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Abstract

We report longitudinal data in which we assessed the relationships between intelligence and support for two constructs that shape ideological frameworks, namely, right-wing authoritarianism (RWA) and social dominance orientation (SDO). Participants (N = 375) were assessed in Grade 7 and again in Grade 12. Verbal and numerical ability were assessed when students entered high school in Grade 7. RWA and SDO were assessed before school graduation in Grade 12. After controlling for the possible confounding effects of personality and religious values in Grade 12, RWA was predicted by low g ($\beta = -.16$) and low verbal intelligence ($\beta = -.18$). SDO was predicted by low verbal intelligence only ($\beta = -.13$). These results are discussed with reference to the role of verbal intelligence in predicting support for such ideological frameworks and some comments are offered regarding the cognitive distinctions between RWA and SDO.

Keywords: Right-wing authoritarianism, RWA, social dominance orientation, SDO, intelligence, longitudinal, cognitive ability

Cognitive ability, right-wing authoritarianism, and social dominance orientation: A
five-year longitudinal study amongst adolescents

Introduction

Intelligence has important consequences for everyday life (Gottfredson, 1997) including democracy, political freedoms, and the rule of law (Rindermann, 2008). A number of recent studies have demonstrated that intelligence assessed during childhood predicts social attitudes and political behaviours in adulthood. Indeed, Deary and his colleagues found evidence that intelligent children turn out to be “enlightened adults” (Deary, Batty, & Gale, 2008, p. 1). Analysing data from the 1970 British Cohort Study, they found that intelligence at age 10 years predicted more tolerant social attitudes at age 30. More specifically, intelligence was found to have direct and significant effects on a latent trait identified as liberal, non-traditional social attitudes. This trait was found to underpin a number of attitude domains including pro-working women and anti-racist views (see also the results of Schoon, Cheng, Gale, Batty, and Deary, 2010). Thus, there is support for Meisenberg’s (2004, p. 139) views that “IQ is a powerful predictor of modern, non-traditional values” (see also Kanazawa, 2010; Stankov, 2009).

A social attitude that has significant political implications for contemporary society is prejudice and, by extension, intergroup hostility. Wars, political turmoil, and natural calamities are still common in the 21st century, and have resulted in the displacement of approximately 42 million persons, thus giving rise to large numbers of refugees and asylum seekers (UNHCR, 2010). Some of this tidal wave of human movement is a direct consequence of prejudice. Even in major western democracies, for example, large pockets of minority groups evoke unease and prejudice amongst the majority population with negative attitudes towards Muslims on the rise in

countries such as Britain and France (Bleich, 2009). Conversely, anti-Semitism continues to exist in overt (see Anti-Defamation League, 2010) and covert forms (Cohen, Jussim, Harber, & Bhasin, 2009). In the US there seems to be limited support for race-targeted policies to assist blacks (Rabinowitz, Sears, Sidanius, & Krosnick, 2009), whilst in Australia the value functions related to prejudice varies depending on the minority group in question (Griffiths & Pedersen, 2009).

The ideological underpinnings of prejudice

It has been argued that prejudice and intergroup hostility are predicated upon stable and enduring personal characteristics (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950; Altemeyer, 1981, 1996, 1998; Pratto, Sidanius, Stallworth, & Malle, 1994). These characteristics are expressed in the form of two major ideological dimensions, or world views, that underpin prejudice and intergroup hostility. The dimensions are right-wing authoritarianism (RWA) and social dominance orientation (SDO) and they drive our views of the social world and determine our relationships with members of other ethnic and religious groups.

Individuals high on RWA see the world as a dangerous and threatening place. They deal with this fact through their high levels of social conformity and submission to authority figures who they believe will create order and security within society. In contrast, individuals high on SDO liken the world to a competitive jungle (Duckitt, Wagner, du Plessis, & Birum, 2002). In order to survive, high SDO individuals are supportive of the dominance of high status and more powerful groups over weaker and less influential ones. SDO individuals are toughminded and act to maintain societal inequalities and their privileged position in the social hierarchy (Pratto et al., 1994). On the other hand, RWA individuals are social conformers, usually vote conservative, and are submissive to the legitimate authorities of the day (Altemeyer,

1981, 1998; Duckitt et al., 2002). Many studies have attested to the importance of these ideological dimensions as primary shapers of general social attitudes and intergroup relationships (e.g. Altemeyer, 1998; Duckitt et al., 2002; Duriez, Van Hiel, & Kossowska, 2005; Heaven, Organ, Supavadeeprasit, & Leeson, 2006; Kreindler, 2005; Pratto et al., 1994; Sibley & Duckitt, 2008; Sidanius & Pratto, 1999; Van Hiel & Mervielde, 2005; Verkuyten & Hagendoorn, 1998).

