Community-level diversity decreases right-wing authoritarianism and social dominance orientation by alleviating dangerous and competitive worldviews: Multilevel and longitudinal tests of the Dual Process Model

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Although living in diverse communities can affect socio-political views, studies rarely—if ever—assess mediators of the relationship between macro-level diversity and individual-level intergroup attitudes. According to the Dual Process Model of Ideology and Prejudice, community-level diversity should correlate negatively with right-wing authoritarianism (RWA) and social dominance orientation (SDO) by reducing dangerous and competitive worldviews, respectively. Study 1 examined these hypotheses using a nationwide random sample of New Zealand Europeans (N = 11,007) nested in 254 communities. As hypothesised, community-level diversity had specific negative indirect effects on between-level variability in RWA and SDO via reductions in dangerous and competitive worldviews, respectively. Study 2 pursued a longitudinal follow-up (N = 9,355) and showed that dangerous and competitive worldviews predicted increases in RWA and SDO (respectively) a year later. Collectively, these results demonstrate that living in diverse communities can improve intergroup attitudes by reducing perceptions that the world is a dangerous and competitive place.

Keywords: Dual Process Model, Social Dominance, Authoritarianism, Diversity, Worldviews, Multilevel Modelling

INTRODUCTION

"When Mexico… sends its people… they're sending people that [sic] have lots of problems, and they're bringing those problems to us. They're bringing drugs. They're bringing crime. They're rapists. And some, I assume, are good people…"

—Donald Trump

When Donald Trump announced his presidential candidacy, he expressed a familiar set of racist tropes. In addition to inciting fear over exaggerated crime statistics (Holpuch, 2015, July 7), Trump claimed that immigrants were competing with United States' (US) citizens for jobs. To the surprise (and chagrin) of many, Trump's now-infamous speech—a speech that drew upon the dual themes of fear and competition—resonated with many voters and eventually propelled him to the highest elected office in the US. Thus, Trump's electoral success demonstrates the effectiveness of political campaigns that appeal to those who view the world as a dangerous and competitive place.

But what happens when majority group members actually encounter immigrants? In the current paper, we argue—and demonstrate using a random sample of native-born New Zealand Europeans—that the size of the immigrant population in the local community alleviates majority group members' perceptions that the world is a dangerous and competitive place. In turn, declines in dangerous and competitive worldviews should reduce right-wing authoritarianism (RWA; Altemeyer, 1996) and social dominance orientation (SDO; Pratto et al., 1994). Before testing these hypotheses with multilevel (Study 1) and longitudinal (Study 2) data, respectively, we review research examining the effects of macro-level[1] diversity on individual-level attitudes toward minorities. We then provide a brief overview of Duckitt's (2001) Dual Process Model (DPM) of Ideology and Prejudice to theorise about the effects of macro-level diversity on individual-level intergroup attitudes.

Community Diversity

Scholars have long been interested in the impact that living in an ethnically diverse community has on majority group members' attitudes toward minorities. In one notable early example of this interest, renowned political scientist V. O. Key (1949) argued that the proportion of blacks living in Southern electoral counties posed a threat to whites' political power and should thus elicit racially conservative voting. Consistent with this "racial threat" hypothesis, Southern whites' support for the Democratic

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[1] Past research examining the impact of the broader social context on intergroup attitudes has focused on various levels of analysis including the local community (e.g., Reny & Newman, 2018), municipality (e.g., Sarrasin et al., 2017), metropolitan area (e.g., Taylor, 1998), and country (e.g., Quillian, 1995). Here, we use macro-level diversity as an umbrella term to capture these myriad levels of analysis and note (when appropriate) the specific focus when discussing individual studies.

Party—a party that fervently resisted racial integration at the time (see Black & Black, 2002; Osborne et al., 2011)—correlated positively with the proportion of blacks living in the electoral county. That is, the greater the proportion of blacks, the more support Southern Democrats received from white voters.

More recently, Reny and Newman (2018) showed that the entry of African Americans into predominately white communities during the 1940s to 1960s correlated positively with whites' support for a racially charged housing policy in California. Likewise, Taylor (1998) revealed that the percentage of blacks in the local area correlated positively with whites' anti-black biases, anti-egalitarianism, stereotyping, and avoidance of intergroup contact. These results were, however, specific to anti-black biases—the proportion of blacks living in an area was unassociated with prejudice towards Asians or Latinos. Outside of the US, Quillian (1995) found a positive correlation between the proportion of immigrants living in Western European countries and anti-immigrant views amongst majority group members, especially in countries undergoing financial hardship (see also Hjerm, 2009; Rink et al., 2008).

Although these studies corroborate the racial threat hypothesis, the diversity of one's local community could also decrease intergroup hostility. Indeed, research on contact theory shows that interactions with outgroup members—interactions that are more prevalent in areas with high levels of ethnic diversity (e.g., see Brune et al., 2016; Hewstone & Schmid, 2014; Van Assche, Asbrock, Dhont, et al., 2018; Wagner et al., 2006)—can reduce majority group members' biases by dispelling some of the misperceptions they may have of minorities (e.g., see Allport, 1954). Accordingly, Pettigrew and Tropp's (2006) meta-analysis demonstrated that intergroup contact reduces biases towards racial and non-racial outgroups. These results call into question the conclusion that macro-level diversity always elicits intergroup bias (see also Hewstone, 2015).

There are other reasons to question the generalisability of the racial threat hypothesis. For example, Voss (1996) noted that studies that find support for the racial threat hypothesis assess macro-level diversity at an inappropriate level of analysis (i.e., state- and county-wide measures of diversity likely overestimate whites' actual proximity to minorities), omit key macro-level variables (e.g., cultural differences across parishes), and suffer from measurement error. Voss addressed these shortcomings by examining the parish-level support David Duke, a former Imperial Wizard of the Ku Klux Klan, received in Louisiana's Senate and gubernatorial elections in 1990 and 1991, respectively. Contrary to the racial threat hypothesis, the proportion of blacks living in local parishes was unassociated with support for David Duke. Thus, the amount of diversity present in majority group members' local environment need not always elicit intergroup hostility.

Subsequent work demonstrates the potential for the diversity of one's local context to improve intergroup relations. Although the actual proportion of immigrants living in a given locality correlates positively with the perceived size of the immigrant population, objective indicators of the immigrant population are indirectly associated with tolerance via intergroup contact (Schlueter & Scheepers, 2010; Schlueter & Wagner, 2008). Accordingly, Wagner and colleagues (2006) revealed that the proportion of minorities living in a community correlated negatively with intergroup bias via increased contact with members of the minority group (also see Sarrasin et al., 2012). The perceived diversity of one's local community—a likely consequence of living in a diverse neighbourhood—also correlates positively with support for economic redistribution (Steele & Perkins, 2018). Finally, community-level contact fosters group norms for diversity, which then reduce intergroup bias (see Christ et al., 2014). Living in diverse communities has the potential to alleviate intergroup biases among majority group members.

Dual Process Model of Ideology and Prejudice

When discussing intergroup attitudes, it is important to note that distinct motivational goals underlie prejudice. Indeed, Duckitt's (2001) Dual Process Model (DPM) of Ideology and Prejudice posits that social biases originate from two social ideological attitudes: RWA (see Altemeyer, 1996) and SDO (see Ho et al., 2015; Pratto et al., 1994). Whereas RWA reflects the goals to establish security and order, SDO captures the need for dominance and power. Accordingly, RWA and SDO are manifestations of two distinct worldviews: RWA arises from the view that the world is a dangerous and threatening place, whereas SDO emerges from a competitive worldview (also see Duckitt & Sibley, 2017; Osborne et al., 2023).

A burgeoning literature corroborates the tenets of the DPM. For example, Duckitt and colleagues (2002) demonstrated that dangerous (but not competitive) worldviews correlated positively with RWA, whereas competitive (but not dangerous) worldviews correlated positively with SDO. These findings have been replicated in various countries including Belgium (Van Hiel et al., 2007), Italy (Chirumbolo et al., 2016), New Zealand (Duckitt, 2001; Sibley & Duckitt, 2009), and the US (Crowson, 2009; Weber & Federico, 2007). And notably, Sibley et al. (2007) showed in a five-month longitudinal study that dangerous (but not competitive) worldviews had a positive cross-lagged effect on RWA, whereas competitive (but not dangerous) worldviews had a positive cross-lagged effect on SDO. Consistent with the DPM, these results suggest that distinct worldviews temporally precede RWA and SDO.

In arguably the most definitive study on the topic to date, Perry and colleagues (2013) conducted a meta-analysis of 46 cross-sectional studies (N = 12,939) investigating the associations between worldviews and (a) RWA and (b) SDO. Consistent with the DPM, the average association between dangerous worldviews and RWA was over three times the size of the corresponding association between competitive worldviews and RWA. Likewise, the average association between competitive worldviews and SDO was nearly seven times the size of the corresponding relationship between dangerous worldviews and SDO. Thus, RWA and SDO are separate instantiations of distinct motivational goals to avoid threat and achieve dominance, respectively.

Although studies demonstrate that RWA and SDO are rooted in distinct worldviews, research has neglected the possibility that people's macro-level environment may affect their perceptions of the world as a dangerous and

competitive place. This is a notable oversight, as Duckitt (1989) argued that one of the key shortcomings of the authoritarianism literature is its near-exclusive focus on the individual—a form of psychological reductionism present in much of social psychology (for similar critiques, see Pettigrew, 1991; Pettigrew et al., 2010; see also Osborne et al., 2019). Accordingly, Duckitt's (2001) DPM drew inspiration from cross-cultural work by D'Andrade (1992), Strauss (1992) and others (e.g., Ross, 1993) when noting that the local environment can affect people's needs for conformity and dominance. Whereas punitive socialization practices should elicit needs for social conformity that, in turn, foster dangerous worldviews and RWA, a childhood scarred by unaffectionate parenting should instil a toughminded approach to the world that fosters competitive views of the world and SDO. However, research has yet to examine the extent to which other key aspects of the macro-level environment (e.g., community-level diversity) correlate with RWA and SDO via dangerous and competitive worldviews.

