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Beyond deficit narratives: religious practice, meaning, and resilience in a national sample of New Zealand Muslims

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ABSTRACT

Religious minorities often endure hostility, yet longitudinal data tracking the consequences of such threats are scarce. We report findings from the Muslim Diversity Study (N = 667) housed within the New Zealand Attitudes and Values Study (N = 32,193). Our population-weighted analyses show that New Zealand Muslims exhibit a distinct and devout religious profile. Although no more likely than other New Zealanders to endorse general spirituality (61% vs 63%), New Zealand Muslims report far higher rates of belief in God (92% vs 40%) and dramatically more frequent engagement in costly religious practices, such as worship and prayer. Muslims also report markedly higher religious and ethnic discrimination, with differences concentrated in domains most plausibly linked to Muslim identity rather than age- or gender-based discrimination. At the same time, New Zealand Muslims show broadly comparable health and distress outcomes, with higher meaning in life, neighbourhood cohesion, and self-esteem, and a small trend towards lower generalized social support. These cross-sectional findings are descriptive and motivate the study's core longitudinal aim: to quantify pathways by which religious culture may help sustain resilience under adversity.

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Cooperation; discrimination; health; longitudinal; prejudice; religion; resilience; well-being

Costly religious practices and beliefs are theorized to build group resilience by stabilizing cooperation (Botero et al., 2014; Bulbulia, 2004; Irons, 2001; Schloss & Murray, 2011; Shaver, Power et al., 2020; Sosis & Bressler, 2003). Yet, cohesion theories of religion are seldom tested within minority groups who face the kind of persistent out-group hostility that makes such resilience necessary. Rigorous tests, particularly those with longitudinal data from representative samples, remain scarce. The 15 March 2019 terrorist attacks on two Christchurch mosques starkly underscored this empirical gap in New Zealand. Existing research documents pervasive prejudice against Muslims (J. A. Bulbulia, Afzali et al., 2023; Greaves, Rasheed et al., 2020; Shanaah et al., 2023; Shaver, Sibley et al., 2017; Shaver, Troughton et al., 2016; Sibley, Afzali et al., 2020); however, limited sampling of this minority has left their sources of resilience largely unobserved. To address this gap, we launched the Muslim Diversity Study (MDS), a booster cohort embedded within the nationally representative New Zealand Attitudes and Values Study (NZAVS). The design increases

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Muslim participation from 62 respondents in the Wave 15 NZAVS probability sample to 667 after booster recruitment, nearly tenfold, enabling the first outcome-wide, population-weighted contrasts of a Muslim minority in a Western democracy (Afzali et al., 2025). This article presents the panel's baseline findings, offering a comprehensive snapshot of Muslim life in New Zealand. These data lay the foundation for tracking how communities endure adversity and for quantitatively assessing theories of religious solidarity and resilience. The aim of this paper is descriptive: to provide population-standardized baseline estimates comparing Muslims and non-Muslims across religion, discrimination, and well-being domains. We do not attempt to isolate the causal effects of religiosity or discrimination, nor to identify the "active ingredients" of resilience; instead, we treat these results as a baseline portrait and hypothesis-generating scaffold for longitudinal tests in subsequent panel waves.

1. Method

1.1. Study design and data sources

The New Zealand Attitudes and Values Study (NZAVS) is an ongoing, address-based probability panel that has tracked the attitudes, values, and health of adult New Zealanders (18+ years old) since 2009. The panel is refreshed with replacement draws from the electoral roll. Annual surveys are administered via mixed modes (postal and secure web). To maintain engagement, the NZAVS employs monetary incentives (NZ $500 × 10 prizes) and personalized reminders, achieving approximately 70% wave-to-wave retention. The NZAVS is university-based and operates independently of political or corporate funding. It tends to under-sample males and Asian individuals slightly while over-sampling females and Māori (the indigenous people of New Zealand). To improve representativeness, we apply census-based post-stratification weights adjusting for age, gender, and ethnicity (New Zealand European, Asian, Māori, Pacific) (Sibley, 2023). For more information about the NZAVS, visit: OSF.IO/75SNB. Supplement S1 presents descriptive sample statistics.

