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Predicting explicit and implicit attitudes towards gay men using the dual process model of prejudice and the dark tetrad

Lily Moor^a, Tayla Kapelles^a, Yasin Koc^b, Joel Anderson^{a,c,*}

^a School of Behavioural and Health Sciences, Australian Catholic University, Melbourne, Australia

^b Department of Social Psychology, University of Groningen, the Netherlands

^c Australian Research Centre for Sex, Health, and Society, La Trobe University, Melbourne, Australia

A B S T R A C T

Although attitudes towards gay men are becoming increasingly inclusive, negative attitudes are still experienced by this socially marginalised group. Prejudice research often uses the Dual Process Model of Prejudice (DPM; comprised of right-wing authoritarianism and social dominance orientation) to understand negative social attitudes, and recently researchers have begun exploring the role of personality in addition to this theoretical framework. In this paper, we explored the predictive potential of the DPM (right-wing authoritarianism, social dominance orientation) and the dark tetrad model of personality (D4: narcissism, psychopathy, Machiavellianism, everyday sadism) in explaining implicit and explicit attitudes towards gay men. The sample ($N = 182$; $M_{\text{age}} = 39.15$ years, $SD = 10.65$) was recruited using Amazon's Mechanical Turk. Variance in explicit negative attitudes towards gay men was predicted by the ideological variables in the DPM, and further variance was predicted with the addition of the D4 traits (narcissism, psychopathy, and Machiavellianism each contributed unique variance, while sadism did not). Variance in implicit attitudes towards gay men was not predicted by any individual difference factors. The current study offers theoretical and empirical contributions to the ongoing debate surrounding the utility of the D4 in explaining antisocial cognitions.

1. Introduction

Anti-gay attitudes are prevalent across many cultures, and being gay continues to be illegal and even punishable by death in many countries (Anderson & Holland, 2015). However anti-gay attitudes are also ameliorating – a recent temporal analysis of a large scale data set demonstrated self-reported anti-gay attitudes decreased by 15% across seven years (Westgate, Riskind, & Nosek, 2015) and this shift in attitudes is arguably being reflected in socio-political change. For example, the recent legalisation of same-sex marriage in the US (2015), Australia (2017), and most recently Austria and Taiwan (both 2019) all provide evidence of this shift, and survey-poll data has shown that self-reported moral approval of gay men and lesbian women is increasing (Gallup, 2006, 2013). Although anti-gay attitudes arguably reflect a societal expression of out-group bias, the structural stigma which facilitates this prejudice occurs at both the individual and societal level (Herek, 2000; for a review, see Herek & McLemore, 2013). Thus, it is necessary to understand the individual difference factors that facilitate the differences in individual attitudes which perpetuate societal bias.

In this paper, we explored a series of individual difference variables, specifically socio-political ideological factors and a model of personality traits that is unexplored in this domain, in an attempt to understand the antecedents of explicit and implicit anti-gay attitudes. First, we used a well-established theoretical framework to explore anti-gay

attitudes. Specifically, we used the Dual Process Motivational Model of Prejudice (DPM; Duckitt & Sibley, 2010), which has previously explained general and target-specific prejudices using motivation-based ideologies. Second, there has been a recent interest in the exploration of how individual differences in socio-political ideology moderate the relationship between personality and general prejudice. This research has typically used the five-factor model of personality (Goldberg, 1990), however research is yet to explore how other personality theories may contribute to understandings of prejudice. Thus, we explored the role of the dark tetrad model of personality traits (D4; Buckels, Jones, & Paulhus, 2013) in contributing to variation in prejudice towards gay men, both at the univariate level and in predicting variation beyond the contribution of the DPM.

1.1. The dual process motivational model of prejudice

The DPM posits that two ideological constructs, right-wing authoritarianism (RWA) and social dominance orientation (SDO), predict unique variance in prejudiced attitudes and behaviours towards out-group members (Duckitt, 2001; Duckitt & Sibley, 2010). RWA is a system-justifying ideology which emphasises unwavering obedience to authority, aggression against value-violating out-groups, and conformity to the *status quo* (Altemeyer, 1998). Those high on RWA are staunchly intolerant of religious or moral norm violations, and

* Corresponding author.

E-mail address: joel.anderson@acu.edu.au (J. Anderson).

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categorise the violators as threats to the collective security of their in-group (i.e., creating social distance which manifests as prejudice; Bogardus, 1933). Alternatively, SDO is a status-endorsing ideology based in the belief that social groups should be ordered hierarchically (Pratto, Sidanius, Stallworth, & Malle, 1994). Those high on SDO endorse the belief that their in-groups deserve to dominate over others in terms of wealth, status, and recognition, which perpetuates societal inequalities and prejudices towards members of low-status out-groups.