Although RWA and SDO both predict prejudice, they are qualitatively quite different. RWAs have a need for structure whereas SDOs strive to dominate weaker groups. Whereas RWAs are religious fundamentalists, SDOs are not; RWAs are more likely to be self-righteous than SDOs; RWAs vote for right-wing political parties, whereas there is no relationship between SDO and voting intention (Altemeyer, 1998).

Aims and rationale of the present study

Although it has been shown that RWA has a strong genetic component (McCourt, Bouchard, Lykken, Tellegen, & Keyes, 1999), Altemeyer (1981) has emphasised that one's ideological points of view are also shaped by one's parents and peers and that they begin to properly take form during adolescence. As he explains, younger children are too cognitively immature to appreciate the issues of the adult world, but this changes with adolescence when "...these attitudes can develop and become increasingly organized...and finally established at the age of 18" (p. 256; p. 257). New experiences have the ability to alter one's ideological viewpoint but, by and large, it is expected that RWA and SDO are fairly well established by the time an individual graduates from high school.

Our study extends previous research in a number of important ways. First, previous research (e.g. Deary et al., 2008; Schoon et al., 2010) found childhood IQ to

link with social attitudes during adulthood. Nonetheless, it is not clear from this work what effect IQ has on the development of ideology during the formative period of adolescence. As it is not clear when such linkages are formed, it is important to investigate whether intelligence predicts ideological viewpoints during the teenage years. Second, although previous research has found cognitive ability to predict social attitudes, no research has been conducted into the cognitive correlates or underpinnings of overarching ideological frames of reference such as RWA and SDO. The primary aim of this study was therefore to assess whether cognitive ability as assessed during the first year of high school (Grade 7) would predict RWA and SDO assessed during the final year of school (Grade 12).

Possible confounding factors. Research evidence shows that RWA and SDO are linked to the major personality dimensions with a number of studies focusing on the Big Five personality domains (see, for example, Ekehammar, Akrami, Gylje, & Zakrisson, 2004; Flynn, 2005; Heaven & Bucci, 2001; Sibley & Duckitt, 2008; Van Hiel, Kossowska, & Mervielde, 2000). In one of the earliest studies using the Big Five measures, it was found that both RWA and SDO tended to be associated with low Openness to experience (O). RWA was also found to correlate significantly with Conscientiousness (C), whilst SDO was negatively related to agreeableness (A) (Heaven & Bucci, 2001). Using structural equation modelling, Ekehammar and colleagues (2004) found low A to have direct effects on SDO, whilst RWA was best predicted by C, E, and low O.

Finally, a recent meta-analysis of 71 studies (Sibley & Duckitt, 2008) concluded that SDO was significantly related to low agreeableness and O, while RWA was significantly related to Conscientiousness and significantly negatively related to O. Given that RWA and SDO are related to personality dimensions, it was

thought prudent to control for these confounding influences in our analyses. Thus, we sought to investigate whether cognitive ability as assessed in Grade 7 predicts RWA and SDO in Grade 12 once personality in Grade 12 has been accounted for.

Ideological preferences are also influenced by one's level of religiosity. Unger (2007) found positive relationships between religiosity and support for the 2003 war in Iraq and the limiting of civil liberties out of concern for national security. These relationships were stronger in the so-called "red" (conservative) than "blue" (more liberal) states of the US. Bertsch and Pesta (2009) found that higher IQ was significantly negatively related to the belief that one's religion was favoured by God. Those with higher IQs were also likely to question their religious beliefs. Religiosity also appears to be differentially related to RWA and SDO. For example, Altemeyer (1998) reported significant relationships between RWA and spirituality and religious fundamentalism, but no significant relations with SDO. Given the possible importance of religiosity, we therefore decided to partial out the effects of Grade 12 religious values in our analyses.