1.2. Participants and eligibility

Participants were eligible if they (i) completed the Wave 15 NZAVS questionnaire and (ii) provided a binary response (0 = no; 1 = yes) to the item "*Do you identify with a religion and/or spiritual group?*". In total, 32,193 adults met these criteria (non-Muslims = 31,526; Muslims = 667).

1.3. Muslim diversity study booster cohort

Muslims constitute <2% of the New Zealand population and were historically under-represented in the NZAVS by roughly an order of magnitude (Sibley, 2023). To rectify this, we initiated the *Muslim Diversity Study (MDS)* in June–December 2023 as a dedicated booster cohort using the standard NZAVS Wave 15 instrument (administered in English via postal and secure web modes). For Wave 15 of the study, we expanded the Muslim sample from 62 Muslim respondents in the Wave 15 NZAVS probability sample (pre-booster) to 667 participants after booster recruitment (Afzali et al., 2025). We achieved this using community-based, respondent-driven sampling, augmented with targeted outreach through mosques, university student associations, and cultural organizations. Recruitment focussed on six major urban centres: Auckland, Hamilton, Palmerston North, Wellington, Christchurch, and Dunedin. Eligible participants were New Zealand residents aged 18 or over who self-identified as Muslim. As explained in Afzali et al. (2025), the recruitment of diverse, stigmatized minorities from diverse backgrounds poses considerable challenges, owing to diminished interest and trust. Although the Muslim Diversity Study recruited nearly 1% of New Zealand's Muslim minority, the sample cannot be considered random or representative.

1.4. Outcomes and instruments

We employed an outcome-wide framework for our descriptive analysis of well-being (VanderWeele et al., 2020), categorizing 39 variables into seven domains (religion, discrimination, health, psychological, present-reflective, life-reflective, social). Full item wordings and psychometrics are in Supplement S2: Tables S1, S2, and S3 summarize constructs. Exercise hours were right-skewed and log-transformed before analysis, with predicted means back-transformed for presentation. Details on measures are in S2; see also Sibley (2023). The Wave 15 NZAVS instrument includes many additional constructs (e.g., personality, authoritarianism, political attitudes) collected for other programme aims; we do not analyze them here to maintain a focused baseline portrait of religion, discrimination, and multi-dimensional flourishing.

1.5. Statistical analysis

We quantified Muslim/non-Muslim differences using survey-weighted generalized linear models (GLMs) fitted to multiply imputed data. Item-level missingness was addressed with group-aware multiple imputation using `mice` (20 imputations, predictive mean matching). The imputation model included Muslim identity as a fully observed auxiliary variable that predicted all other variables but was never imputed itself, thereby preserving group-specific missing-data patterns (Zhang et al., 2023). For each completed data set, we built a survey design object containing: (i) calibrated post-stratification weights raked to the 2018 New Zealand census totals and (ii) the analytic variables. We employed a simple survey design that accounts for post-stratification weighting but does not incorporate clustering or stratification adjustments. Survey design objects were created using `survey::svydesign(ids = ~1, weights = ~adjusted_weights)` for each imputed dataset. Although non-probability recruitment and potential selection bias limit causal inference, post-stratification to 2018 census benchmarks enhances the representativeness of population-level between-group (Muslim vs. non-Muslim) contrasts by adjusting for demographic differences between the sample and target population. Effective sample sizes (Kish) based on adjusted weights were 17,168 for non-Muslims ($n = 31,526$) and 456 for Muslims ($n = 667$), so uncertainty in Muslim–non-Muslim contrasts is driven primarily by the smaller Muslim effective sample size. Within each imputed design, we fitted the model:

$$(E[Y_i]) = \beta_0 + \beta_1 \text{Muslim}_i + f(\text{age}_i) + \beta_2 \text{Ethnicity}_i + \beta_3 \text{Male}_i + \beta_4 \text{BornNZ}_i,$$

where $f(\text{age}_i)$ is a natural spline with 4 df. This flexible adjustment was used to accommodate common non-linear age–outcome patterns; (note: substantive conclusions are unchanged under simpler age terms). In R:

```
formula <- "~ muslim + splines::ns(age, df = 4) + eth_cat + male_binary +
born_nz_binary"
```

using `survey::svyglm()`. Continuous outcomes used the Gaussian family with identity link; binary outcomes used the quasibinomial family with logit link to handle potential overdispersion (Lumley, 2004). Standard errors were derived from model-based linearization, accounting for the weighting scheme.