The DPM suggests that although these ideologies are strongly correlated, they motivate prejudice in unique ways. First, RWA is motivated by (a) a socialisation process resulting in beliefs that the world is threatening, and (b) the personality trait of 'social conformity'. In combination, these facilitate increases in RWA which result in a perception of the world as a dangerous place to elicit prejudicial attitudes and behaviours. Second, SDO is believed to be increased by (a) a socialisation process which emphasises group dominance, inequality, and competition, and (b) the personality trait of 'tough-mindedness'. Together, these facilitate the perception of the world as a competitive jungle, demonstrating an independent motivation for eliciting prejudice. In summary, RWA and SDO are well-documented independent predictors of prejudice on their own, however the DPM posits that they both uniquely contribute to prejudice (Sibley & Duckitt, 2008).

Evidence identifying the DPM as a useful model for explaining prejudice is compelling. Asbrock, Sibley, and Duckitt (2010) used a longitudinal study to assess the causal effects of RWA and SDO on generalised prejudice. At two time points (six months apart) participants were required to respond to a measure of RWA and SDO and rate their feelings towards three distinct types of out-group: dangerous, derogated, and dissident. Dangerous out-groups are those who are socially inferior, yet threaten the upstanding social order (e.g., drug dealers, terrorists) and endanger the 'good people' of society. Derogated groups are also inferior, although non-threatening (e.g., housewives, obese people). Lastly, dissident groups are a combination of both (e.g., feminists [i.e., 'problem' women who reject the current social order]). The results aligned with the causal relationships asserted by the DPM. RWA alone causally predicted prejudiced attitudes towards the dangerous groups, as it confirmed the perception of the world as threatening and dangerous. Similarly, SDO uniquely predicted prejudice towards the derogated group, as it endorses the belief that society exists as a competitive hierarchy which must be maintained. Both RWA and SDO predicted prejudiced attitudes towards the dissident groups as they threaten the societal goals of both ideologies. These findings validate the DPM model by asserting that ideology-based prejudice is dependent upon the ideology-relevant features of the attitude-target.

Both RWA and SDO are well known correlates and predictors of explicit anti-gay attitudes. Theoretical predictions would suggest that RWA may be a stronger predictor of anti-gay attitudes than SDO, based on RWA being characterised by submission to authority, such as religious figures, and knowledge that gay men and lesbian women are considered 'morally deviant' in traditional religious teaching (Whitley & Ågisdóttir, 2000). Evidence supporting this claim was reported by Whitley (1999) who found SDO was related to multiple targets of prejudice, whereas RWA primarily related to anti-gay attitudes. It was suggested gay people would not be considered a threat to the social hierarchy in terms of competition for jobs and status, thus SDO was not as strongly related to anti-gay attitudes towards them (Whitley, 1999). Other researchers have corroborated these findings (Anderson & Koc, 2015; Lippa & Arad, 1999; Von Collani, Grumm, & Streicher, 2010; Whitley & Ågisdóttir, 2000). The evidence detailed above suggests that both ideology-based pathways uniquely contribute to both general and general anti-gay attitudes, but that anti-gay attitudes may be more strongly related to RWA.

Recent trends in prejudice research have seen research teams explore theoretically-relevant variables that predict variance in prejudice above that accounted for by the DPM. This has been established with theories of social justice (Anderson, Stuart, & Rossen, 2015), individual

differences in empathy (Bäckström & Björklund, 2007), identity (Duriez & Soenens, 2006), and the big-five dimensions of personality (Sibley & Duckitt, 2008). In this paper, we test the incremental validity of the dark tetrad model of personality above that of the DPM.

1.2. The Dark Side of Personality: Introducing the Dark Tetrad

Social psychologists have begun to explore the relationship between prejudice and malevolent personality traits. Specifically, researchers have begun using the D4 model of personality, which comprises four personality traits that each uniquely predict callous, unemotional, and anti-social behaviours (Buckels et al., 2013; Moor & Anderson, 2018; Paulhus & Williams, 2002). Originally a trio, these traits are narcissism, psychopathy, Machiavellianism, and the recent addition to the tetrad of everyday sadism. Narcissism is perhaps the least sinister of the three - those high in sub-clinical trait narcissism present as entitled, with airs of grandiosity and superiority, which often manifest in aversive behaviours such as bragging and being excessively selfish (Campbell, Foster, & Finkel, 2002; Vazire & Funder, 2006). Also taking its origins in the clinical nomenclature is subclinical psychopathy - those high in this trait exhibit low empathy and remorse, and are known to use aggression and intimidation to violate social norms to achieve self-centred goals (Furnham, Richards, Rangel, & Jones, 2014). Finally, the trait of Machiavellianism has its origins in literature (based on the works of political theorist Niccolò Machiavelli; see Muris, Merckelbach, Otgaar, & Meijer, 2017). Those high in Machiavellianism are characterised by the manipulation and exploitation of others with the use of strategic flattery and deception. They are cynical, calculating, and affectively unphased by their disregard of others (Furnham, Richards, & Paulhus, 2013). These three traits once comprised the dark triad (D3) and have been linked to various forms of prejudice (Anderson & Cheers, 2018; Hodson, Hogg, & MacInnis, 2009; Jonason, 2015). However, the relatively recent reconceptualization of the triad as a tetrad has been less explored in terms of its relationship with prejudice.