Method

Participants

Participants were drawn from the longitudinal *Wollongong Youth Study*. This project commenced when students entered high school (Grade 7) and is on-going. Students were drawn from five secondary schools in a Catholic Diocese of New South Wales (NSW), Australia. Three schools are located in the Sydney metropolitan area whereas two are not, thereby ensuring a fairly diverse sample with respect to socio-economic status. A total of 784 students were assessed in Grade 7 (Time 1). At that time the mean age of the group was 12.30 years ($SD = 0.49$) and comprised 382 males and 394 females (8 did not indicate their gender). The second time point of interest to

this report occurred when students were in Grade 12. We were able to directly match the Time 1 and Time 2 responses of 375 individuals (168 males; 207 females). The average age of respondents at Time 2 was 17.0 yrs. ($SD = .37$). Part of the attrition rate is due to the fact that in NSW Grade 10 is an exit point for students. Many leave for other schools, technical training or the workforce. Those who provided data in Grade 7 and also completed the RWA and SDO measures in Grade 12 had significantly higher verbal and numerical ability scores than those who only provided data in Grade 7 (both $ps < .01$).

At Time 1 our sample represented a diverse range of key demographic indicators. For example, the spread of some occupations of the fathers of our participants closely resembled national distributions (Australian Bureau of Statistics, ABS, 2004): for example, professionals, 20.4% (16.5% nationally); associated professionals, 15.1% (12.7%); intermediate production and transport, 11.2% (13.4%); tradespersons, 34.3% (21%); managers, 4.8% (9.7%); labourers, 3.3% (10.8%); advanced clerical, 1.2% (0.9%); intermediate clerical, 5.5% (8.8%); and elementary clerical, 4.3% (6.1%). Additionally, 22% lived in non-intact families, whereas the national divorce rate at the time was 29% (ABS, 2005), and 19.77% were exposed to a language other than English in the home, whereas the national figure was 15.8% (ABS, 2006).

Materials

Time 1, Grade 7. All students completed standardized numerical and verbal assessments. These tests are compulsory for all students in the state of NSW in the first year of high school. The tests used are curriculum-based, criterion-referenced tests and are administered by the NSW Department of Education and Training. There are six numerical (numeracy, number, measurement, space, data, numeracy problem

solving) and three verbal (writing achievement, reading achievement, and language achievement) subtests. Alpha coefficients were .95 (verbal ability) and $\alpha = .87$ (numerical). Although they cannot be defined as intelligence tests, cognitive ability tests such as these have in previous research been used to derive g scores (see, for example, Deary, Strand, Smith, & Fernandes, 2007; Frey & Detterman, 2004). In subsequent research we have conducted, we found IQ as assessed with the Wechsler Abbreviated Scale of Intelligence (Wechsler, 1999) to correlate significantly with our measures of verbal ($r = .63, p < .01$) and numerical ability ($r = .41, p < .01$).

Time 2, Grade 12. When in Grade 12, students completed a number of psychological assessments. The following are of interest to this report:

1. Right-wing authoritarianism (Altemeyer, 1981). A brief 10-item version, previously found to be suitable for Australian respondents, was used (Heaven & St Quintin, 2003). This measure has good internal consistency and has been found to predict attitudes to various ethnic groups in Australia (Heaven & St Quintin, 2003). In their meta-analysis, Sibley and Duckitt (2008) found RWA to correlate .49 with prejudice. On the present occasion, $\alpha = .74$.

2. Social dominance orientation (Sidanius & Pratto, 1999). We used the 16-item measure (the SDO-6) with known validity and internal consistency. Meta-analysis has found SDO to correlate .55 with prejudice (Sibley & Duckitt, 2008) and is significantly related to power, achievement, hedonism, and security, and negatively related to tradition, benevolence, and universalism (Feather & McKee, 2008). On the present occasion, $\alpha = .92$.

