes or personality traits. However, the relationship between Social Desirability and the attitude dimensions exhibited a remarkably different pattern of results. The locus of the relationship in this case rested on shared environmental influences on the two traits. Due to the significant spousal correlations for both Social Desirability and socio-political attitudes, it is likely that some part of the shared environmental covariance is attributed to assortative mating. The result provides some support for existing social science expectations about the importance of environmental influences for the relationship between personality traits and social attitudes (see Mondak & Halperin, 2008). The social nature of Social Desirability makes the connection between this personality trait and the associated social attitudes reasonable. However, this environmental relationship is the exception to our understanding of personality and politics based on our findings here and in other studies (see Verhulst et al., 2009).

These analyses should be seen as the beginning of a new stage in the research connecting personality and politics. At this point, we know that the patterns of relationships are more complex than those suggested by previous models. That is, we cannot assume causality, nor focus only on a single left–right ideological spectrum. Future research focusing on both active and passive gene–environment covariation using extended kinship designs, and gene–environment interaction models are underway to further explore these patterns.

Appendix 1. Confirmatory factor structure of the EPQ

	Psychoticism	Extraversion	Neuroticism	Social Desirability
Do you prefer to go your own way rather than act by the rules?	.57			
Do you stop to think things over before doing anything?	–.31			
Would you take drugs which may have strange or dangerous effects?	.79			
Do good manners and cleanliness matter much to you?	–.42			
Would you like other people to be afraid of you?	.38			
Is it better to follow society's rules than go your own way?	–.46			
Are you a talkative person?		.66		
Are you rather lively?		.71		
Do you enjoy meeting new people?		.60		

(continued on next page)

Appendix A (continued)

	Psychoticism	Extraversion	Neuroticism	Social Desirability
Can you usually let yourself go and enjoy yourself at a lively party?	.76			
Do you usually take the initiative in making new friends?	.69			
Can you easily put some life into a rather dull party?	.81			
Do you tend to keep in the background on social occasions?	-.83			
Do you like mixing with people?	.73			
Do you often take on more activities than you have time for?	.26			
Do you like plenty of bustle and excitement around you?	.60			
Do you like doing things in which you have to act quickly?	.57			
Are you mostly quiet when you are with other people?	-.75			
Do other people think of you as being very lively?	.81			
Can you get a party going?	.80			
Would you call yourself happy-go-lucky?	.49			
Does your mood often go up and down?			.69	
Do you ever feel 'just miserable' for no reason?			.64	
Are you an irritable person?			.62	
Are your feelings easily hurt?			.65	
Do you often feel 'fed-up'?			.72	
Would you call yourself a nervous person?			.63	
Are you a worrier?			.75	
Would you call yourself tense or 'high-strung'?			.65	
Do you worry too long after an embarrassing experience?			.62	
Do you suffer from 'nerves'?			.59	
Do you often feel lonely?			.66	
Are you often troubled about feelings of guilt?			.66	
If you say you will do something, do you always keep your promise?				.49
Were you ever greedy by helping yourself to more than your share?				-.63
Have you ever blamed someone for what was really your fault?				-.59
Are <i>all</i> your habits good and desirable ones?				.59
Have you ever taken anything that belonged to someone else?				-.68
Have you ever broken or lost something belonging to someone else?				-.55
Have you ever said anything bad or nasty about anyone?				-.71
As a child, were you ever 'fresh' towards your parents?				-.51
Have you ever cheated at a game?				-.70
Have you ever taken advantage of someone?				-.76
Do you always practice what you preach?				.57
Do you sometimes put off until tomorrow what you ought to do today?				-.36

Appendix 2. Confirmatory factor structure of the Australian socio-political attitude index

	Religious	Sex	Out-groups	Punishment
Bible Truth	.84			
Divine Law	.74			
Sabbath Observance	.74			
Church Authority	.76			
Divorce	-.60			
Evolution Theory	-.55			
Condom Machine		-.86		
Abortion		-.78		
Legalized Prostitution		-.69		
Casual Sex		-.64		
Chastity		.63		
Birth Control		-.51		
Surrogate Mothers		-.50		
Test Tube Babies		-.44		
Gay Rights		-.54	-.46	
Asian Immigration			-.79	
Multiculturalism			-.73	