Everyday sadism is the predatory, appetitive motivation to cause harm or distress to innocent others and taking pleasure in doing so. This differs conceptually from psychopathy, in which harm is purely instrumental (Baumeister & Campbell, 1999). The addition of everyday sadism to the triad was proposed by Buckels et al. (2013) as it was able to explain antisocial behaviours beyond that of the original triad. They provided behavioural evidence for this claim by demonstrating that an everyday sadistic personality uniquely predicted a strong preference for being killing bugs in a coffee grinder (i.e., a behaviour chosen that mimic the desires of the everyday sadist - that is a capacity to choose to inflict pain and suffering) over less sadistic alternatives. Importantly, the traits in the dark triad did not predict this sadistic behaviour. This evidence suggests that the addition of everyday sadism to theories of dark personality traits might be useful in predicting social attitudes and behaviours.

Although the traits of the D4 are socially undesirable, it should be noted that they are still within the normal, sub-clinical range (Vernon, Villani, Vickers, & Harris, 2008). Thus, those high on the traits are everyday members of society, emphasising the importance of understanding how they relate to social attitudes (Furnham et al., 2013). Research has provided evidence for the D3 as predictors of general prejudice and conservative attitudes towards socio-political issues including capital punishment, gay marriage, and refugee treatment (Anderson & Cheers, 2018; Arvan, 2013; Hodson et al., 2009). Despite this, little research has been conducted to understand the relationship between the D4 and anti-gay attitudes.

1.3. The current study

No existing research has empirically analysed whether the traits of the D4 are able to predict anti-gay attitudes, and if they predict above the variance account for by the well-established predictor of prejudice

that is the DPM. Thus, the first major aim of this paper was to extend upon the current DPM research to establish whether the socio-political ideologies outlined in the model contribute variance in anti-gay attitudes. The second major aim was to understand whether the D4 can contribute variance in anti-gay attitudes above the variance accounted for by the ideological variables. To do so, we administered a battery of measures assessing (a) the ideological variables in the DPM, (b), the traits in the D4, and (c) measures of explicit (i.e., conscious) and implicit (i.e., non-conscious) attitudes towards gay men to an online community sample. Based on the relevant literature, we formed the following hypotheses:

H1. Gay male attitudes hypotheses: Research has suggested that gay men are becoming a normatively protected group (Pereira, Monteiro, & Camino, 2009), and thus since negative attitudes towards gay men are now less socially acceptable to express, we predict that implicit attitudes will be more negative than explicit attitudes (since - in the case of social attitudes - the former have been demonstrated to be somewhat impervious to socially desirable responding, while the latter are not; Anderson, 2019; Steffens, 2004).

H2. Dual process motivational model of prejudice hypotheses: In line with the original propositions of the DPM (Duckitt, 2001), we predict that both RWA and SDO will be strongly correlated, but each uniquely predict variance in explicit (H2a) and implicit (H2b) negative attitudes towards gay men.

H3. Dark tetrad hypotheses: Based on research exploring other targets of prejudice (e.g., Anderson & Cheers, 2018; Arvan, 2013; Hodson et al., 2009), we predicted that the D4 traits would share bivariate correlations with negative explicit (H3a) and implicit (H3b) attitudes. We also predicted that in a multiple hierarchical regression analysis (MHRA), the addition of the D4 traits will further explain the variance in explicit (H3c) and implicit (H3d) attitudes towards gay men above that predicted by RWA and SDO.

2. Method

2.1. Participants

Participants were recruited using Amazon's Mechanical Turk (MTurk™) which awarded USD\$2.50 upon completion of the study (we required that participants have a 99% approval rating and use a U.S.-based I.P. address to be eligible to commence participation, and pass built in attention checks which terminated the participation of individuals who were not attending to the study). The sample was non-homogenous in terms of sexual orientation. Since there were no meaningful differences between analyses conducted that excluded non-heterosexuals and the full sample, we retained the 26 self-identifying non-heterosexuals participants in the sample in the interest of conserving statistical power ($n = 2$ gay; $n = 21$ bisexual; $n = 3$ 'other'). The final sample comprised of 208 US participants ($M_{\text{age}} = 39.15$ years, $SD = 10.55$; 101 female, 87.5% heterosexual).

2.2. Measures

2.2.1. Explicit measures

2.2.1.1. Short dark triad scale (SD3; Jones & Paulhus, 2014). This scale measures the D3 over 27 items, divided evenly between the three traits. They are measured on a five-point Likert-type scale (1 [*strongly disagree*] to 5 [*strongly agree*]). Specifically, nine items assess sub-clinical trait narcissism (e.g., 'I know that I am special because everyone keeps telling me so'), nine items assess sub-clinical trait psychopathy (e.g., 'Payback needs to be quick and nasty'), and nine items assess Machiavellianism (e.g., 'It's wise to keep track of information that you can use against people later'). Each of the subscales are independently averaged. Higher scores reflect high levels of each

trait. This scale yielded acceptable reliability in the current sample ($\alpha = 0.87$).