3. Personality dimensions. Because of their links to RWA and SDO, we also included a measure of the Big Five personality dimensions. We used the 50-item version of the International Personality Item Pool (IPIP) to assess extraversion (E),

openness (O), agreeableness (A), conscientiousness (C), and neuroticism (N) (Goldberg, 1999). The IPIP has been found to correlate quite highly with the equivalent markers of the NEO inventory (Gow, Whiteman, Pattie, & Deary, 2005). On this occasion, $\alpha = .82$ (A), $\alpha = .77$ (C), $\alpha = .85$ (N), $\alpha = .80$ (O), and $\alpha = .85$ (E).

4. Religious values. (Braithwaite & Law, 1985). We assessed participants' levels of religious values by asking participants to indicate the extent to which they adhere to three guiding principles in their life. These are "being saved from your sins and at peace with God"; "Being at one with God or the universe"; and "Following your religious faith conscientiously". Responses were indicated on a 7-point scale ranging from "I reject this as a guiding principle" (scored 1) to "I accept this of the greatest importance" (7). This measure has been found to be a good indicator of psychological adjustment in adolescents (Heaven & Ciarrochi, 2007). On this occasion $\alpha = .94$.

Results

Structure of verbal and numerical ability

We conducted analyses using the verbal and numerical ability tests as these might be differentially related to our outcome measures. Scores on the respective sub-measures were summed to create total scores for verbal and numerical ability. However, following previous research (e.g. Deary et al., 2007) we also computed a general intelligence score (*g*) for each individual, using this variable in our analyses as well. To compute *g* we used principal axis factoring to assess the structure of the ability tests. One factor with an eigenvalue of 6.46 and explaining 71.80% of the variance was extracted. All other factors had eigenvalues < 1.0 . This first, unrotated, general ability factor was referred to as *g* and a *g*-score was computed and saved for each participant (see also Deary et al., 2007).

Correlations

As expected, verbal and numerical ability in Grade 7 were highly correlated (see Table 1). RWA and SDO in Grade 12 were also significantly related with the size of this relationship ($r = .16, p < .001$) in line with previous studies which show little overlap in these constructs (e.g. Pratto et al., 1994). The three indices of intelligence were significantly and consistently related to RWA such that brighter students in Grade 7 adopted a more liberal ideological position in Grade 12. The same trend was evident for SDO, although the strength of relationships was somewhat weaker. Intelligence was significantly related to one personality dimension in Grade 12, namely, openness to experience. Thus, more intelligent teenagers were more likely to be amenable to new ideas, values, and feelings. More intelligent students in Grade 7 were less likely to espouse religious values in Grade 12.

RWA was significantly positively and SDO negatively related to religious values. Thus, those who are likely to be social conformers and view the world as a dangerous place, are more likely to hold religious values, whereas those who are driven by a need for power are less likely to hold such values. RWA and SDO were also significantly negatively related to O suggesting that individuals who endorsed these ideological dimensions were less likely to endorse new ideas, values, and feelings. Table 1 also shows that RWA and SDO were significantly related to some of the other personality dimensions: RWA was significantly positively related to C, whereas SDO was significantly negatively related to C and A, and positively related to N. Thus, whereas RWA was associated with persistence, orderliness, and reliability, SDO was not associated with such characteristics, but with traits of disagreeableness.

Predicting RWA and SDO from g

We ran two multiple regression analyses to determine the best predictors of RWA and SDO. Variables were entered in blocks. The first block contained RWA (if we were predicting SDO) or SDO (if we were predicting RWA). The second block contained all of the Big Five personality dimensions and religious values followed by *g* in the third block. The main results are shown in Table 2. RWA was significantly predicted by SDO, C, religious values, and *g*, which explained an additional 2.4% of the variance in RWA. SDO was significantly predicted by RWA, N, A, and religious values, but not *g*. These results partly support Sibley and Duckitt (2008).

Predicting RWA and SDO from verbal and numerical ability

We re-ran the regression analyses described above replacing *g* with verbal and numerical ability scores (see Table 3). RWA was significantly predicted by SDO as well as C, religious values, and low verbal intelligence. SDO was significantly predicted by RWA as well as N, low A, religious values, and low verbal ability. There was a marginal, positive effect of numerical ability on SDO, with higher numerical ability predicting higher SDO.