Study 1

Study 1 addresses this oversight by examining the indirect effects of community-level diversity on RWA and SDO. Because living in diverse communities increases majority group members' opportunity for intergroup contact (see Brune et al., 2016; Wagner et al., 2006), we hypothesized that community-level diversity would correlate negatively with seeing the world as a dangerous and competitive place. In turn, given that RWA and SDO are distinct effects of the motivational goals for social conformity and toughmindedness (respectively; Duckitt, 2001; Osborne et al., 2023), dangerous and competitive worldviews should correlate positively with RWA and SDO, respectively. That is, community-level diversity should have negative indirect effects on RWA and SDO through reductions in dangerous and competitive worldviews, respectively.

In testing our hypotheses, we aimed to rule out plausible alternative explanations for our predicted results. Specifically, because macro-level economic conditions can increase competition between groups (see Scheepers et al., 2002), we adjusted for the community-level (a) unemployment rate and (b) median household income. To demonstrate that our predicted associations are unique to exposure to immigrants, we also adjusted for the impact that the proportion of minorities living in the community had on dangerous and competitive worldviews. Finally, we specified an alternative multilevel model in which community-level diversity moderated the relationships between worldviews and both RWA and SDO. Thus, we can be confident that our results demonstrate the multilevel processes underlying, rather than the boundary conditions of, the DPM.

Study 1 makes multiple contributions to the literature. Although research has assessed the impact that macro-level diversity has on intergroup attitudes (e.g., Sarrasin et al., 2012; Schlueter & Wagner, 2008; Van Assche,

Asbrock, Dhont, et al., 2018; Van Assche, Asbrock, Roets, et al., 2018; Van Assche et al., 2014; Van Assche et al., 2019), studies have yet to investigate how the context shapes people's worldviews and, in turn, their levels of RWA and SDO. Relatedly, we use advanced statistical analyses (namely, multilevel structural equation modelling) to partition the variance of RWA and SDO, as well as dangerous and competitive worldviews, into individual and contextual levels of analysis. This approach helps to increase understanding of the DPM by integrating the context into individual-level predictors of RWA and SDO. Finally, we investigate our hypotheses using a large random sample of New Zealand-born New Zealand Europeans, thus providing a generalisable assessment of the DPM.

METHOD
Sampling procedure

Data come from Time 5 of the New Zealand Attitudes and Values Study (NZAVS)—an annual nationwide panel study that began in 2009.[2] Although data collection for Time 5 began in September 2013 and concluded in October 2014, sampling for Time 5 took place on four occasions. The first occasion was in 2009 (Time 1) and was based on a random sample of adults from the Electoral Roll (a national registry of voters).[3] This first sampling occasion yielded 6,518 participants, which, after adjusting for errors in the Electoral Roll, represents a response rate of 16.6%. By 2011 (Time 3), 3,918 participants were in the sample (a retention rate of 60.1%). To compensate for sample attrition, a non-random booster sample was recruited from the website of a major New Zealand-based newspaper, adding 2,966 new participants to the study and bringing the Time 3 sample size to 6,884.

To increase the size and diversity of the sample, we conducted two additional booster samples in 2012 and 2013. The first of these booster samples consisted of a sample frame of 1,500 people who were between 18-60 years old[4] and listed as Māori on the Electoral Roll. Of those contacted, 92 volunteered for the study (response rate = 6.1%). The second booster sample was based on a random sample of 70,000 people between 18-60 years old listed on the 2014 Electoral Roll. Of those contacted, 7,499 volunteered for the study (response rate = 10.7%). Thus, Time 5 contained 18,261 participants (i.e., 10,593 retained from one or more previous wave; 7,499 additions from booster sampling and 169 unmatched or unsolicited opt-ins).

Participants

We examine the 11,007 native-born New Zealand Europeans (M_{age} = 48.81, SD = 14.16) from Time 5 who provided either partial or complete responses to our focal variables (i.e., 99.2% of our sample who identified as New Zealand European and were born in New Zealand). The sample had more women (n = 6,192) than men (n = 4,095) and were nested in 254 communities (average cluster size = 43.33).

Sample Size and Statistical Power

Because the analyses for the current study are based on

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[2] We use Time 5 data because it is our largest sample size to date that includes dangerous and competitive worldview measures.

[3] Registration on the electoral roll is compulsory, making our sample as close to randomly selected as possible.
[4] We restricted this sample frame to those 60 years and under because we aim to retain them for 15 years.

an ongoing longitudinal study that began in 2009, the sample size was determined by our ability to retain participants for the duration of our projected 20-year study. To these ends, we phoned, emailed, and sent postal reminders to non-respondents to maximize our retention rate (for an examination of attrition rates, see Satherley et al., 2015). We also conducted frequent booster samples to differentiate between cohort effects and normal developmental trends (e.g., see Zubielevitch et al., 2023). Because these external factors determined our sample size, we did not conduct (post-hoc) power analyses for the current study.

Measures

We assessed the following within-level measures relevant to this study: RWA, SDO, and worldviews. Items were rated on a 1 (Strongly Disagree) to 7 (Strongly Agree) scale. Because home addresses were known, within-level data were matched with the following between-level variables: Community-level (a) diversity, (b) unemployment rate, (c) median household income, and (d) size of the minority population. To put these between-level variables on a common metric, community-level median household income was rescaled to range from 0 to 1. Thus, all between-level variables have either a theoretical or actual range of 0 to 1.

Within-level variables

Right-Wing Authoritarianism (RWA) was assessed using six items (items 8, 12, 15, 22, 26, and 29; $\alpha = .691$) from Altemeyer's (1996) 30-item scale. Example items were: (a) "Our country will be destroyed some day if we do not smash the perversions eating away at our moral fibre and traditional beliefs" and (b) "Atheists and others who have rebelled against established religions are no doubt every bit as good and virtuous as those who attend church regularly" (reverse-scored).

Social Dominance Orientation (SDO) was assessed using six items (i.e., items 3, 4, 7, 9, 12, and 13; $\alpha = .739$) from Sidanius and Pratto's (1999) 16-item SDO_6 scale. Example items were: (a) "Inferior groups should stay in their place" and (b) "We should have increased social equality" (reverse-scored).

Dangerous worldviews were assessed using these two items from Duckitt and colleagues' (2002) 10-item scale: "There are many dangerous people in our society who will attack someone out of pure meanness, for no reason at all" and "Despite what one hears about 'crime in the street,' there probably isn't any more now than there ever has been" (reverse-scored; $r = .276$, $p < .001$).

Competitive worldviews were assessed using these two items from Duckitt and colleagues' (2002) 20-item scale: "It's a dog-eat-dog world where you have to be ruthless at times" and "Life is not governed by the 'survival of the fittest.' We should let compassion and moral laws be our guide" (reverse-coded; $r = .302$, $p < .001$).

Between-level variables

All between-level variables were assessed using ward-level data derived from the 2013 New Zealand census and, as such, roughly coincided with the beginning of the year-long data collection period for Time 5 (which also began in 2013). Statistics New Zealand (2009) describes wards as geographic units that reflect the local communities within a given district and are designed "to increase community involvement in the local government system".

Although wards are census-based designations and, as such, do not assess residents' actual level of identification with the local community, they were designed to reflect psychologically meaningful communities similar to cantons or townships in other countries. As such, they are not defined by geographic size, but rather, the sense of community found within a broader district. In 2013, ward size (defined as the number of people who slept in the given ward on the night of 5 March 2013) was relatively small on average ($M_{\text{Residents}} = 16,566.16$, $SD = 27,071.51$), but ranged from 381 residents to 156,081 residents in New Zealand's smallest and largest wards, respectively.

Community-level diversity was assessed by dividing the number of non-New Zealand-born people living in a ward by the total number of people living in the same ward. Thus, community-level diversity reflected the overall proportion of immigrants living in each ward ($M_{\text{Diversity}} = .208$, $SD = .075$) and ranged from .090 to .527 in the least-to-most diverse wards, respectively.

Proportion of minorities living in the community was assessed by dividing the number of non-New Zealand Europeans living in a ward by the total number of people living in each ward ($M_{\text{Minorities}} = .224$, $SD = .140$) and ranged from .075 to .815 in the wards with the least-to-most minorities, respectively.

Community-level unemployment was assessed by dividing the number of unemployed people living in a ward who were 15 years old or older by the total number of people living in the same ward who were 15 years old or older ($M_{\text{Unemployed}} = .038$, $SD = .019$) and ranged from .009 to .123 in the wards with the lowest-to-highest rates of unemployment, respectively. Although New Zealand has no minimum working age, Statistics New Zealand begins counting those 15 years of age and older as unemployed if they (a) have no paid employment at the time of the interview, (b) are available to work and (c) have sought employment in the last four weeks (Statistics New Zealand, 2023).

Community-level median household income was assessed by taking the median household income of the given ward from the 2013 census ($M_{\text{Median income}} = \$59,222.656$, $SD = \$14,300.181$) and ranged from $31,000 to $114,000 (NZD) in the poorest and wealthiest wards, respectively. To place this variable on the same metric as the other between-level variables, community-level median household income was rescaled to range from 0 ($31,000 NZD) to 1 ($114,000 NZD).

RESULTS AND DISCUSSION

The aim of this study was to assess the association between community-level diversity and intergroup attitudes. Because exposure to diverse cultures should dispel majority group members' fears about immigration, community-level diversity should lessen New Zealand Europeans' dangerous and competitive worldviews.

Because participants were nested within communities, traditional mediation analyses were inappropriate for testing our predictions (Preacher et al., 2011; Preacher et al., 2010). Specifically, by ignoring the clustering in our data, we would underestimate our standard errors and increase our Type I error rates (Krull & MacKinnon, 2001). Therefore, statisticians recommend estimating indirect effects that occur across levels of analysis via multilevel structural equation models (Preacher et al.,

Table 1. Descriptive statistics and bivariate correlations between L1 and L2 variables.