Appendix 2 (continued)

	Religious	Sex	Out-groups	Punishment
White Superiority			.64	
Conservationists			-.49	
Apartheid			.46	
Foreign Ownership			-.34	
Stiffer Jail Terms				.82
Strict Rules				.68
Death Penalty				.59
Caning				.48
Teenage Delinquency				-.44

Note: In addition to the 26 items above, the following items comprise the 50-item general conservatism scale: Privatization, Medicare, Trade Unions, Patriotism, Voluntary Euthanasia, Nuclear Power, Working Mothers, Inborn Conscience, Government Welfare, Socialism, Herbal Remedies, Charity Work, Suicide, Licensing Laws, Fluoridation, Royalty, Women Judges, Disarmament, Censorship, White Lies, Teenage Dole, Private Schools, Chiropractors, Defense Spending, Legalized Modern Art. The items excluded from the attitudinal factors did not contribute to the latent attitudes and were thus omitted from the traits.

References

- Adorno, T. W., Frenkel-Brunswick, E., Levinson, D. J., & Sanford, R. N. (1950). *The Authoritarian personality*. New York: Harper and Row.
- Altemeyer, R. A. (1981). *Right-wing Authoritarianism*. Winnipeg: University of Manitoba Press.
- Altemeyer, R. A. (1996). *The Authoritarian specter*. Cambridge, MA: Harvard University Press.
- Altemeyer, R. A. (1998). The other authoritarian personality. *Advances in Experimental Social Psychology*, 30, 41–92.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52(1), 1.
- Block, J., & Block, J. H. (2006). Nursery school personality and political orientation two decades later. *Journal of Research in Personality*, 40, 734–749.
- Bouchard, T. J. Jr., (1994). Genes, environment, and personality. *Science*, 264, 1700–1701.
- Bouchard, T. J. Jr., (1997). The genetics of personality. *Handbook of psychiatric genetics*. CRC Press.
- Bouchard, T. J. Jr., (2009). Authoritarianism religiousness and conservatism: Is obedience to authority the explanation for clustering universality and evolution? In E. Voland & W. Scheifelhovel (Eds.), *The biological evolution of religious mind and behavior* (pp. 165–180). Dordrecht/Heidelberg/London/New York: Springer.
- Bouchard, T. J., Jr., Lykken, D. T., McGue, M., Segal, N. L., & Tellegen, A. (1990). Sources of human psychological differences: The Minnesota Study of Twins Reared Apart. *Science*, 250(4978), 223–228.
- Bouchard, T. J., Jr., & McGue, M. (2003). Genetic and environmental influences on human psychological differences. *Journal of Neurobiology*, 54(1), 4–45.
- Caprara, G. V., & Cervone, D. (2000). *Personality: Determinants, dynamics and potentials*. Cambridge: Cambridge University Press.
- Carney, D. R., Jost, J. T., Gosling, S. D., & Potter, J. (2008). The secret lives of liberals and conservatives: Personality profiles, interaction styles, and the things they leave behind. *Political Psychology*, 29, 807–840.
- Cattell, R. B. (1957). *Personality and motivation structure and measurement*. New York: World Book.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Earlbaum.
- Converse, P. E. (1964). The nature of belief systems in mass publics. In D. E. Apter (Ed.), *Ideology and discontent* (pp. 206–261). New York: Free Press.
- Cooper, M. L., Agocha, V. B., & Sheldon, M. S. (2000). A motivational perspective on risky behaviors: The role of personality and affect regulatory processes. *Journal of Personality*, 68(6).
- Costa, P. T., Jr., & McCrae, R. R. (1992). Normal personality assessment in clinical practice: The NEO Personality Inventory. *Psychological Assessment*, 4, 5–13.
- Depue, R. A., & Collins, P. F. (1999). Neurobiology of the structure of personality: Dopamine, facilitation of incentive motivation, and extraversion. *Behavioral Brain Science*, 22(3), 491–517.
- Eagly, A., & Chaiken, S. (1993). *Psychology of attitudes*. NY: Harcourt, Brace Jovanovich.
- Eaves, L. J., & Eysenck, H. J. (1974). Genetics and the development of social attitudes. *Nature*, 249, 288–289.
- Eaves, L. J., Eysenck, H. J., & Martin, N. G. (1989). *Genes, culture and personality; an empirical approach*. London: Academic Press.
- Eaves, L. J., & Hatemi, P. K. (2008). Transmission of attitudes toward abortion and gay rights: Parental socialization or parental mate selection? *Behavior Genetics*, 38, 247–256.
- Eaves, L. J., Heath, A. C., Martin, N. G., Maes, H. H., Neale, M. C., Kendler, K. S., et al. (1999). Comparing the biological and cultural inheritance of personality and social attitudes in the Virginia 30,000 study of twins and their relatives. *Twin Research*, 2, 62–80.