Discussion

The aim of this research was to ascertain, amongst adolescents, whether cognitive ability predicts, over a five-year period, an individual's ideological stance as indicated by RWA and SDO, and whether it explains significant additional variance in ideology beyond that explained by the Big Five personality dimensions and religious values.

Using *g* scores as well as verbal and numerical ability scores, intelligence in Grade 7 was found to be implicated in predicting the Grade 12 ideological positions of our participants, after controlling for confounding variables. Those with higher RWA scores were found to have lower overall intelligence (*g*) and to have lower

verbal ability scores. SDO was not predicted by *g*, but rather by lower verbal ability scores. The present results go beyond previous work which has just focused on general intelligence by showing that verbal and numerical intelligence function quite distinctly in their prediction of different ideological positions and that the relationship between intelligence and ideology is driven in large measure by verbal intelligence.

Lower verbal intelligence was a significant predictor of both RWA and SDO sentiment even after controlling for confounding factors. This would suggest that those with lower verbal ability are most likely to view the world as a dangerous place, are most likely to be concerned about national security, and are most likely to see the existing social order as being under attack, a key feature of RWA (Duckitt et al., 2002). Those with lower verbal intelligence are also most likely to view the world as highly competitive and as a “dog-eat-dog” world, a key feature of SDO (Duckitt et al., 2002). Lower verbal ability individuals are therefore more likely to find solace in adopting right-wing authoritarian and socially dominant ideological positions.

These results are in line with previous research on the attitudinal correlates of lower intelligence. For instance, of the social attitudes assessed by Deary and colleagues (2008), lower intelligence was most strongly related to political trust and support for conservative views such as “schools should teach children to obey authority” (p. 3). These sorts of attitudes are firmly located within the broader ideological framework of the right-wing authoritarianism construct (Altemeyer, 1981). Following Deary et al. (2008), it would seem that bright teenagers are also more enlightened teenagers.

Different intelligences and ideologies

Why is it the case that RWA and SDO are both predicted by lower verbal intelligence? Ideologies are typically expressed as written or verbal manifestos, rather

than in numerical terms. Ideology relies on argument, on putting forward a point of view, of expressing a particular narrative, rather than relying on numerical skill or expertise. It therefore follows that many attitudinal positions are driven by the level of one's verbal ability. Previous research that has investigated the cognitive processing characteristics of RWA and SDO individuals, has likened those high on RWA to "cognitive misers" who have high levels of need for closure and who expend little effort in information processing (Van Hiel, Pandelaere, & Duriez, 2004, p. 834). They tend to use cognitive schemas which lead to quick, and usually, "simplified judgements" (p. 834). That such forms of information processing are important for high-RWAs, is supported by Altemeyer (1998) who found RWA, but not SDO, to be significantly related to a measure of "need for structure". Thus, RWA reflects a view of the world as a dangerous place (Duckitt et al., 2002), but it is also underpinned by a "simplification motive" to help make it seem safe and more controllable.

Table 3 points to a significant difference between RWA and SDO. Looking at the results for SDO, high numerical intelligence came close to being a significant *positive* predictor. This hints at the possibility that high SDO people may be lower in the relatively social component of intelligence (verbal ability) and higher in the relatively non-social component (numerical ability). It is presently not clear either from our data or from the research of others that SDO individuals function as cognitive misers with a need for over-simplification. Indeed, they engage in hierarchy-enhancing and legitimising myths in order to justify the dominance of more powerful groups over weaker, alienated, and disenfranchised groups (Pratto et al., 1994). Although entirely speculative, it may be the case that such strategies require a certain level of cognitive complexity rather than over-simplification. Such an hypothesis needs further testing.

Limitations, future directions and conclusions

The literature on RWA and SDO and the content of research studies underpinning these constructs would suggest that these ideologies have typically been studied from a right- rather than left-wing perspective. Altemeyer (1996) was not able to identify a left-wing authoritarianism in his work, although this was achieved by Van Hiel, Duriez, and Kossowska (2006) in a study of anarchists. A limitation of the present study is its focus on ideologies of the right. Future research in this area might therefore usefully explore the links between intelligence and left-wing ideologies.