	1	2	3	4	5	6	7	8
L1 Variables								
1. RWA	----							
2. SDO	.191***	----						
3. Dangerous worldviews	.288***	.125***	----					
4. Competitive worldviews	.045***	.414***	.200***	----				
L2 Variables								
5. Proportion of minorities	−.063***	−.020*	−.039***	−.028**	----			
6. Unemployment rate	−.039***	−.038***	−.010	−.032***	.748***	----		
7. Median household income[1]	−.123***	−.019*	−.153***	−.028**	.134***	−.192***	----	
8. Community diversity	−.127***	−.037***	−.134***	−.043***	.691***	.316***	.563***	----
Summary Statistics								
Mean	.380	.225	.530	.350	.256	.042	.320	.284
SD	.181	.147	.232	.203	.134	.014	.140	.104
Dispersion	0-1	0-1	0-1	0-1	.08-.82	.01-.12	.00-1.00	.09-.53
α	.691	.739	.432	.457	----	----	----	----
n	10,999	10,999	10,694	10,682	11,007	11,007	11,007	11,007
Intraclass Correlation Coefficient	.062	.046	.043	.007	----	----	----	----

Note: Variables were rescaled to range from 0 to 1.
[1] Median household income was rescaled to range from 0 ($31,000) to 1 ($114,000). The mean unscaled community-level median household income was $59,222.66 ($SD$ = 14,300.18). * $p < .05$; ** $p < .01$; *** $p < .001$

2011). Thus, we estimated a multilevel structural equation model using maximum likelihood estimates and first-order derivatives (MLF) to approximate the standard errors in *Mplus Version 8.8* (Muthén & Muthén, 1998-2017). We also estimated 95% confidence intervals (CI) to assess the precision of our point estimates.

Prior to testing our hypotheses, we examined the multilevel measurement invariance of our 6-item measures of RWA and SDO by creating three, 2-item parcels for each construct and then following the steps outlined by Kim and colleagues (2017). Parcels were created by averaging the two items with the highest and lowest factor loadings obtained from an initial exploratory factor analysis. The subsequent two items with the next highest and lowest factor loadings were then averaged together. Finally, the last remaining pair of items were averaged together. This balanced parcelling approach was taken for both RWA and SDO (see Little et al., 2002), and provides numerous benefits to model estimation including (a) decreasing the likelihood of correlated residuals, (b) reducing the chance of cross-factor loadings, and (c) improving scale reliability (Rioux et al., 2020).

After parcelling our items, we estimated a multilevel confirmatory factor analysis (CFA) in which the same three, 2-item parcels that loaded onto the RWA (SDO) latent variable at the within-level of analysis were the same three, 2-item parcels that comprised RWA (SDO) at the between-level of analysis. Because this initial configural model yielded a negative residual variance for the first between-level factor loading for SDO, we constrained it to 0, re-estimated the model, and obtained a model with acceptable fit, $\chi^2_{(17)} = 1251.453$, $p < .001$; comparative fit index (CFI) = .916; root mean square error of approximation (RMSEA) = .081; standardized root mean square residual$_{within}$ (SRMR$_{within}$) = .071; SRMR$_{between}$ = .117. We then constrained the congeneric factor loadings to equality across the two levels of analysis to estimate a model with metric invariance but once again encountered a negative residual variance at the between-level of analysis. After constraining this second residual variance to 0, the change in model fit was acceptable (i.e., ΔCFI < .010; see Cheung & Rensvold,

2002), $\chi^2_{(22)} = 1361.738$, $p < .001$; CFI = .909; RMSEA = .074; SRMR$_{within}$ = .070; SRMR$_{between}$ = .331. The increase in the SRMR$_{between}$ does, however, suggest a likely source of misfit at the between-level of analysis. We therefore freed the equality constraints on the second and third between-level factor loadings for SDO and achieved a better-fitting model (as indicated by the SRMR$_{between}$), $\chi^2_{(20)} = 1293.903$, $p < .001$; CFI = .913; RMSEA = .076; SRMR$_{within}$ = .070; SRMR$_{between}$ = .154. Because only (partial) metric invariance is needed to compare the strength of associations across levels of analysis (see Heck & Thomas, 2020; Putnick & Bornstein, 2016; Widaman & Reise, 1997), we used this model with partial metric invariance as the measurement model for the multilevel structural equation model used to test our hypotheses.

Hypothesised model

Table 1 shows the bivariate correlations and descriptive statistics for the within- and between-level variables included in this study. To test our hypotheses that community-level diversity would have negative indirect effects on RWA and SDO by reducing dangerous and competitive worldviews (respectively), we estimated a multilevel structural equation model that partitioned the variance of these variables into within-level and between-level effects. The within-level component of our model regressed both the RWA and SDO latent variables onto both dangerous and competitive worldviews. We also estimated the covariance between both worldviews, as well as a residual correlation between RWA and SDO. Our between-level model reproduced and extended our within-level model by adding community-level diversity as a predictor of dangerous and competitive worldviews. To rule out plausible alternative explanations, our between-level model also used community-level (a) size of the minority population, (b) median household income,

Figure 1. Multilevel structural equation model in which community-level diversity has a negative indirect effect on right-wing authoritarianism and social dominance orientation via declines in dangerous and competitive worldviews, respectively.
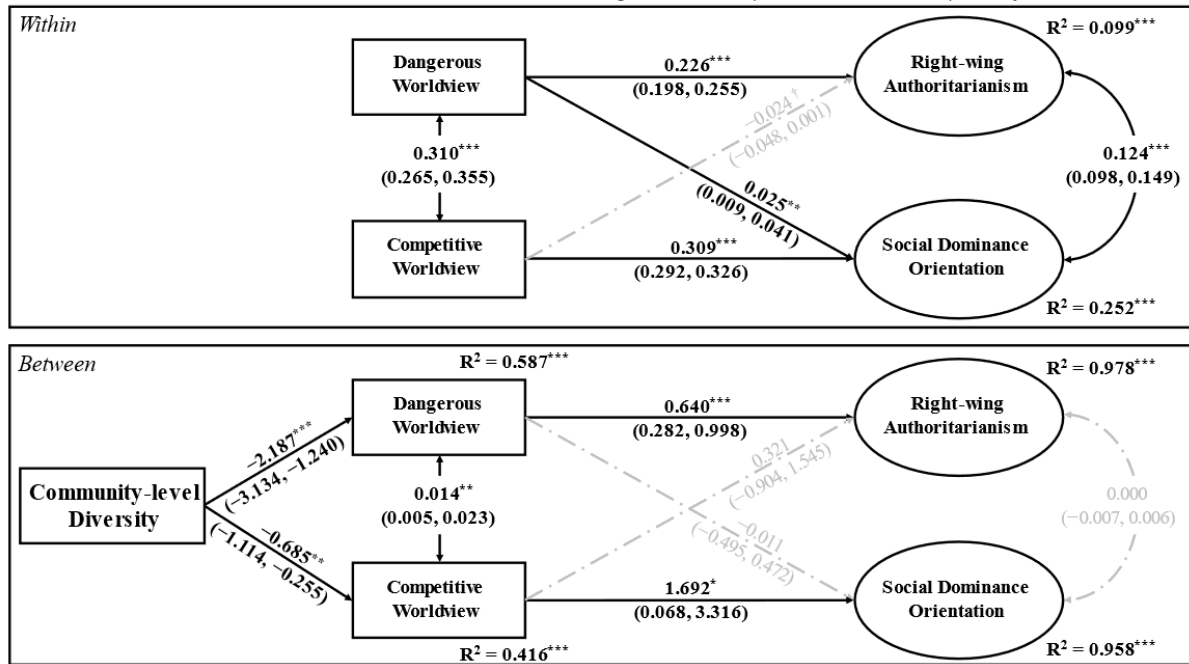
Note. Analyses adjust for community-level (a) proportion of minorities, (b) unemployment rate, and (c) median household income. Paths reflect unstandardized regression coefficients (with 95% confidence intervals in parentheses). The hypothesized model fit these data well, $\chi^2_{(60)} = 1839.759$, $p <$ .001; comparative fit index (CFI) = .908; root mean square error of approximation (RMSEA) = .052; standardized root mean square residual$_{within}$ (SRMR$_{within}$) = .065; SRMR$_{between}$ = .139. $^†p < .10$; $^*p < .05$; $^{**}p < .01$ $^{***}p < .001$.

and (c) unemployment rate to predict both worldviews.[5] All community-level variables were allowed to covary at the between-level of analysis (for *Mplus* syntax, see Appendix B).

Figure 1 demonstrates that our model provided an acceptable fit to these data, $\chi^2_{(60)} = 1839.759$, $p < .001$; CFI = .908; RMSEA = .052; SRMR$_{within}$ = .065; SRMR$_{between}$ = .139. The upper half of Figure 1 reveals that, as hypothesised, dangerous worldviews predicted RWA better than did competitive worldviews ($b = 0.226$, 95% CI = [0.198, 0.255]; $p < .001$ vs. $b = −0.024$, 95% CI = [−0.048, 0.001]; $p = .058$, respectively; $b_{difference} = 0.250$, 95% CI = [0.210, 0.290]; $p < .001$). Conversely, competitive worldviews predicted SDO better than dangerous worldviews ($b = 0.309$, 95% CI = [0.292, 0.326]; $p < .001$ vs. $b = 0.025$, 95% CI = [0.009, 0.041]; $p = .002$, respectively; $b_{difference} = 0.284$, 95% CI = [0.260, 0.308]; $p < .001$). After accounting for the effects of dangerous and competitive worldviews, the residual covariance between RWA and SDO was both positive and significant ($b = 0.124$, 95% CI = [0.098, 0.149]; $p < .001$).

As for our between-level model, the lower half of Figure 1 shows that community-level diversity correlated negatively with dangerous worldviews ($b = −2.187$, 95% CI = [−3.134, −1.240]; $p < .001$). In turn, although competitive worldviews did not correlate with community-level RWA ($b = 0.321$, 95% CI = [−0.904, 1.545]; $p = .608$), between-level variability in dangerous worldviews correlated positively with RWA (as

hypothesized; $b = 0.640$, 95% CI = [0.282, 0.998]; $p < .001$). Consequently, the hypothesised negative specific indirect effect of community-level diversity on RWA via dangerous worldviews was reliable ($b_{indirect} = −1.400$, 95% CI = [−2.353, −0.447]; $p = .004$).[6] Notably, these effects adjust for the effects of the community-level (a) unemployment rate ($b = −4.508$, 95% CI = [−9.973, 0.957]; $p = .106$), (b) median household income ($b = −0.586$, 95% CI = [−0.991, −0.182]; $p = .005$), and (c) size of the minority population ($b = 1.024$, 95% CI = [0.227, 1.820]; $p = .012$) on dangerous worldviews.