1.6. Population-standardized contrasts

Population-averaged predictions were obtained using:

```
ggeffects::predict_response(
model = svyglm_fit,
terms = Muslim, margin = "empirical",
weights = weights(svy_design)     # explicit post-stratification weights )
```

The `margin = "empirical"` invokes `marginaleffects::avg_predictions()`, predicting under both conditions and averaging with survey weights. This yields standardized marginal means for Muslims ($\hat{\mu}_{1m}$) and non-Muslims ($\hat{\mu}_{0m}$) in imputation `m`. The contrast $\hat{\Delta}_m = \hat{\mu}_{1m} - \hat{\mu}_{0m}$ was pooled across imputations using Rubin's rules (`mitools::MIcombine()`), yielding $\bar{\Delta}$ incorporating sampling and imputation uncertainty (Rubin, 1987).

1.7. Control for multiple testing

To account for multiple testing across our 39 outcomes, we controlled the false discovery rate using the Benjamini-Hochberg procedure ($q = 0.05$). We chose Benjamini-Hochberg because this is an outcome-wide, descriptive analysis with correlated outcomes, so controlling the false discovery rate offers a better balance between multiplicity control and power than the more conservative Bonferroni family-wise error-rate correction. As a sensitivity check, we also examined Bonferroni-adjusted p-values. The principal conclusions were unchanged: the largest differences in religion, religious and ethnic discrimination, meaning, self-esteem, and neighbourhood cohesion remained reliable, whereas several smaller secondary differences, including sleep, exercise, gratitude, subjective health, relationships, and generalized social support, were attenuated. Adjusted confidence intervals reflect the Benjamini-Hochberg correction.

1.8. Software and reproducibility

Analyses used R 4.4.1 (R Core Team, 2025) with `tidyverse` (Wickham et al., 2019). Key packages: `mice` 3.16 (Van Buuren, 2018), `survey` 4.4-2, `ggeffects` 1.3 (Ludecke, 2018), `marginaleffects` 0.20 (Arel-Bundock et al., 2024), and `boilerplate` 1.1.3 (Bulbulia, 2025). Reproducible scripts are archived at OSF: https://osf.io/75snb/files/osfstorage (folder: `025-muslim-diversity-study-baseline-analysis-study`).

2. Results

Adjusted population comparisons between Muslims and non-Muslims are summarized in Table 1; see also data visualizations in S3 and the balanced bootstrap sensitivity analysis in S4. Three main findings emerge from these comparisons.

2.1. Profound religious differences

Muslims exhibit far higher levels of religious belief and practice. Belief in God is more than double that of non-Muslims (92% vs. 40%). Behavioural measures reveal even starker gaps: Muslims attend services nearly seven times as often (5.33 vs. 0.77/month) and pray almost nine times as frequently (19.73 vs. 2.22/week). Religious self-identification is higher by 3.93 points on a 7-point scale.

2.2. Elevated religious and ethnic discrimination

Muslims report considerably higher discrimination. The largest difference across all outcomes was for religious discrimination (+1.49 points). Ethnic discrimination was also elevated (+0.41). No reliable differences emerged for age- or gender-based discrimination. Thus, between-group differences in perceived discrimination were concentrated in domains most plausibly linked to Muslim identity, rather than showing a uniform elevation across all discrimination domains.