2.2.1.2. Short sadistic impulse scale (SSIS; O'Meara, Davies, & Hammond, 2011). This scale measures everyday sadism on 10 items using a Likert-type scale (1 [*strongly disagree*] to 4 [*strongly agree*]; e.g., 'I would enjoy hurting someone physically, sexually, or emotionally'). Scores are averaged with higher scores reflecting high levels of everyday sadism. This scale yielded acceptable reliability in the current sample ($\alpha = 0.91$).

2.2.1.3. Right-wing authoritarianism scale (RWA; Altemeyer, 1998). This scale comprises 16 items measuring ideals based in conventionalism, authoritarian aggression, and authoritarian submission. Participant endorse items on a Likert-type scale (1 [*very negative*] to 7 [*very positive*]; e.g., 'God's laws about abortion, pornography, and marriage must be strictly followed before it is too late, violations must be punished'). Responses are averaged and higher scores reflect high RWA. This scale yielded acceptable reliability in the current sample ($\alpha = 0.95$).

2.2.1.4. Social dominance orientation scale (SDO; Pratto et al., 1994). This scale is assessed on 14 items, using a seven-point Likert-type response scale (1 [*very negative*] to 7 [*very positive*]) to measure how an individual feels about statements such as, 'this country would be better off if we cared less about how equal people were'. Responses are averaged and a higher score reflects high SDO. This scale yielded acceptable reliability in the current sample ($\alpha = 0.97$).

2.2.1.5. Attitudes towards homosexuality scale (ATHS; Anderson, Koc, & Falomir-Pichastor, 2018). This scale is assessed on 16 evaluative items relating to attitudes towards homosexuality (e.g., 'Gay people disgust me'), however we adjusted the items where possible to reflect attitudes towards gay men (e.g., 'Gay men disgust me'), and the instructions indicated that all items referred to gay men. Participants endorsed their responses on a seven point Likert-type scale (1 [*not at all in agreement*] to 7 [*absolutely in agreement*] – with a neutral midpoint). After reverse scoring, responses are averaged. Higher scores reflect stronger negative attitudes towards homosexuals. This scale yielded acceptable reliability in the current sample ($\alpha = 0.97$).

2.3. Implicit measures

The go/no-go association task (GNAT; Nosek & Banaji, 2001) is a computerised, speeded measure of implicit social cognition which determines an individual's unconscious attitudes or evaluations of a target group. The GNAT measures the strength of the association between a target category and an attribute, as well as being able to discriminate between target and distractor stimuli. When stimuli flash on the screen participants are required to press the space bar ('go' response) or not respond ('no-go' response), classifying as 'belonging' to the category or attribute being assessed in that block. The rate at which participants respond indicates how strongly the target and the attribute are automatically associated. Green and Swets' (1966) theory of signal detection theory of d' is used to determine the ratio of correct responses to target stimuli and incorrect responses to distractor stimuli. The strength of implicit associations of the category and attributes is calculated to determine a d' score. A stronger (i.e., more accurate) implicit association between the target and the attribute will result in a higher d' score.

In the current study, the GNAT consisted of two blocks. Images of gay couples were consistently represented as the target category stimuli. Block one assessed the implicit association between gay men and positive words using images of heterosexual couples and negative attributes as the distractor category stimuli and attributes, respectively. Block two assessed the implicit association between gay men and negative words. The same distractor category stimuli were used, however

positive words were implemented as the distractor attributes. In this study, all participants who were not previously excluded responded to the implicit measure above the level expected by chance (i.e., $M_d > 0$), and the reliability for blocks was acceptable (RaSSH scores were .76 and .81 for blocks measuring associations with positive and negative attributes, respectively) using the method described by Williams and Kaufmann (2012).

The stimuli used in the GNAT were sexualised, non-sexualised, and symbolic images of gay couples (i.e., target) and heterosexual couples (i.e., distractor; taken from Anderson & Koc, 2015). These stimuli were matched for content, displaying images of both couples in bridal attire, hugging or kissing, wedding cake toppers, and interlocking sex symbols. They were presented in a 10 × 10 centimetre box against a black background. The target attribute words were either positive (e.g., 'JOYFUL') or negative (e.g., 'DISLIKE') dependent on the block and were matched for length and frequency (taken from Anderson, 2018). All words were presented in white, 24-point uppercase Arial font. A full list of the visual stimuli used can be found in Appendix A.

2.4. Procedure

The participants responded to an advertisement on MTurk™ and after providing consent, were redirected to the website hosting the experiment. Participants provided demographic information about their age, gender, religious affiliation, sexual orientation, and political orientations in relation to social and economic issues (scale from 1 [completely conservative] to 5 [completely progressive]), and country of birth. They then completed the battery of explicit measures (randomised) followed by the 2-block GNAT (blocks randomised) before being reimbursed for their time and debriefed.