This is the first study to examine, in adolescents, the longitudinal links between intelligence and ideological frameworks such as right-wing authoritarianism and social dominance orientation. Whereas previous studies have tended to find that conservatism is associated with lower intelligence, the present data suggest that the relationships between intelligence and various ideologies may be more complex. Our data suggest that ideological positions reflected in constructs such as RWA and SDO are partly driven by lower verbal intelligence. This is occurring as early as the teenage years.

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Table 1 *Correlations between cognitive ability (Grade 7) and RWA, SDO, and personality in Grade 12*

	Grade 7			Grade 12								
	Verbal ability	Numerical ability	g	RWA	SDO	C	A	N	O	E	Religious values	
Verbal ability	-----											
Numerical ability	.77***	-----										
g	.76***	.88**	-----									
RWA	-.26***	-.19***	-.22***	-----								
SDO	-.15**	-.03	-.05	.16***	-----							
C	.07	.03	.04	.23***	-.17***	-----						
A	.10	.00	.06	.04	-.41***	.28***	-----					
N	.03	-.01	-.01	.07	.13**	-.20***	-.13**	-----				
O	.23***	.21***	.23***	-.14**	-.21***	.23***	.38***	-.15**	-----			
E	.03	.02	.03	-.07	-.09	.06	.27***	-.26***	.31***	-----		
Religious values	-.08	-.10	-.14**	.30***	-.16***	.24***	.17***	-.08	-.06	-.01	-----	

** $p < .01$; *** $p < .001$.

Table 2

Results of regression analyses involving Grade 7 g predicting Grade 12 RWA and SDO, whilst controlling for personality and religious values at Grade 12

Variable	B	SEB	β	df	t	R ²	ΔR^2
Dependent Variable: Grade 12 Right Wing Authoritarianism							
Step 1: SDO	.16	.03	.28	1,346	5.14***	.035	.035***
Step 2:				7,340		.196	.160***
E	-.04	.05	-.04		-.81		
C	.22	.06	.21		3.99***		
A	.10	.06	.10		1.71		
N	-.01	.04	-.01		-.27		
O	-.09	.06	-.09		-1.56		
Religious values	.09	.02	.24		4.71***		
Step 3: g factor	-.11	.03	-.16	8,339	-3.25***	.22	.024***
Dependent variable: Grade 12 Social Dominance Orientation							
Step 1: RWA	.465	.09	.22	1,346	5.14***	.035	.035***
Step 2:				7,340		.284	.248***
E	.08	.09	.05		.99		
C	-.06	.10	-.03		-.62		
A	-.71	.10	-.39		-7.39***		
N	.14	.07	.10		1.97*		
O	-.14	.10	-.07		-1.38		
Religious values	-.11	.03	-.17		-3.34***		
Step 3: g factor	.06	.06	.05	8,339	.68	.285	.001

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 3

Results of regression analyses involving Grade 7 verbal and numerical ability predicting Grade 12 RWA and SDO, whilst controlling for personality and religious values in Grade 12

Variable	B	SEB	B	df	t	R ²	ΔR ²
Dependent Variable: Grade 12 Right Wing Authoritarianism							
Step 1: SDO	.14	.03	.26	1,347	4.74***	.035	.035***
Step 2:				6,341		.196	.161***
E	-.04	.05	-.04		-.80		
C	.22	.05	.22		4.12***		
A	.10	.06	.10		1.67		
N	.00	.04	.00		-.01		
O	-.08	.06	-.08		-1.42		
Religious values	.09	.02	.24		4.86***		
Step 3				2,339		.235	.038***
Verbal ability	-.02	.01	-.18		-2.73**		
Numerical ability	-.00	.01	-.04		-.56		
Dependent variable: Grade 12 Social Dominance Orientation							
Step 1: RWA	.43	.09	.24	1,347	4.74***	.035	.035***
Step 2:				6,341		.284	.248***
E	.08	.08	.05		.93		
C	-.05	.10	-.03		-.48		
A	-.68	.10	-.38		-7.11***		
N	.15	.07	.11		2.14*		
O	-.13	.10	-.07		-1.28		
Religious values	-.11	.03	-.17		-3.40***		
Step 3				2,339		.294	.01
Verbal ability	-.03	.01	-.13		-2.06*		
Numerical ability	.02	.01	.12		1.9#		

$p = .053$; * $p < .05$; ** $p < .01$; *** $p < .001$.