The lower half of Figure 1 also reveals that community-level diversity correlated negatively with competitive worldviews ($b = −0.685$, 95% CI = [−1.114, −0.255]; $p = .002$). In turn, although dangerous worldviews and SDO did not correlate at the community-level ($b = −0.011$, 95% CI = [−0.495, 0.472]; $p = .964$), between-level variability in competitive worldviews correlated positively with SDO (as hypothesized; $b = 1.692$, 95% CI = [0.068, 3.316]; $p = .041$). Consequently, the predicted negative indirect effect of community-level diversity on SDO through competitive worldviews was reliable ($b_{indirect} = −1.158$, 95% CI = [−2.285, −0.032]; $p = .044$).[7] These associations emerged after adjusting for the effects of the community-level (a) size of the minority population ($b = 0.413$, 95% CI = [0.064, 0.762]; $p = .020$), (b) median household income ($b = −0.097$, 95% CI = [−0.296, 0.101]; $p = .336$), and (c) unemployment rate ($b = −3.331$, 95% CI = [−6.324, −0.339]; $p = .029$) on competitive

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[5] We obtained similar results when also controlling for age and education at the individual-level, although the indirect effect of community-level diversity on SDO via between-level variability in competitive worldviews became marginally significant (see Appendix A).

[6] The specific indirect effect of community-level diversity on RWA via competitive worldviews was non-significant, $b_{indirect} = −0.219$, 95% CI = [−1.080, 0.641]; $p = .617$.
[7] The specific indirect effect of community-level diversity on SDO via dangerous worldviews was non-significant, $b_{indirect} = 0.024$, 95% CI = [−1.033, 1.082]; $p = .964$.

worldviews.

Alternative model

In a final set of analyses, we sought to rule out the possibility that community-level diversity moderates the relationships worldviews have with RWA and SDO. Specifically, community-level diversity may serve as a situational cue that strengthens the correlations both worldviews have with RWA and SDO (e.g., see Duckitt & Sibley, 2017; Osborne et al., 2023). Indeed, research reveals that authoritarianism may only correlate with intergroup attitudes when threats to the normative environment are salient (see McCann, 2008; Stenner, 2005). Thus, community-level diversity may serve as a social cue that activates authoritarian predispositions, thereby strengthening the association between dangerous worldviews and RWA. Similar processes may occur for SDO whereby situational cues regarding competition (e.g., community-level diversity) strengthen the association between competitive worldviews and SDO.

To rule out these potential alternative explanations, we estimated a multilevel random coefficients model in which the associations dangerous and competitive worldviews have with RWA and SDO (respectively) were treated as random slopes moderated by community-level diversity. Accordingly, we group-mean centred our individual-level predictors, and grand-mean centred our between-level variables. We then regressed the RWA and SDO latent variables onto both worldviews at the individual-level of analysis. To assess potential cross-level interactions, we estimated the slopes for the associations between (a) RWA and dangerous worldviews and (b) SDO and competitive worldviews as separate random effects. Community-level diversity was then used to predict these two random slopes (after adjusting for our between-level covariates). Consistent with our multi-level mediation analysis, we used a measurement model with partial metric invariance to estimate this model. However, to ensure model convergence, we added a Montecarlo integration and increased the M iterations to 4000.

Results revealed that community-level diversity correlated negatively with between-level variability in RWA ($b = -1.692$, 95% CI = [−2.458, −0.926]; $p < .001$). Notably, this relationship emerged after adjusting for community-level (a) median household income (b −0.397, 95% CI = [−0.741, −0.054]; $p = .023$), (b) unemployment rate ($b = -3.539$, 95% CI = [−7.731, 0.652]; $p = .098$), and (c) size of the minority population ($b = 0.643$, 95% CI = [0.048, 1.238]; $p = .034$). Most importantly, the cross-level interaction in which community-level diversity moderated the relationship between dangerous worldviews and RWA was non-significant ($b = 0.141$, 95% CI = [−0.272, 0.553]; $p = .505$). Likewise, none of the three community-level covariates moderated the relationship between dangerous worldviews and RWA (ps ≥ 0.693).

Similar results emerged when examining the potential cross-level interaction in which community-level diversity moderates the relationship between competitive worldviews and SDO. Specifically, community-level diversity correlated negatively with between-level variability in SDO ($b = -1.101$, 95% CI = [−1.692, −0.510]; $p < .001$). Once again, this association emerged after adjusting for community-level (a) size of the minority population ($b = 0.725$, 95% CI = [0.222, 1.228]; $p = .005$), (b) unemployment rate ($b = -5.445$, 95% CI = [−9.151, −1.739]; $p = .004$), and (c) median household income ($b = -0.164$, 95% CI = [−0.456, 0.128]; $p = .271$). Critically, the cross-level interaction in which community-level diversity moderates the relationship between competitive worldviews and SDO was non-significant ($b = 0.240$, 95% CI = [−0.099, 0.578]; $p = .165$). Likewise, none of the three community-level covariates reliably correlated with the strength of the relationship between competitive worldviews and SDO (ps ≥ 0.383). Together, these results support our contention that, rather than moderating the associations worldviews have with RWA and SDO, community-level diversity indirectly impacts RWA and SDO via reductions in dangerous and competitive worldviews, respectively.

Study 2

Table 2. Descriptive statistics and bivariate correlations for the variables used in Study 2. Although the summary statistics are reported here, latent variables were used in the focal analyses.

	1	2	3	4	5	6	7	8
Time 5								
1. RWA	----							
2. SDO	.198	----						
3. Dangerous worldviews	.299	.136	----					
4. Competitive worldviews	.052	.423	.202	----				
Time 6								
5. RWA	.799	.226	.299	.070	----			
6. SDO	.232	.709	.166	.418	.268	----		
7. Dangerous worldviews	.292	.167	.646	.216	.305	.178	----	
8. Competitive worldviews	.059	.404	.190	.637	.081	.463	.215	----
Summary Statistics								
Mean	3.259	2.329	4.126	3.043	3.186	2.357	4.004	2.998
SD	1.091	0.879	1.396	1.206	1.109	0.900	1.371	1.202
Dispersion	1-7	1-7	1-7	1-7	1-7	1-6.5	1-7	1-7
α	.700	.746	.435	.458	.707	.779	.415	.465
n	9,348	9,348	9,097	9,086	9,352	9,353	9,327	9,136

Note: All bivariate correlations are significant at $p < .001$.

Table 3. *Fit statistics for a longitudinal measurement model of RWA and SDO across two annual waves (N = 9,354).*

	χ^2	df	RMSEA	RMSEA 90% CI	SRMR	CFI	ΔCFI	Pass?
Measurement Model								
Configural invariance	4045.937***	132	.056	[.055, .058]	.065	.946	----	----
Metric invariance	4076.598***	138	.055	[.054, .057]	.065	.946	.000	Yes
Scalar invariance	4433.792***	144	.056	[.055, .058]	.065	.941	.005	Yes

Note. Configural invariance: Similar factor loading patterns; Metric invariance: Equal factor loadings; Scalar invariance: Equal intercepts
***$p < .001$.

Although Study 1 offers initial support for hypotheses, the cross-sectional nature of these data cannot speak to the temporal order of these associations. To address this critical limitation, we conducted a follow-up study with the same participants a year later to examine the longitudinal associations worldviews had with RWA and SDO.[8] Specifically, participants completed measures of dangerous worldviews, competitive worldviews, RWA and SDO, as well as several scales outside the scope of this study. Given both the theoretical basis of the DPM (Duckitt, 2001) and past longitudinal work (Sibley et al., 2007), we hypothesized that dangerous and competitive worldviews would predict subsequent increases in RWA and SDO, respectively. Such results would bolster our argument that decreases in dangerous and competitive worldviews elicited by community-level diversity influence RWA and SDO, respectively.

Participants

We retained 9,355 of the 11,007 native-born New Zealand Europeans who participated in Study 1 (i.e., 84.99% retention rate) in a follow-up survey one year later (i.e., Time 6 of the NZAVS). Once again, the sample contained more women ($n = 5,917$) than men ($n = 3,423$; $n_{\text{non-binary}} = 15$) and were an average of 49.62 ($SD = 14.00$) years old at the first measurement occasion in 2013 (i.e., Time 5).

Measures

Study 2 used the same six-item measures of RWA and SDO, as well as the same two-item measures of dangerous and competitive worldviews, used in Study 1. All four sets of variables were assessed in 2013 (i.e., Time 5) and 2014 (i.e., Time 6).

RESULTS AND DISCUSSION

Table 2 displays the descriptive statistics and bivariate correlations for the variables used in Study 2. Before testing our hypotheses that dangerous and competitive worldviews predict subsequent increases in RWA and SDO, respectively, we estimated three increasingly restrictive longitudinal CFAs to ensure that participants responded to our items similarly over time. We began by using the same three, 2-item parcels for RWA and SDO used in Study 1 as freely estimated indicators of their respective latent constructs at Times 5 and 6. The two-item measures for dangerous and competitive worldviews were also used as freely estimated factor loadings of their respective latent constructs at both time points. Thus, identical factor loading patterns were estimated at Times 5 and 6. To recognize item-specific measurement error, we allowed congeneric items / parcels to correlate with each other across time. Finally, we used effects coding to identify the measurement model such that factor loadings

and item intercepts for each construct averaged to 1 and 0 (respectively), and the latent variable means and variances were constrained to 0 and 1 (respectively) at each timepoint.