3. Results

3.1. Data preparation and normality testing

A missing values analysis revealed that all data was missing completely at random. The distribution of the RWA, SDO, narcissism, psychopathy, and everyday sadism variables were all strongly positively skewed, and the explicit prejudice variable was strongly negatively skewed. A maximum Mahalanobis distance of 19.13 indicated there were potential issues relating to multivariate outliers as it exceeded the chi-square criterion value of 16.81 (Field, 2018). In an attempt to resolve these issues of normality, one univariate outlier case in SDO ($Z = 3.16$), three cases in psychopathy ($Zs = 3.29$), and seven cases in everyday sadism ($3.01 < Zs < 5.79$) were all identified and replaced with $M + 3SD$ (Field, 2018), and then logarithmic transformations were applied to all skewed variables.¹

3.2. Descriptive statistics

The sample reported relatively low scores on all explicit measures (i.e., positive attitudes towards gay men, and low levels of the D4 and ideology variables). Unsurprisingly, the factors of the D4 were all positively and significantly correlated, except for the relationship between narcissism and everyday sadism. Similarly, both attitudinal measures (RWA and SDO) were strongly and significantly related; narcissism was the only trait to correlate with RWA and all traits correlated with SDO. Explicit attitudes were negatively related to both attitudinal measures, narcissism, psychopathy, Machiavellianism, religious affiliation, and positively related to gender and social and economic progressiveness. Implicit attitudes were negatively correlated only with religion. Bivariate correlation coefficients are presented in Table 1.

¹ The raw data can be obtained by contacting the corresponding author - joel.anderson@acu.edu.au

3.3. Inferential testing

3.3.1. Measurement model

Prior to testing our hypotheses, we ran a measurement model to show that the variables of dual process model and dark tetrad are distinct constructs from one another (in spite of being strongly related to one another). However, we encountered convergence issues because our sample size was not big enough to accommodate the complexity of the measurement model. Therefore, we opted for using item parcels instead of individual items for the model (see Little, Cunningham, Shahar, & Widaman, 2002) as the use of item parcels often result in better model convergence when there are fewer respondents (Meade & Kroustalis, 2005). For this, we followed Little et al.'s (2002) recommendations to create equally balanced item parcels for all variables (e.g., using both positive and negative items in a parcel). For RWA and SDO, we created four item parcels each. For the dark tetrad variables, we created three item parcels each. According to Boomsma and Hoogland (2001), a sample size of 100 or more is usually acceptable for modelling latent variables with 3 or 4 indicators per factor, and our current sample size met this criterion comfortably. Next, we used these three or four parcels as indicators for each latent factor, so as to have locally just-identified latent factors which tend to give more stable results (Little et al., 2002). The model showed acceptable fit to the data, according to Kline's (2005) criteria $\chi^2(152) = 384.85$, $p < .001$; comparative fit index (CFI) = 0.939; root mean square error of approximation (RMSEA) = 0.086 (90% CI, 0.076, 0.097); standardised root mean square residual (SRMR) = 0.061; and all the indicators loaded onto the factors significantly ($\beta_s \geq 0.67$, $p < .001$).

We also ran an alternative model where we had two factors: one for the dual process model including RWA and SDO, and one for the dark tetrad including Machiavellianism, sadism, psychopathy, and narcissism. This model showed a very poor fit to the data: $\chi^2(169) = 1632.67$, $p < .001$; comparative fit index (CFI) = 0.618; root mean square error of approximation (RMSEA) = 0.206 (90% CI, 0.197, 0.215); standardised root mean square residual (SRMR) = 0.169. Overall, our 6-factor measurement model provided evidence that the variables of dual process model and dark tetrad are related but distinct constructs. Therefore, we used each of these factors as separate variables in the subsequent analyses.

3.3.2. Regression analyses

Two MHRA were conducted to estimate the proportion of variance in explicit and implicit attitudes towards gay men that can be accounted for by RWA and SDO alone, as well as in combination with the traits of the D4. Step 1 of both regressions included RWA and SDO, and Step 2 included both ideological variables and introduced the D4² to explore if these traits account for variance in attitudes above the variance accounted for by the DPM.

3.3.2.1. Predicting explicit attitudes. In Step 1, the ideological variables both significantly accounted for 77.5% ($R^2 = 0.60$) of the variance in explicit attitudes towards gay men, with RWA and SDO significantly predicting negative explicit attitudes; $F(2, 190) = 143.29$, $p < .001$. The inclusion of the D4 in Step 2 of the model accounted for a further 2.83% of the significant variance in explicit attitudes. All predictor variables apart from everyday sadism significantly predicted negative attitudes towards gay men; $R^2_{\text{change}} = 0.02$; $\Delta F(4, 186) = 2.73$, $p = .03$. The final model accounted for a total of 79% of the adjusted variance; $R^2 = 0.62$; $F(6, 186) = 51.33$, $p < .001$, large effect, Cohen's $f^2 = 1.65$.³

² As regression analyses are sensitive to issues of normality, the MHRA was conducted using the transformed variables. However, for ease of interpretation the untransformed descriptive findings are presented (i.e., M_s , SD_s).