- Eysenck, H. J. (1954). *The psychology of politics*. New Brunswick, NJ: Routledge.
- Eysenck, H. (1976). *Sex and personality*. London Open Books.
- Eysenck, H. J. (1990). Biological dimensions of personality. In L. A. Pervin (Ed.), *Handbook of personality: Theory and research* (pp. 249–276). New York: Guilford.
- Eysenck, H. J. (1991). Dimensions of personality: 16, 5 or 3? Criteria for a taxonomic paradigm. *Personality and Individual Differences*, 12, 773–790.
- Eysenck, H. J., & Eysenck, M. W. (1985). *Personality and individual differences: A natural science approach*. New York: Plenum.
- Eysenck, H. J., & Eysenck, S. B. G. (1997). *Eysenck Personality Questionnaire-Revised (EPQ-R) and short scale (EPQ-RS)*. Madrid: TEA Ediciones.
- Eysenck, S. B. G., Eysenck, H. J., & Barrett, P. (1985). A revised version of the Psychoticism scale. *Personality and Individual Differences*, 6(1), 21–29.
- Eysenck, H. J., & Wilson, G. D. (1978). *The psychological basis of ideology*. Lancaster: MTP Press.
- Feldman, S. (2003). Enforcing social conformity: A theory of authoritarianism. *Political Psychology*, 24, 41–74.
- Francis, L. J., Brown, L. B., & Pearson, P. R. (1991). The dual nature of the EPQ lie scale among university students in Australia. *Personality and Individual Differences*, 12(10), 989–991.
- Gosling, S. D., Rentfrow, P. J., & Swann, W. B. Jr., (2003). A very brief measure of the big-five personality domains. *Journal of Research in Personality*, 37, 504–528.
- Hatemi, P. K., Medland, S. E., Morley, K. I., Heath, A. C., & Martin, N. G. (2007). The genetics of voting: An Australian Twin Study. *Behavior Genetics*, 37(3), 435–448.
- Jost, J. T., Federico, C. M., & Napier, J. L. (2009). Political ideology: Its structure, functions, and elective affinities. *Annual Review of Psychology*, 60, 339–367.
- Jost, J. T., Glaser, J., Kruglanski, A. W., & Sulloway, F. J. (2003). Political conservatism as motivated social cognition. *Psychological Bulletin*, 129(3), 339–375.
- Jost, J. T., Napier, J. L., Thorisdottir, H., Gosling, S. D., Palfai, T. B., & Ostafin, B. (2008). Are needs to manage uncertainty and threat associated with political conservatism or ideological extremity? *Personality and Social Psychology Bulletin*, 33, 989–1007.
- Leeson, P., & Heaven, P. C. L. (1999). Social attitudes and personality. *Australian Journal of Psychology*, 51, 19–24.
- Martin, N. G. (1987). Genetic differences in drinking habits alcohol metabolism and sensitivity in unselected samples of twins. In H. W. Goedde & D. P. Agarwal (Eds.), *Genetics and alcoholism* (pp. 109–119). New York: Alan R. Liss.
- Martin, N. G., Eaves, L. J., Heath, A. C., Jardine, R., Feingold, L. M., & Eysenck, H. J. (1986). Transmission of social attitudes. *Proceedings for the National Academy of Sciences*, 83, 4364–4368.
- McCloskey, H. (1958). Conservatism and personality. *American Political Science Review*, 52, 27–45.
- McCrae, R. R. (1996). Social consequences of experiential openness. *Psychological Bulletin*, 120(3), 323–337.
- Medland, S. E., & Hatemi, P. K. (2009). Political science, biometric theory and twin studies: A methodological introduction. *Political Analysis*, 17(2), 191–214.
- Miller, J. D., Lynam, D., Zimmerman, R. S., Logan, T. K., Leukefeld, C., & Clayton, R. (2004). The utility of the Five Factor Model in understanding risky sexual behavior. *Personality and Individual Differences*, 36(7), 1611–1626.
- Mischel, W., & Shoda, Y. (1998). Reconciling processing dynamics and personality dispositions. *Annual Review of Psychology*, 49, 229–258.
- Mondak, J. J., & Halperin, K. D. (2008). A framework for the study of personality and political behaviour. *British Journal of Political Science*, 38, 335–362.
- Neale, M. C., Boker, S., Xie, G., & Maes, H. (2003). *Mx: Statistical modeling* (5th ed.). Richmond, VA: Department of Psychiatry, Virginia Commonwealth University.
- Neale, M. C., & Cardon, L. L. (1992). *Methodology for genetic studies of twins and families*. Kluwer Academic.
- Niemel, R. G., & Jennings, M. K. (1991). Issues and inheritance in the formation of party identification. *American Journal of Political Science*, 35, 970–988.
- Pearson, P. R., & Grotorex, B. J. (1981). Do tough-minded people hold tough-minded attitudes? *Current Psychology*, 1(1), 45–48.