Table 3 demonstrates that our initial measurement model with configural invariance fit these data well, $\chi^2_{(132)} = 4045.937$, $p < .001$; CFI = .946; RMSEA = .056, 90% CI [.055, .058]; SRMR = .065. As such, we added further parameter constraints to this initial baseline measurement model to estimate a longitudinal CFA with metric invariance. Specifically, we constrained the factor loadings at Time 6 to equality with their congeneric factor loadings at Time 5 and then freely estimated the latent variances of each construct at Time 6. Next, we estimated a longitudinal CFA with scalar invariance by further constraining to equality the congeneric item intercepts at Times 5 and 6 and by freely estimating the latent means of each construct at Time 6. Based on Cheung and Rensvold's (2002) criteria (i.e., ΔCFI < .010), the addition of these increasingly restrictive model constraints did not significantly reduce model fit for either the metric (ΔCFI = .000) or scalar (ΔCFI = .005) invariant measurement models. Thus, participants interpreted our four latent variables similarly across time.

To investigate our hypotheses that dangerous and competitive worldviews precede increases in RWA and SDO, respectively, we used the scalar invariant measurement model noted above to estimate a cross-lagged panel model (with latent variables) in which our Time 6 latent variables were regressed onto the Time 5 measures. We also estimated the residual correlations between our Time 6 measures, as well as the correlations between dangerous worldviews, competitive worldviews, RWA, and SDO at Time 5. Based on standard criteria for assessing model fit (i.e., CFI > .95; RMSEA < .06; SRMR < .08; Hu & Bentler, 1999), our model fit these data well, $\chi^2_{(144)} = 4433.792$, $p < .001$; CFI = .941; RMSEA = .056, 95% CI [.055, .058], $p < .001$; SRMR = .065.

Figure 2 reveals that dangerous ($b = 0.760$, 95% CI = [0.668, 0.852]; $p < .001$) and competitive ($b = 0.986$, 95% CI = [0.815, 1.158]; $p < .001$) worldviews were stable across time. Likewise, RWA ($b = 0.919$, 95% CI = [0.880, 0.957]; $p < .001$) and SDO ($b = 0.653$, 95% CI = [0.583, 0.722]; $p < .001$) were stable across our annual assessment. After adjusting for these autoregressive effects, dangerous worldviews had a positive cross-lagged effect on RWA ($b = 0.060$, 95% CI = [0.013, 0.108]; $p = .013$), whereas competitive worldviews were unassociated with RWA ($b = -0.070$, 95% CI = [−0.143, 0.003]; $p = .059$). Conversely, competitive worldviews had a positive cross-lagged effect on SDO ($b = 0.270$, 95% CI = [0.183,

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[8] Because community-level diversity was an L2 variable derived from the New Zealand census (which is conducted every 5 years), we were unable to examine the temporal ordering of community-level diversity on these processes.

Figure 2. Cross-lagged panel model of the relationships between worldviews, RWA, and SDO.

Note. Paths reflect unstandardized coefficients (with 95% confidence intervals in parentheses). The hypothesized model fit these data well, $\chi2(144) = 4433.792$, $p < .001$; CFI = .941; RMSEA = .056, 95% CI [.055, .058], $p < .001$; SRMR = .065. *$p < .05$; **$p < .01$ ***$p < .001$.
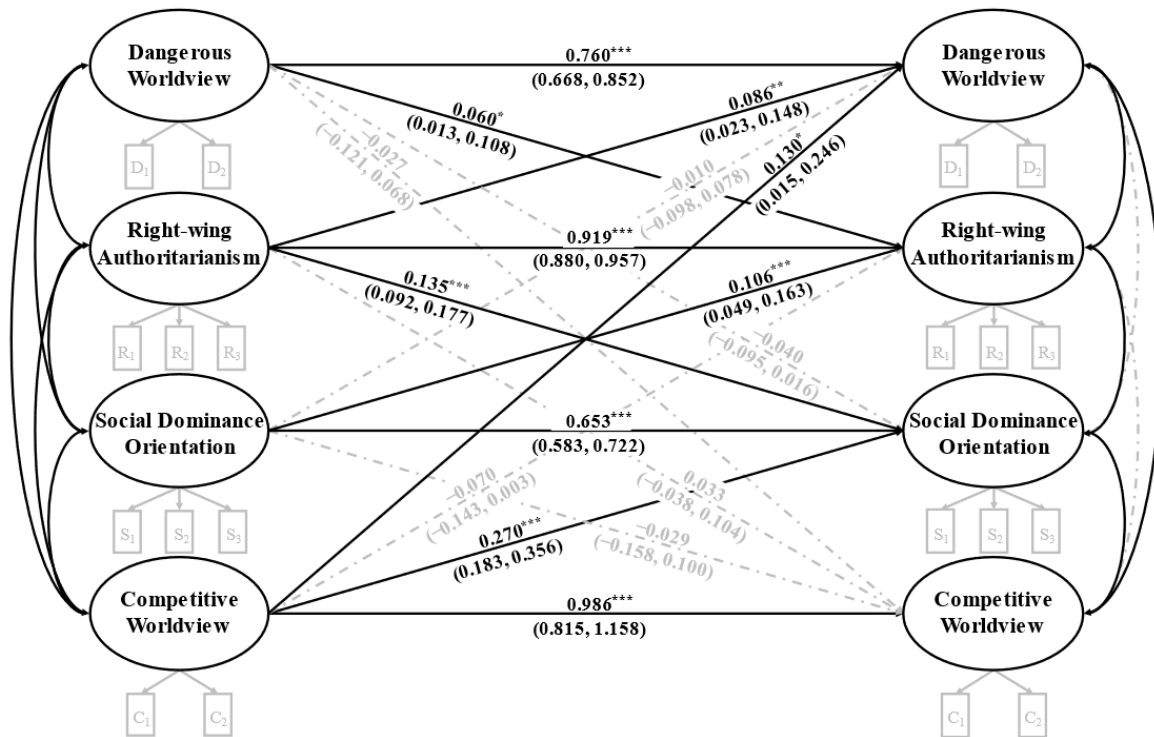
0.356]; $p < .001$), but dangerous worldviews were unassociated with SDO ($b = -0.040$, 95% CI = [−0.095, 0.016]; $p = .164$). These results support our hypotheses and demonstrate that dangerous (but not competitive) worldviews predict increases in RWA over time, whereas competitive (but not dangerous) worldviews predict increases in SDO over time.

Figure 2 also examines the potential reciprocal associations that RWA and SDO have with worldviews. Accordingly, RWA predicted increases in dangerous worldviews ($b = 0.086$, 95% CI = [0.023, 0.148]; $p = .007$), but SDO was unassociated with changes in dangerous worldviews over time ($b = -0.010$, 95% CI = [−0.098, 0.078]; $p = .829$). In contrast, neither SDO ($b = -0.029$, 95% CI = [−0.158, 0.100]; $p = .661$), nor RWA ($b = 0.033$, 95% CI = [−0.038, 0.104]; $p = .363$), were associated with changes in competitive worldviews. Finally, competitive worldviews predicted increases in dangerous worldviews ($b = 0.130$, 95% CI = [0.015, 0.246]; $p = .027$), whereas dangerous worldviews were unassociated with changes in competitive worldviews ($b = -0.027$, 95% CI = [−0.121, 0.068]; $p = .582$). These results indicate that dangerous worldviews and RWA reinforce each other over time, whereas the relationship between worldviews and the preference for group-based hierarchy is unidirectional in that competitive worldviews predict increases in SDO over time (but not vice-versa).

GENERAL DISCUSSION

In two studies, we examined the impact that community-level diversity has on RWA and SDO via worldviews (Study 1) and the longitudinal associations between these worldviews and RWA and SDO (Study 2). Because living in diverse communities should expose majority group members to information that dispels their concerns about

immigration, we predicted in Study 1 that community-level diversity would have negative indirect effects on RWA and SDO via reductions in dangerous and competitive worldviews, respectively. To demonstrate that our results are unique to community-level diversity, we adjusted for community-level unemployment and median household income, as well as the size of the minority population. Study 2 then assessed the cross-lagged effects that dangerous and competitive worldviews have on RWA and SDO using the same sample of participants surveyed again a full year later.

As hypothesised, Study 1 revealed that dangerous and competitive worldviews correlated positively with RWA and SDO (respectively) at the within-level of analysis. Although dangerous worldviews also correlated positively with SDO at the within-level of analysis, this unexpected association was less than a tenth the size of the corresponding hypothesized association between competitive worldviews and SDO. More importantly, community-level diversity correlated negatively with RWA and SDO via dangerous and competitive worldviews (respectively). Study 2 then assessed the cross-lagged effects of worldviews on RWA and SDO, revealing that dangerous worldviews predicted increases in RWA better than did competitive worldviews (which predicted non-significant decreases in RWA), whereas competitive worldviews predicted SDO better than did dangerous worldviews (which predicted non-significant decreases in SDO). Together, these results support recent theorizing that community-level diversity can reduce intergroup conflict (Hewstone, 2015; Pettigrew, 2016; Van Assche, Asbrock, Dhont, et al., 2018).

Our results showing that community-level diversity correlates negatively with both RWA and SDO via dangerous and competitive worldviews (respectively)

corroborate Visintin and colleagues' (2016) findings that ethnic diversity can promote support for multiculturalism. Specifically, Visintin et al. showed that the proportion of Roma living in districts across Bulgaria correlated positively with Bulgarians' support for multiculturalism, but only when a high proportion of Bulgarian Turks also resided in the district. That is, multi-cultural diversity fosters harmonious intergroup attitudes. Our results replicate and extend these findings by showing that the beneficial effects of community-level diversity on intergroup attitudes generalise to declines in RWA and SDO, and by identifying two critical mediators of this process (namely, dangerous and competitive worldviews).

Studies 1 and 2 also increase understanding of the DPM by demonstrating the impact that the macro-level environment has on how people view the world (Study 1), as well as the longitudinal associations these worldviews have with RWA and SDO (Study 2). Although many argue that the context shapes worldviews (e.g., Duckitt, 2001; Duckitt & Fisher, 2003; Osborne et al., 2023; Sibley et al., 2007), multilevel tests of this thesis are rare, with one exception. Sibley and colleagues (2013) analysed independently collected council data and showed that the proportion of immigrants living in a given meshblock—an area unit smaller than the community-level measure used here in Study 1—increased the strength of the negative relationship between dangerous worldviews and pro-immigrant attitudes. We extend this literature by illustrating one of the reasons why community-level diversity correlates with RWA and SDO (namely, diversity in the community correlates negatively with dangerous and competitive worldviews). Study 2 also builds upon the nascent literature examining the longitudinal effects of worldviews to show that dangerous and competitive worldviews precede RWA and SDO, respectively.