³ Effect sizes for the MHRA were based on the effects for the final model (i.e.,

Table 1

Descriptive statistics and correlation analyses for attitudes towards gay men, ideology variables, and traits of the dark tetrad.

	1	2	3	4	5	6	7	8	9	10	11	12	13	M	SD
1. Explicit prejudice	(0.97)													5.27	1.86
2. Implicit prejudice	0.15	–												–0.04	0.97
3. RWA	–0.80**	–0.13	(0.95)											2.88	1.53
4. SDO	–0.60**	–0.08	0.61**	(0.97)										2.18	1.52
5. Narcissism	–0.27**	–0.01	0.19*	0.30**	(0.87)									2.36	0.92
6. Psychopathy	–0.16*	0.14	0.10	0.30**	0.52**	(0.78)								1.8–0	0.69
7. Machiavellianism	–0.21*	0.10	0.12	0.27**	0.24**	0.63**	(0.90)							2.79	0.97
8. Everyday sadism	–0.13	0.03	0.11	0.15*	0.14	0.50**	0.46**	(0.91)						1.25	0.44
9. Age	–0.04	–0.00	0.02	–0.12	–0.10	–0.19*	–0.23**	–0.16*	–					39.15	10.55
10. Gender	0.21**	0.09	0.10	0.30**	0.37**	0.52**	0.19*	0.13	0.04	–				–	–
11. Religion	–0.43**	–0.24**	0.50**	0.30**	0.03	–0.13	0.07	–0.12	0.30**	0.09	–			–	–
12. Social progressiveness	0.75**	0.13	–0.77**	–0.58**	–0.27**	–0.04	0.01	0.06	–0.82	–0.19*	0.45**	–		3.28	1.36
13. Economic progressiveness	0.61**	0.12	–0.65**	–0.56**	–0.25**	–0.14	–0.05	–0.02	–0.10	0.25**	–0.36*	0.80**	–	3.08	1.33

Note. Higher explicit and implicit attitude scores indicate negative attitudes. Cronbach's alpha coefficients are presented in parentheses. Spearman's rho correlation coefficient was reported for gender and religion variables. Statistically significant coefficients presented in boldface.

** $p < .001$.

* $p < .05$.

Table 2Unstandardised (B) and standardised (β) regression coefficients and semi-partial correlations for predictors in regression models predicting explicit and implicit attitudes towards gay men.

	Explicit attitudes					Implicit attitudes				
	B [95% CI]	SE B	β	p	sr^2	B [95% CI]	SE B	β	p	sr^2
Step 1										
RWA	–4.99 [–5.84 to –4.14]	0.43	–0.69	< 0.001	0.28	–0.51 [–1.31–0.30]	0.41	–0.13	0.213	0.01
SDO	–1.14 [–1.94 to –0.33]	0.41	–0.16	0.006	0.02	–0.00 [–0.76–0.76]	0.38	–0.00	0.995	0.00
Step 2										
RWA	–4.86 [–5.71 to –4.01]	0.43	–0.65	< 0.001	0.26	–0.37 [–1.81–0.44]	0.41	–0.10	0.363	0.00
SDO	–1.01 [–1.85 to –0.17]	0.43	–0.14	0.019	0.01	–0.22 [–1.08–0.65]	0.41	–0.06	0.588	0.00
Narcissism	–1.60 [–2.76 to –0.45]	0.58	–0.15	0.007	0.02	–0.54 [–1.64–0.56]	0.56	–0.10	0.337	0.01
Psychopathy	2.18 [0.55–3.81]	0.83	0.19	0.009	0.01	1.37 [–0.18–2.93]	0.79	0.22	0.082	0.02
Machiavellianism	–0.24 [–0.46 to –0.01]	0.12	–0.12	0.040	0.00	0.04 [–0.18–0.26]	0.11	0.04	0.719	0.00
Everyday sadism	–0.54 [–2.25–1.17]	0.87	–0.03	0.536	0.00	–0.60 [–2.24–1.03]	0.83	–0.07	0.468	0.00

Note. Boldface denotes significant coefficients ($ps < 0.05$). Explicit attitudes: Step 1 constant = -0.09 ($SE = 0.27$); Step 2 constant = -0.23 ($SE = 0.63$). Implicit attitudes: Step 1 constant = 0.15 ($SE = 0.15$); Step 2 constant = -0.09 ($SE = 0.31$). Explicit attitudes: collinearity tolerance statistics range from 0.42 to 0.74 (VIF scores range from 1.36 to 2.39); Implicit attitude: collinearity tolerance statistics range from 0.48–0.78 (VIF scores range from 1.42 to 2.07).