Table 1. Muslim vs Non-Muslim Comparative Analysis: Non-Muslim as Reference Group

Domain	Measure	Non-Muslim	Muslim	Δ from Non-Muslim
Religion	Belief in God (%)	40% [39, 41]	92% [88, 96]***	+51%***
	Belief in Spirit (%)	63% [62, 64]	61% [55, 67]	−3%
	Religious Service/month	0.77 [0.71, 0.83]	5.33 [4.26, 6.40]***	+4.56***
	Religious ID	1.69 [1.64, 1.75]	5.62 [5.37, 5.87]***	+3.93***
	Prayer/week	2.22 [2.05, 2.40]	19.73 [17.72, 21.74]***	+17.51***
	Scripture/week	0.88 [0.80, 0.96]	4.66 [3.39, 5.92]***	+3.78***
	Spiritual ID	3.80 [3.76, 3.84]	5.04 [4.80, 5.27]***	+1.23***
Discrim	Age Discrimination	3.20 [3.17, 3.24]	3.39 [3.18, 3.60]	+0.18
	Ethnic Discrimination	2.25 [2.22, 2.28]	2.67 [2.45, 2.88]***	+0.41***
	Gender Discrimination	2.51 [2.48, 2.54]	2.47 [2.28, 2.65]	−0.04
	Religious Discrimination	2.13 [2.10, 2.16]	3.62 [3.41, 3.82]***	+1.49***
Health	Sleep Hours	6.90 [6.88, 6.92]	6.72 [6.55, 6.89]*	−0.18*
	Log Hours Exercise	1.59 [1.57, 1.60]	1.44 [1.32, 1.56]***	−0.15***
	Subjective Health	4.76 [4.73, 4.78]	4.90 [4.76, 5.05]*	+0.14*
Psych	Hlth Fatigue	1.82 [1.80, 1.84]	1.72 [1.60, 1.84]	−0.10
	Anxiety	1.38 [1.36, 1.39]	1.30 [1.19, 1.40]	−0.08
	Depression	0.71 [0.69, 0.72]	0.76 [0.65, 0.86]	+0.05
	Rumination	1.00 [0.98, 1.02]	0.92 [0.79, 1.04]	−0.08
Present	Forgiveness	4.92 [4.89, 4.95]	4.76 [4.56, 4.95]	−0.16
	Perfectionism	3.32 [3.28, 3.35]	3.35 [3.16, 3.54]	+0.04
	Pwb Standard Living	7.16 [7.11, 7.21]	7.01 [6.70, 7.33]	−0.14
	Pwb Your Future Security	5.70 [5.65, 5.76]	5.87 [5.52, 6.22]	+0.17
	Pwb Your Health	6.41 [6.36, 6.46]	6.60 [6.27, 6.93]	+0.19
	Pwb Your Relationships	7.42 [7.37, 7.48]	7.79 [7.47, 8.10]*	+0.36*
	Self Esteem	5.05 [5.02, 5.08]	5.47 [5.31, 5.64]***	+0.43***
Life	Gratitude	5.85 [5.83, 5.87]	5.98 [5.87, 6.09]***	+0.13***
	Life Satisfaction	4.98 [4.96, 5.01]	5.23 [5.09, 5.37]***	+0.24***
	Meaning & Purpose	4.94 [4.91, 4.96]	5.79 [5.63, 5.95]***	+0.85***
	Meaning Sense	5.57 [5.55, 5.60]	6.01 [5.86, 6.15]***	+0.43***
Social	Belong Accept	5.54 [5.51, 5.57]	5.56 [5.38, 5.74]	+0.03
	Belong Beliefs	4.72 [4.69, 4.75]	4.68 [4.48, 4.88]	−0.04
	Belong Routside Reversed	4.84 [4.80, 4.88]	4.92 [4.68, 5.16]	+0.08
	Neighbourhood Community	4.28 [4.24, 4.31]	4.77 [4.53, 5.00]***	+0.49***
	Support	5.86 [5.84, 5.89]	5.70 [5.53, 5.87]	−0.16

Note: Values show estimates with confidence intervals [lower, upper]; confidence levels reflect BH multiple-testing adjustment. Δ = difference from Non-Muslim. Estimates from 20 multiply imputed datasets using Rubin's rule with design-based survey weights. Statistical significance (BH-adjusted p-values): ***$p_adj < 0.01$, *$p_adj < 0.05$. (***) = highly reliable difference, (*) = reliable difference, otherwise no reliable difference. Effective sample sizes (Kish, adjusted_weights): Non-Muslim eff $n = 17168$ ($n = 31526$); Muslim eff $n = 456$ ($n = 667$).