Our results showing that community-level diversity may facilitate intergroup harmony also contribute to research on contact theory. Specifically, research has long noted the potential for intergroup contact to reduce prejudice (e.g., see Allport, 1954; Hewstone, 2015; Pettigrew & Tropp, 2006, 2011). Indeed, longitudinal studies show that intergroup contact has negative cross-lagged effects on prejudice (Christ et al., 2014; Dhont et al., 2012; Swart et al., 2011). However, multilevel tests of this hypothesis are rare (for exceptions, see Christ et al., 2014; Pettigrew et al., 2010; Sarrasin et al., 2012; Wagner et al., 2006). Our results suggest that the contact opportunities afforded by living in diverse communities can reduce perceptions of the world as a dangerous and competitive place amongst native-born ethnic majority group members.

Strengths, Limitations, and Future Directions

Although the results from Study 1 are consistent with contact theory, a measure of contact with immigrants was not included in our dataset. The proportion of immigrants living in one's community should, however, increase contact opportunities. Indeed, the diversity of one's local area correlates positively with intergroup contact (Pettigrew et al., 2010; Wagner et al., 2006). For example, Stein and colleagues (2000) found that the proportion of Latinos living in counties in Texas correlated positively with European Americans' reported contact with minorities. Likewise, Brune and colleagues (2016)

showed that the number of Asians living within the immediate community correlated positively with self-reported time spent with Asian friends amongst New Zealand Europeans. Although these results corroborate our argument that community-level diversity facilitates intergroup contact, future research should include measures of contact with immigrants to validate and extend the results from Study 1.

On a related note, although Study 1 identified one set of processes through which community-level diversity reduces bias, other mechanisms could also transmit these effects. Christ and colleagues (2014) showed that positive contact at the community-level decreases intergroup biases by fostering norms of tolerance, irrespective of personal contact. Relatedly, the increased opportunities for contact afforded by community-level diversity may foster intergroup friendships, a key factor that alleviates intergroup conflict (see Pettigrew & Tropp, 2011; Swart et al., 2010). Finally, Schmid and colleagues (2014) found that neighbourhood diversity correlated positively with intergroup contact but correlated negatively with intergroup threat. In turn, intergroup contact and intergroup threat correlated positively and negatively (respectively) with outgroup trust. We contribute to this literature by highlighting another route through which community-level diversity can foster harmony between groups.

Due to limitations of the New Zealand census, Study 1 could only adjust for three between-level variables. Accordingly, other (non-measured) between-level variables could explain our results. For example, conservatism and intergroup bias correlate positively at the individual-level (see Duckitt et al., 2002; Jost et al., 2009). Thus, conservative communities may similarly foster dangerous and competitive worldviews that, in turn, influence RWA and SDO. Community-level norms could also decrease (or increase) intergroup biases in people (see Christ et al., 2014). Future research should consider these (and other) between-level variables when examining the contextual factors that shape individual-level worldviews, RWA, and SDO.

Although Study 2 demonstrated that dangerous and competitive worldviews precede increases in RWA and SDO (respectively), Study 1 is unable to determine if people who are low on dangerous and competitive worldviews seek out diverse communities, or if diverse communities attenuate dangerous and competitive worldviews. Indeed, people who are high (low) in SDO are attracted to—and subsequently pursue—hierarchy-enhancing (hierarchy-attenuating) academic majors (Sidanius et al., 2003) and occupations (Zubielevitch et al., 2022). However, living in diverse communities may nevertheless promote tolerance. Indeed, both experimental (Gaertner et al., 1999; Pettigrew & Tropp, 2006) and longitudinal (Dhont et al., 2012; Pettigrew & Tropp, 2006; Swart et al., 2011; Vezzali et al., 2010) studies demonstrate that contact with outgroups precedes reductions in intergroup bias. Moreover, our between-level data were obtained from the 2013 New Zealand census which concluded before the data collection period

or our individual-level data.[9] Although this methodological point increases confidence that community-level diversity preceded individual-level dangerous and competitive worldviews, some participants may have completed the survey in neighbourhoods that experienced either an increase or decrease in immigration since the 2013 New Zealand census. As such, longitudinal research that follows people as they move into, and out of, neighbourhoods in real time is needed to see if tolerant people are attracted to diverse communities, or if diverse communities foster tolerant residents.

We should also note that increases in ethnic diversity could increase intergroup bias under some conditions. Scheepers and colleagues (2002) found that the proportion of non-European Union (EU) citizens living in 15 EU countries correlated positively with ethnic exclusionism, presumably due to increases in perceived threat. Quillian (1995) also showed that the percentage of immigrants living in European countries correlated positively with prejudice. Finally, Van Assche and colleagues (Van Assche, Asbrock, Dhont, et al., 2018; Van Assche et al., 2014; Van Assche et al., 2019) have shown that the diversity within one's community can facilitate both positive and negative contact, which, in turn, promotes and undermines intergroup tolerance, respectively, particularly among those who are high on authoritarianism (see also Boin et al., 2021). Thus, increases in the diversity of one's community can sometimes elicit intergroup hostility especially amongst those who are pre-disposed to view outgroups with suspicion.

The discrepancy between our findings that the proportion of immigrants living in a community can ultimately lessen RWA and SDO and other studies showing that diversity can elicit intergroup conflict may be due to a few factors. For one, contextual diversity should reduce bias when actual intergroup contact is high (see Laurence et al., 2019; Stein et al., 2000). Accordingly, state- and country-wide measures of diversity may overestimate the extent to which majority group members actually interact with minorities (see also Voss, 1996). Community-level diversity could also have a curvilinear relationship with intergroup attitudes whereby small amounts of diversity reduce intergroup biases, but large influxes of immigration elicit fears about competition and unleash various prejudices: Once the diversity of a neighbourhood exceeds a certain threshold (e.g., 50%), further increases in immigration could inflame fears over danger and competition. Relatedly, the impact of community-level diversity on ethnic majority group members' worldviews may depend on whether the current neighbourhood composition reflects a recent increase or decrease in foreign-born community members. Dramatic and/or rapid changes to the composition of a neighbourhood could also have a different impact than gradual changes in immigration on dangerous and competitive worldviews (cf. Smith et al., 2019). Because the complexity of our multilevel analyses in Study 1 required us to use a static measure of community-level diversity, we were unable to examine these important nuances. Nevertheless, these reflect crucial questions for future research to address.

Given the complexity of multilevel analyses, we focused on the impact community-level diversity has on the motivational antecedents of RWA and SDO. Thus, Study 1 cannot speak directly to the outcomes of the DPM. However, considerable research highlights the consequences of RWA and SDO. For example, RWA and/or SDO correlate positively with prejudice towards various groups including immigrants (Chirumbolo et al., 2016), minorities (Bilewicz et al., 2017) and members of the LGBTQI+ community (Poteat & Mereish, 2012; Whitley, 1999), as well as sexism (Akrami et al., 2011; Austin & Jackson, 2019; Christopher et al., 2013) and racism (Van Hiel & Mervielde, 2005; Van Hiel et al., 2004). RWA and SDO also predict prejudice towards dangerous and threatening groups, respectively (Cohrs & Asbrock, 2009). Finally, longitudinal research reveals that RWA and/or SDO precede increases in generalized prejudice (Asbrock et al., 2010; Bratt et al., 2016; Osborne et al., 2021). Collectively, these studies demonstrate the harmful effects of RWA and SDO on intergroup relations, and further highlight the need to examine the individual and contextual antecedents to these two distinct intergroup attitudes.

Unexpectedly, Study 2 found a reciprocal relationship between dangerous worldviews and RWA. Specifically, dangerous worldviews predicted increases in RWA (as hypothesized) and RWA predicted increases in dangerous worldviews. Although these results do not contradict our thesis that dangerous worldviews foster RWA, the reciprocal associations were similar in magnitude and leave the question about temporal order (which we hypothesized) unanswered. Despite being inconclusive, the autoregressive effects of RWA and SDO were larger than the autoregressive effect of dangerous and competitive worldviews. Thus, there was noticeably more residual variance left to explain in worldviews than in either RWA or SDO. That dangerous worldviews still predicted increases in highly stable levels of RWA a year later illustrates the potential for worldviews to shape RWA. Still, future research should examine more closely the potential for dangerous worldviews and RWA to mutual reinforce each other.

Finally, our results reflect intergroup processes occurring in one nation. Nevertheless, we view this potential limitation as a strength. Indeed, as noted by Sarrasin and colleagues (2012), examining the effects of between-level variables on individual-level outcomes within a country has multiple benefits. Specifically, between-country comparisons conflate cross-national differences in ideological, historical, and institutional variables with differences in levels of diversity— confounds that are not present in analyses that investigate diversity within a nation. Cross-country analyses also overlook variability in the amount of diversity found within a nation. By focusing on communities within a single country, we increase confidence that between-level diversity drives these relationships (rather than the many other differences that invariably exist across nations).

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[9] The 2013 New Zealand census was based on population counts on 5 March 2013, whereas data collection for Time 5 of the NZAVS began 17 September 2013 and concluded 20 October 2014.

Conclusion

Although many have debated the impact that living in diverse communities has on intergroup attitudes, the mechanisms responsible for transmitting these effects to individual-level outcomes have been largely unexamined. We addressed this oversight by assessing the indirect effects of community-level diversity on RWA and SDO via the mechanisms posited by the DPM (Duckitt, 2001). As predicted, Study 1 revealed that community-level diversity had negative indirect effects on RWA and SDO via dangerous and competitive worldviews, respectively,

whereas Study 2 showed that the corresponding worldviews predicted increases in RWA and SDO a year later. These results highlight the impact that socio-structural factors have on psychological variables and elucidate how local environments influence intergroup attitudes. Ultimately, these data conflict with former US President Trump's xenophobic worldview by showing that, rather than bringing danger and competition, the diversity produced by immigration can foster intergroup harmony.