3.3.2.2. Predicting implicit attitudes. Implicit attitudes towards gay men were not predicted by either the ideological variables (Step 1: $p = .288$) nor the D4 (Step 2: $p = .348$; Cohen's $f^2 = 0.05$). The coefficients for both explicit and implicit attitudes towards gay men can be found in Table 2.

4. Discussion

In this paper, we aimed to replicate the existing research asserting the DPM as an effective model for predicting attitudes towards gay men. We also extended the literature by testing the capacity of the traits of the D4 to predict variance in attitudes towards gay men beyond that accounted for by the DPM. In line with dual process theorists (e.g., Nosek & Banaji, 2001; Nosek & Smyth, 2007), who argue that explicit measures alone cannot capture the nuances of social attitudes, we used both explicit (i.e., self-report) and implicit (i.e., non-conscious) measurement techniques. In the case of explicit attitudes, the hypotheses were largely supported, however these predictions did not hold in the case of implicit attitudes.

(footnote continued)

calculated from the observed R^2 after the inclusion of the final step of the MHRA) and were calculated using software by Soper (2015) based on the work of Cohen (1988).

4.1. Re-visiting the findings

The attitudes hypothesis (H1) was supported. Explicit attitudes were positive, and implicit attitudes were neutral. This is consistent with the literature on implicit-explicit correspondence (Anderson, 2019; Nosek, 2007), and on socially normative change. For example, the longitudinal analysis conducted by Westgate et al. (2015) revealed a cultural shift in attitudes towards gay men - explicit anti-gay attitudes have decreased across time at a rate of almost double that of their implicit counterpart. This could be interpreted as normative attitudinal shift that is slower to penetrate implicit attitudes, which matches theoretical arguments by Bargh and Ferguson (2000) that implicit attitudes change will be slower to evolve than explicit. This is evidence for theories suggesting dual processes of attitudes towards gay men, whereby explicit and implicit attitudes are distinct constructs that share a target (Nosek, 2007).

4.1.1. Predicting explicit attitudes

The DPM hypothesis was supported in the case of explicit attitudes (H2). These findings are compatible with previous research that found relationships between the ideological variables and anti-gay attitudes (H2a; Lippa & Arad, 1999; Von Collani et al., 2010; Whitley & Egisdóttir, 2000; Zakrisson, 2005). In addition, RWA was a stronger predictor of explicit negative attitudes towards gay men aligning with a study conducted by Whitley (1999), who reported that RWA relates specifically to negative affective attitudes towards homosexuals. This is likely because RWA ideals result in prejudice towards group members

perceived to be value violators; gay men are typically perceived to violate values of heteronormative society and in addition are perceived as religious value violators (and religiosity is a known correlate of RWA; Jonathan, 2008).

This paper presents the first empirical exploration of the D4 traits as predictors of explicit and implicit negative attitudes towards gay men. Contrary to predictions, only the traits of the D3 correlated with explicit attitudes (supporting H3a) and predicted explicit attitudes towards gay men above the ideological variables (supporting H3c). Narcissism was the strongest predictor of negative attitudes. It may be that heterosexual participants who report high levels of narcissism consider themselves superior to gay men due to their majority status and high self-regard. However, subclinical narcissists are also characterised by their disregard of and disinterest in others, including out-group members. Both explanations would account for increased prejudice. Machiavellianism was also a predictor of explicit negative attitudes, explained by the manipulative nature of Machiavellians, who may recognise gay men as a vulnerable minority group which are easily exploitable, and thusly endorse negative attitudes towards them to facilitate such exploitation (see Anderson & Cheers, 2018). We acknowledge that these explanations are somewhat undermined when considering that our sample also was comprised of a small proportion of gay men ($n = 2$) and other non-exclusively heterosexual participants ($n = 24$).

Unexpectedly, psychopathy shared a bivariate negative correlation with explicit negative attitudes, yet it predicted explicit positive attitudes in the regression model. This is likely a suppression effect, a statistical anomaly in which one variable impacts another to distort their predictive capacity (Thompson & Levine, 1997).⁴ Against predictions, everyday sadism was not predictive of attitudes; perhaps possessing negative attitudes towards gay men is not inherently cruel, aggressive, or demeaning as is characteristic of the everyday sadist (Chabrol, Van Leeuwen, Rodgers, & Séjourné, 2009). However, given that this trait does correlate at the bivariate level, it is likely that it simply did not contribute variance in combination with the other traits. Taken together, these findings (pertaining to explicit prejudice) align with the findings of Hodson et al. (2009) who also found the D3 traits to predict generalised prejudice after controlling for RWA and SDO in a DPM-like model.