- Posner, S. F., Baker, L. A., Heath, A. C., & Martin, N. G. (1996). Social contact; social attitudes and twin similarity. *Behavior Genetics*, 26(2), 123.
- Ray, J. J. (1980). Are Authoritarians extraverted? *British Journal of Social and Clinical Psychology*, 19, 147–148.
- Riemann, R., Grubich, C., Hempel, S., Mergl, S., & Richter, M. (1993). Personality and attitudes towards current political topics. *Personality and Individual Differences*, 15, 313–321.
- Saucier, G. (2000). Isms and the structure of social attitudes. *Journal of Personality and Social Psychology*, 78, 366–385.
- Schenk, J., & Pfrang, H. (2005). Extraversion, neuroticism and sexual behavior: Interrelationships in a sample of young men. *Journal Archives of Sexual Behavior*, 15(6), 449–455.
- Stenner, K. (2005). *The Authoritarian dynamic*. London: Cambridge University Press.
- Tellegen, A., Lykken, D. T., Bouchard, T. J., Jr., Wilcox, K. J., Segal, N. L., & Rich, S. (1988). Personality similarity in twins reared apart and together. *Journal of Personality and Social Psychology*, 54(6), 1031–1039.
- Truett, K. R., Eaves, L. J., Walters, E. E., Heath, A. C., Hewitt, J. K., Meyer, J. M., et al. (1994). A model system for the analysis of family resemblance in extended kinships of twins. *Behaviour Genetics*, 24, 35–49.
- Van Hiel, A., Kossowska, M., & Mervielde, I. (2000). The relationship between openness to experience and political ideology. *Personality and Individual Differences*, 28(4), 741–751.
- Van Hiel, A., Pandelaere, M., & Duriez, B. (2004). The impact of need for closure on conservative beliefs and racism: Differential mediation by Authoritarian submission and Authoritarian dominance. *Personality and Social Psychology Bulletin*, 30, 824–837.
- Verhulst, B., Hatemi, P. K., & Eaves, L. J. (2009). Personality traits and political ideologies. In *Paper presented at the 39th annual meeting of the behavior genetics association, Minneapolis, MN, June 17–20*.
- Waller, N. G., Kojetin, B. A., & Bouchard, T. J. (1990). Genetic and environmental influences on religious interests, attitudes, and values. A study. *Psychological Science*.
- Wilson, G. D., & Patterson, J. R. (1968). A new measure of conservatism. *British Journal of Social and Clinical Psychology*, 7, 264–269.
- Winter, D. G., & Barenbaum, N. B. (1999). History of modern personality theory and research. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research*. New York, NY: The Guilford Press (2nd ed., pp. 3–27).