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APPENDIX A

Although Study 1 controlled for multiple community-level variables, individual-level variables could also explain the relationships dangerous and competitive worldviews have with RWA and SDO. Indeed, education correlates negatively (Coenders & Scheepers, 2003; Wagner & Zick, 1995), whereas age correlates positively (Duriez & Van Hiel, 2002; Sarrasin et al., 2012; Zubielevitch et al., 2023), with hostile intergroup attitudes. As such, we re-ran the multilevel structural equation model reported in Study 1 after adjusting for the effects of age and education on RWA and SDO (see Table S1 for the descriptive statistics and bivariate correlations). Specifically, using the measurement model with (partial) metric invariance described in the main manuscript, we regressed the latent variables of RWA and SDO onto both worldviews, education, and age for the within-level component of our model. We also estimated the covariance between worldviews, age, and education, as well as the residual correlation between RWA and SDO. Our between-level model reproduced and extended our within-level model by adding community-level diversity as a predictor of both worldviews, as well as the following between-level covariates: (a) proportion of minorities living in the community, (b) community-level unemployment, and (c) median household income. All four community-level variables were allowed to covary at the between-level of analysis.

Figure S1 provides an overview of our results, $\chi^2_{(93)} = 2715.223$, $p < .001$; comparative fit index (CFI) = .881; root mean square error of approximation (RMSEA) = .051; standardized root mean square residual$_{within}$ (SRMR$_{within}$) = .060; SRMR$_{between}$ = .280. The upper half of Figure S1 reveals that, as hypothesised, dangerous worldviews predicted RWA better than did competitive worldviews ($b = 0.201$, 95% CI = [0.168, 0.234]; $p < .001$ vs. $b = -0.015$, 95% CI = [−0.043, 0.013]; $p = .281$, respectively; $b_{difference} = 0.216$, 95% CI = [0.171, 0.261]; $p < .001$). Conversely, competitive worldviews predicted SDO better than dangerous worldviews ($b = 0.325$, 95% CI = [0.305, 0.344]; $p < .001$ vs. $b = 0.007$, 95% CI = [−0.011, 0.026]; $p = .428$, respectively; $b_{difference} = 0.317$, 95% CI = [0.290, 0.344]; $p < .001$). Notably, these associations emerged after adjusting for the impact of age ($b = 0.010$, 95% CI = [0.008, 0.012]; $p < .001$) and education ($b = −0.045$, 95% CI = [−0.057, −0.033]; $p < .001$) on RWA, as well as the impact of age ($b = 0.008$, 95% CI = [0.006, 0.010]; $p < .001$) and education ($b = −0.030$, 95% CI = [−0.039, −0.022]; $p < .001$) on SDO. After accounting for the effects of both worldviews and our socio-demographic covariates on RWA and SDO, the residual covariance between both outcomes was both positive and significant ($b = 0.105$, 95% CI = [0.075, 0.134]; $p < .001$).

As for our between-level model, the lower half of Figure S1 shows that community-level diversity correlated negatively with dangerous worldviews ($b = −2.088$, 95% CI = [−3.150, −1.025]; $p < .001$). In turn, between-level variability in dangerous worldviews correlated positively with RWA ($b = 0.611$, 95% CI = [0.193, 1.029]; $p = .004$), whereas competitive worldviews were unassociated with community-level RWA ($b = 0.435$, 95% CI = [−0.975, 1.846]; $p = .545$). Consequently, the hypothesised negative specific indirect effect of community-level diversity on RWA via dangerous worldviews was significant ($b_{indirect} = −1.275$, 95% CI = [−2.325, −0.225]; $p = .017$)[10]. Notably, these relationships adjust for the community-level (a) size of the minority population ($b = 0.924$, 95% CI = [0.011, 1.836]; $p = .047$), (b) median household income ($b = −0.504$, 95% CI = [−0.920, −0.087]; $p = .018$), and (c) unemployment ($b = −3.682$, 95% CI = [−10.260, 2.896]; $p = .273$).

The lower half of Figure S1 also reveals that community-level diversity correlated negatively with competitive worldviews ($b = −0.660$, 95% CI = [−1.118, −0.203]; $p = .005$). In turn, there was a marginally significant positive association between competitive worldviews and SDO at the between-level ($b = 1.794$, 95% CI = [−0.096, 3.684]; $p = .063$), whereas dangerous worldviews did not correlate with community-level SDO ($b = −0.054$, 95% CI = [−0.622, 0.514]; $p = .852$). Most importantly, the predicted negative indirect effect of community-level diversity on SDO via competitive worldviews was marginally significant ($b_{indirect} = −1.184$, 95% CI = [−2.456, 0.088]; $p = .068$)[11]. These associations emerged after adjusting for community-level (a) size of the minority population ($b = 0.376$, 95% CI = [0.012, 0.741]; $p = .043$), (b) median household income ($b = −0.081$, 95% CI = [−0.286, 0.124]; $p = .441$), and (c) unemployment ($b = −2.978$, 95% CI = [−6.127, 0.170]; $p = .064$).\

Summary

Despite adding age and education as individual-level covariates, a similar pattern of results emerged across the models presented here and in our manuscript. Indeed, both sets of analyses demonstrated that community-level diversity had negative indirect effects on RWA and SDO via declines in dangerous and competitive worldviews (although the latter indirect effect was only marginally significant). Accordingly, these supplementary analyses increase confidence in our conclusion that community-level diversity has negative indirect effects on RWA and SDO via reductions in dangerous and competitive worldviews.

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[10] The negative specific indirect effect of community-level diversity on RWA via competitive worldviews was not significant, $b_{indirect} = −0.287$, 95% CI = [−1.254, 0.679]; $p = .560$.

[11] The negative specific indirect effect of community-level diversity on SDO via dangerous worldviews was not significant, $b_{indirect} = 0.113$, 95% CI = [−1.074, 1.300]; $p = .852$.

Table S1. Descriptive statistics and bivariate correlations between L1 and L2 variables.

	1	2	3	4	5	6	7	8	9	10
L1 Variables										
1. Age	---									
2. Education	-.129***	---								
3. RWA	.179***	-.219***	---							
4. SDO	.086***	-.170***	.191***	---						
5. Dangerous worldviews	.047***	-.293***	.288***	.125***	---					
6. Competitive worldviews	-.165***	-.167***	.045***	.414***	.200***	---				
L2 Variables										
7. Proportion of minorities	-.036***	.079***	-.063***	-.020*	-.039***	-.028**	---			
8. Unemployment rate	-.028**	.041**	-.039***	-.038***	-.010	-.032***	.748***	---		
9. Median household income[1]	-.069***	.182***	-.123***	-.019*	-.153***	-.028**	.134***	-.192***	---	
10. Community diversity	-.058***	.174***	-.137***	-.037***	-.134***	-.043***	.691***	.316***	.563***	---
Summary Statistics										
Mean	48.81	4.81	3.28	2.35	4.18	3.10	.26	.04	.44	.28
SD	14.16	2.78	1.09	0.88	1.39	1.22	.13	.01	.19	.10
Dispersion	18-94	0-10	1-7	1-7	1-7	1-7	.08-.82	.01-.12	.00-1.00	.09-.53
α	---	---	.691	.739	.432	.457	---	---	---	---
n	11,007	10,868	10,999	10,999	10,694	10,682	11,007	11,007	11,007	11,007
ICC	.024	.052	.062	.046	.043	.007	---	---	---	---

[1] Median household income was rescaled to range from 0 ($31,000) to 1 ($114,000). The mean unscaled community-level median household income was $59,222.66 ($SD = 14,300.18$). * $p < .05$; ** $p < .01$; *** $p < .001$

Figure S1. Multilevel structural equation model in which community-level diversity has a negative indirect effect on right-wing authoritarianism and social dominance orientation via declines in dangerous and competitive worldviews, respectively.
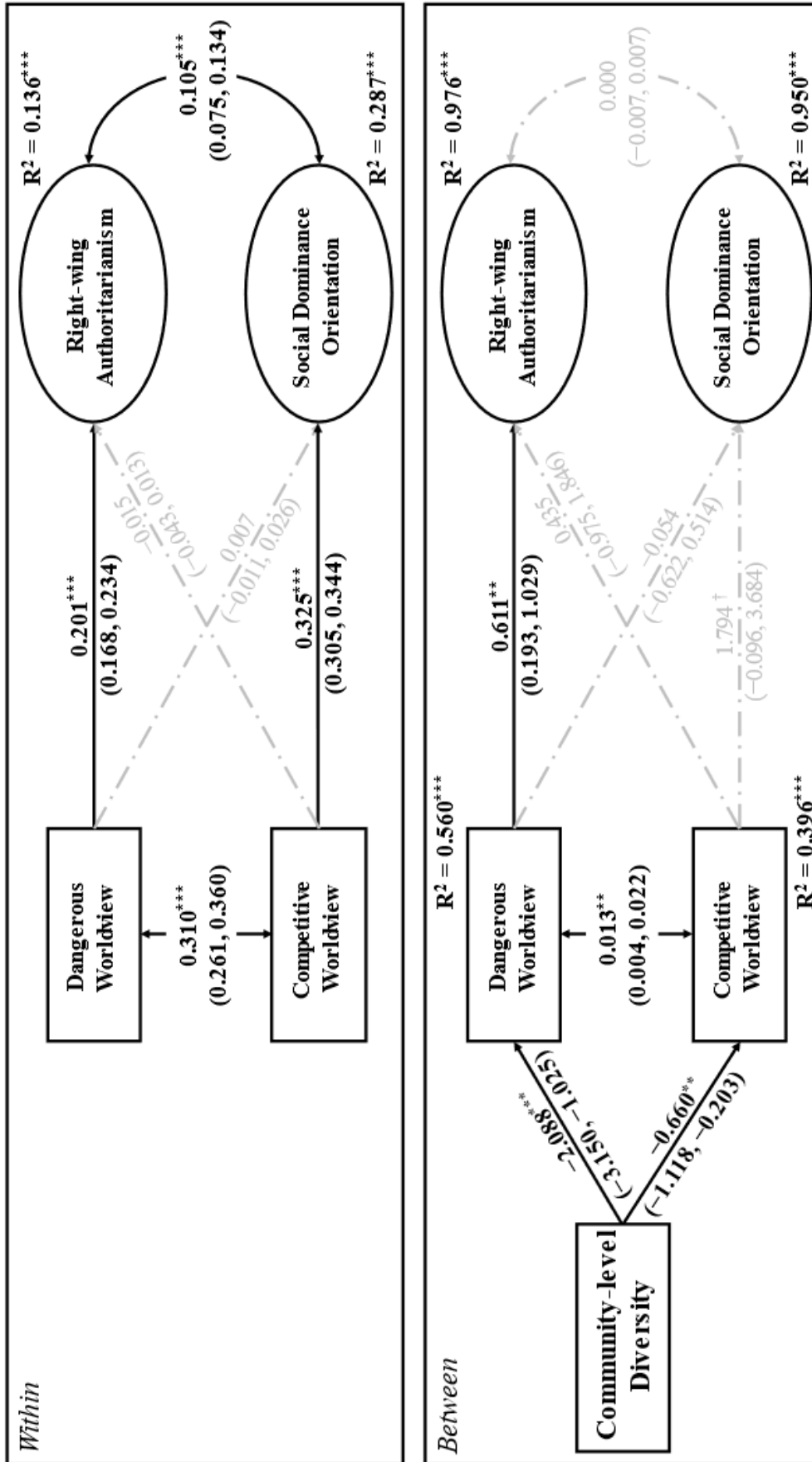
Note. Analyses adjust for community-level (a) proportion of minorities, (b) unemployment, and (c) median household income, as well as participants' age and education (at the within-level of analysis). Paths represent unstandardized regression coefficients (with 95% confidence intervals shown in parentheses). Fit indices for the model were: $\chi^2_{(93)} = 2715.223$, $p < .001$; comparative fit index (CFI) = .881; root mean square error of approximation (RMSEA) = .051; standardized root mean square residual$_{within}$ (SRMR$_{within}$) = .060; SRMR$_{between}$ = .280. $^\dagger p < .10$; $^* p < .05$; $^{**} p < .01$ $^{***} p < .001$.