4.1.2. Predicting implicit attitudes

Hypotheses for the prediction of implicit attitudes were not supported (H2b, H3b, H3d). In the case of the DPM, other researchers have found the same pattern of results (i.e., in a sample where explicit, but not implicit, attitudes correlate with the DPM; Anderson & Koc, 2015; Tsang & Rowatt, 2007). In the case of the D4, no research has yet explored correlations between these traits and any implicit constructs. It is worth considering that potentially there are issues with the GNAT as a valid measure of anti-gay attitudes (although it has previously been used to measure gay attitudes [Anderson & Koc, 2015]), or that there may have been sampling issues (discussed below). However, a more parsimonious explanation is that implicit attitudes are unrelated to individual difference factors, or at least those measured in this thesis. This adds to the growing body of literature demonstrating that explicit and implicit attitudes are dual processes – overlapping in their shared

⁴ After noting that psychopathy predicts negative attitudes at the bivariate level, but positive attitudes in the multivariate level, we explored for suppression effects. To do so, we systematically removed one independent variable at a time, and re-ran the analysis – in all of these analyses the suppression effect remained. We then removed two independent variables at a time, then three, then four. The suppression effect disappeared when the model contained psychopathy and sadism only, or psychopathy and RWA only (i.e., in these instances psychopathy returned to predicted negative attitudes). The same patterns of directional (albeit non-significant) findings also occur when applying this same systematic removal and re-analysis when implicit attitudes were the dependent variable, thus adding to the evidence that this is a suppressor effect.

target but unique in their antecedents and correlates.

4.2. Limitations and future research

There are several limitations of this research which warrant discussion. First, the use of MTurk™ to crowdsource participants may not have yielded an ideal sample. Despite its cost-effectiveness and convenience, there have been speculations regarding the potentially problematic external validity of estimates derived from MTurk™ samples; specifically issues of generalisability (Berinsky, Huber, & Lenz, 2012; Huff & Tingley, 2015). Huff and Tingley (2015) found MTurk™ participants to be younger, more politically progressive, and more interested in news media. Thus, the explicit attitudes towards gay men in the current study may not provide an accurate representation of US attitudes towards gay men as a nation.

Further investigation is also warranted to understand why none of the D4 traits were predictive of implicit anti-gay attitudes. Both the SD3 (Jones & Paulhus, 2014) and the SSIS (O'Meara et al., 2011) are relatively short measures of the D3 and everyday sadism, respectively. Although preferable compared to even briefer measures of the triad such as the Dirty Dozen (Jonason & Webster, 2010), the SD3 claims to encapsulate the dimensionality of three distinct antisocial traits in just nine items each. This warrants scepticism based on the multifaceted nature of each of the traits. For example, narcissism is a multifaceted trait which can manifest as either vulnerable or grandiose, and the distinction is known to differently predict socially-relevant outcomes (Carrotte & Anderson, 2018; Swami, Cass, Waseem, & Furham, 2015), however the narcissism-based items on the SD3 solely tap characteristics of the grandiose narcissist (Rohmann, Neumann, Herner, & Bierhoff, 2012). Thus, to best estimate the relationships between the dark traits and both explicit and implicit anti-gay attitudes, future research may consider implementing a larger and more thorough measure of the triad/tetrad. Finally, future research should also consider the attitude-based findings of relationships between the DPM and the D4 further, to investigate if these findings can be extrapolated to predict anti-gay behaviours (ranging from microaggressions, to blatant homophobia, non-support for pro-gay policy and gay rights activism, etc.).

4.3. Conclusions

In this paper, we explored whether the D4 model of personality was able to predict anti-gay attitudes above the original ideological variables of the DPM (i.e., RWA and SDO). Supporting previous literature, implicit prejudice was more negative than explicit prejudice. Interestingly however, only explicit anti-gay attitudes were predicted by factors explored in this paper. These findings solidify and extend upon existing research identifying RWA to be a stronger predictor of explicit prejudice towards this minority group, compared to SDO. Once controlling for the DPM variables, the traits of the D3 did predict attitudes towards gay men providing theoretical and empirical contributions to the personality and prejudice literature. Surprisingly, everyday sadism did not significantly predict prejudice towards gay men, thus this D4 may not be as useful as the D3 within the realm of prejudice. None of the implicit attitudes hypotheses were supported, suggesting that perhaps implicit attitudes towards gay men are not predictable by the individual differences variables, or at least those presented in this paper.

These findings contribute to the literature in several important ways. It offers theoretical contributions to the ongoing debate surrounding the number of unique dark personality traits that exist (Furnham et al., 2013). At least in the prediction of explicit anti-gay attitudes towards gay men, the members of the D3 may be the best encapsulation of explicit attitudes rather than the D4. They have also extended upon existing research identifying the DPM as a successful model through which prejudiced socio-political attitudes may be understood, however it may also be suggested that it is an insufficient

model to understand implicit attitudes towards gay men.

This research argues that understanding the individual ideological and personality differences underlying anti-gay attitudes aids the prediction of intergroup anti-gay and socio-political attitudes. That is, to facilitate societal-level change in anti-gay attitudes, it is necessary to intervene at the individual level. Developing knowledge of the socio-political ideologies and antisocial personality traits which accumulate to perpetuate systemic prejudice towards gay men may inform relevant policy and education initiatives with an aim to create an equal and respectful society.

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