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APPENDIX B

TITLE:

```
================================================================================
This is the script the following paper:

Community-level diversity decreases right-wing authoritarianism and social dominance orientation by alleviating dangerous
and competitive worldviews: Multilevel and longitudinal tests of the Dual Process Model
================================================================================

DATA: FILE IS MLM Data Extract.txt;

VARIABLE:

IDVARIABLE IS subnum;
MISSING ARE ALL (9999);

NAMES ARE

EthCatT5
BORNNZT5
O_SBORNW
MINORW
UNEMPW
MEDINC
SDO1T5  ! It is OK if some groups have more of a chance in life than others.
SDO2T5  ! Inferior groups should stay in their place.
SDO3T5  ! To get ahead in life, it is sometimes okay to step on other groups.
SDO4RT5         ! We should have increased social equality.
SDO5RT5         ! It would be good if groups could be equal.
SDO6RT5         ! We should do what we can to equalise conditions for different groups.
RWA1T5          ! It is always better to trust the judgment of the proper authorities in government
                ! and religion than to listen to the noisy rabble-rousers in our society who are trying ! to create doubt in
                people's minds.
RWA2T5          ! It would be best for everyone if the proper authorities censored magazines so that
                ! people could not get their hands on trashy and disgusting material.
RWA3T5          ! Our country will be destroyed some day if we do not smash the perversions eating
                ! away at our moral fibre and traditional beliefs.
RWA4rT5         ! People should pay less attention to The Bible and other old traditional forms of
                ! religious guidance, and instead develop their own personal standards of what is
                ! moral and immoral.
RWA5rT5         ! Atheists and others who have rebelled against established religions are no doubt
                ! every bit as good and virtuous as those who attend church regularly.
RWA6rT5         ! Some of the best people in our country are those who are challenging our
                ! government, criticizing religion, and ignoring the "normal way" things are supposed ! to be done.
CmWd1T5         ! It's a dog-eat-dog world where you have to be ruthless at times.
CmWd2rT5        ! Life is not governed by the 'survival of the fittest.' We should let compassion and
                ! moral laws be our guide.
DnWd1T5         ! There are many dangerous people in our society who will attack someone out
                ! of pure meanness, for no reason at all.
DnWd2rT5        ! Despite what one hears about "crime in the street," there probably isn't any more
                ! now than there ever has been.
SUBNUM
WARD13T5;

USEVARIABLE ARE

SDOP1           !2-item parcel of SDO
SDOP2           !2-item parcel of SDO
SDOP3           !2-item parcel of SDO

RWAP1           !2-item parcel of RWA
RWAP2           !2-item parcel of RWA
RWAP3           !2-item parcel of RWA
```

```
CWT5                !2-item competitive world beliefs scale.
DWT5                !2-item dangerous world beliefs scale.

O_SBornW            !1-(Number NZ born divided by total people in ward)

MinorW              !1-(Number of NZ Europeans divided by total people in ward)

UnEmpW              !(Number of people 15 years and over who are unemployed divided by total
                    !people in ward)

MedInc;             !Median household income in ward scaled to range from 0 to 1

USEOBSERVATIONS ARE (EthCatT5 EQ 1 AND BORNNZT5 EQ 1);

CLUSTER = Ward13T5;         !Specifies Urban Area as a Level 2 ID variable in MLM
BETWEEN = O_SbornW MinorW UnEmpW MedInc;

DEFINE:

SDOP1 = MEAN(SDO4RT5 SDO2T5);        !Highest and lowest factor loading
SDOP2 = MEAN(SDO6RT5 SDO3T5);        !Second highest and second lowest factor loading
SDOP3 = MEAN(SDO5RT5 SDO1T5);        !Third highest and third lowest factor loading

RWAP1 = MEAN(RWA2T5 RWA4rT5);        !Highest and lowest factor loading
RWAP2 = MEAN(RWA3T5 RWA5rT5);        !Second highest and second lowest factor loading
RWAP3 = MEAN(RWA1T5 RWA6rT5);        !Third highest and third lowest factor loading

CWT5 = MEAN (CmWd1T5 CmWd2rT5);      !Competitive Worldview
DWT5 = MEAN (DnWd1T5 DnWd2rT5);  !Dangerous Worldview

ANALYSIS:

TYPE = Twolevel;
PROCESSORS = 4;
ESTIMATOR = MLF;
H1Iterations = 4000;

MODEL:

!================================================================================
!============================= START OF L1 MODEL ================================
!================================================================================

%WITHIN%

!================================================================================
!============================START OF MEASUREMENT MODEL==========================
!============================OF HYPOTHESIZED MODEL @ L1==========================
!================================================================================

SDO BY SDOP1
    SDOP2    (F1L2)
    SDOP3    (F1L3);

RWA BY RWAP1
    RWAP2    (F2L2)
    RWAP3    (F2L3);

!================================================================================
!=============================END OF MEASUREMENT MODEL===========================
!============================OF HYPOTHESIZED MODEL @ L1==========================
!================================================================================

!================================================================================
!=================ANALYSES PREDICTING PARTICIPANTS' RWA AND SDO @ L1=============
!================================================================================
```

```
RWA ON DWT5 (W_DWRWA)
    CWT5 (W_CWRWA);

SDO ON CWT5 (W_CWSDO)
    DWT5 (W_DWSDO);


!=================================================================================
!=============================ADDITIONAL MODEL SPECIFICATIONS=====================
!=================================================================================


RWA WITH SDO;        !Estimates the correlation between RWA and SDO @ L1
DWT5 WITH CWT5;      !Estimates the correlation between world views @L1


!=================================================================================
!============================== START OF L2 MODEL ================================
!=================================================================================


%BETWEEN%


!=================================================================================
!==============================START OF MEASUREMENT ==============================
!===========================OF HYPOTHESIZED MODEL @ L2===========================
!=================================================================================


BSDO BY SDOP1
    SDOP2        !(F1L2)    Full metric invariance constraint relaxed due to model misfit
    SDOP3;       !(F1L3)    Full metric invariance constraint relaxed due to model misfit

SDOP1@0;


BRWA BY RWAP1
    RWAP2        (F2L2)
    RWAP3        (F2L3);

RWAP1@0;


!=================================================================================
!==============================END OF MEASUREMENT MODEL==========================
!===========================OF HYPOTHESIZED MODEL @ L2===========================
!=================================================================================


!=================================================================================
!=================ANALYSES PREDICTING PARTICIPANTS' RWA AND SDO @ L2==============
!=================================================================================


BRWA ON DWT5 (B_DWRWA)
    CWT5 (B_CWRWA);

BSDO ON CWT5 (B_DWSDO)
    DWT5 (B_CWSDO);


!=================================================================================
!=============ANALYSES PREDICTING PARTICIPANTS' WORLDVIEWS @ L2===================
!=================================================================================


DWT5 ON O_SBornW (L2b1)
    MinorW
    UnEmpW
    MedInc;

CWT5 ON O_SBornW (L2b2)
    MinorW
    UnEmpW
    MedInc;


!=================================================================================
!=====================ADDITIONAL MODEL SPECIFICATIONS=====================
```

```
!=================================================================================

BRWA WITH BSDO;          !Estimates the correlation between RWA and SDO @ L2
DWT5 WITH CWT5;          !Estimates the correlation between world views @L2
O_SBornW WITH UnEmpW MinorW MedInc;
UnEmpW WITH MinorW MedInc;
MinorW WITH MedInc;


!=================================================================================
!=============================          =================================
!============================= END OF L2 MODEL  =================================
!=============================          =================================
!=================================================================================

MODEL INDIRECT:
BSDO ind O_SBornW;

BRWA ind O_SBornW;

!=================================================================================
!=================================================================================
!============================START OF MODEL CONSTRAINTS=========================
!=================================================================================
!=================================================================================

MODEL CONSTRAINT:

NEW(W_RWA W_SDO B_RWA B_SDO);

W_RWA = (W_DWRWA - W_CWRWA);
B_RWA = (B_DWRWA - B_CWRWA);

W_SDO = (W_CWSDO - W_DWSDO);
B_SDO = (B_CWSDO - B_DWSDO);


!=================================================================================
!=================================================================================
!===========================END OF MODEL CONSTRAINTS=========================
!=================================================================================
!=================================================================================

OUTPUT:

SAMPSTAT CINTERVAL TECH1 STDYX;
```