2.3. Psychological and social resources

Despite discrimination, Muslims show a positive well-being profile. No evidence of heightened distress; anxiety, depression, rumination, and fatigue levels are indistinguishable from those of non-Muslims. Muslims report higher subjective health (+0.14) and self-esteem (+0.43), but slightly fewer hours of sleep (−0.18) and lower hours of exercise (−0.15) than non-Muslims. Resilience extends to existential and social domains. The most considerable positive differences were in perceived sense of purpose and meaning (+0.85 for Meaning: Purpose, +0.43 for Meaning: Sense). Muslims also show higher gratitude (+0.13), life satisfaction (+0.24), and perceived neighbourhood community (+0.49). A small trend towards lower generalized social support (−0.16) was also observed, although this difference was modest and less robust than the positive differences in meaning and neighbourhood cohesion.

3. Discussion

At face value, this pattern sits uneasily with deficit-based minority-stress theories, which predict worse health and well-being under persistent discrimination (Paradies, 2006; Pascoe & Smart

Richman, 2009). Our data do not allow a clean test of such theories. They also do not permit a counterfactual estimate of how much better off Muslims would be in a less prejudiced environment. That counterfactual remains entirely plausible. Nothing here should be read as implying that Islamophobia or racism is benign, adaptive, or beneficial. Still, the descriptive pattern motivates a narrower question. If discrimination differences are concentrated in identity-linked domains, why do many well-being outcomes look similar, or even modestly higher? One possibility is resilience, in the ordinary sense of protective resources that partially offset harms. Social identity perspectives, including rejection-identification models, propose that discrimination can strengthen group identification and in-group ties, which may buffer well-being (reviewed in Schmitt et al., 2014). At the same time, reverse directions are also plausible. A strong sense of meaning and purpose may help to support stronger ties. A third possibility is selection bias. Only those Muslims who experience relatively high well-being chose to participate. These possibilities cannot be adjudicated with a single cross-sectional wave. Nevertheless, it is striking that in the stratum of Muslims who chose to participate in the Muslim Diversity Study, multi-dimensional well-being and experiences of religious discrimination co-exist. Before suggesting theoretically motivated grounds for subsequent causal investigations, we must clarify what the Muslim/non-Muslim contrast can and cannot identify from a single set of cross-sectional observations.

3.1. What the Muslim–non-Muslim comparison can and cannot identify

The focal contrast in this paper is between a small religious minority and a large population benchmark. That contrast combines many differences. It includes religious tradition, minority status, migration history, language, and socioeconomic variation, as well as exposure to discrimination. As a result, baseline cross-sectional differences cannot be attributed to any single component. They could reflect religious practice, community selection processes, differential exposure to prejudice, unmeasured confounding, or combinations of these. Our goal is therefore modest. We provide population-standardized descriptive estimates and use them to motivate hypotheses for longitudinal follow-up. First, future waves can test temporal ordering and within-person covariation. For example, do increases in perceived discrimination tend to precede changes in identification, social connection, meaning, or distress? Such analyses can be informative and prognostic, but even longitudinal observations cannot, by themselves, deliver the counterfactual contrasts required to compute causal effects (Hernan & Robins, 2020). Tracking within-person change does not tell us how persons would have changed had they been exposed to different circumstances (Bulbulia, 2024). A second line of inquiry, then, focuses on causality, which stands at the centre of scientific and policy interests. Before we can answer causal questions, however, we must first clearly state them. Such clarity requires stating and describing the target population, the interventions to be contrasted, and the timing of outcome measurement following the interventions of interest (Hernan & Robins, 2020). We have noted that there are many ways in which New Zealand Muslims differ from non-Muslims besides religion. Identifying causality may require contrasts with other religious minorities and with non-religious stigmatized groups, to separate the role of religiosity from the broader ecology of minority status and prejudice. Now that we have described the limits of cross-sectional data – why we cannot do more than suggest pathways for future discovery – we can more responsibly discuss how, within an evolutionary framework, an amplified sense of meaning and purpose may build social cohesion.

3.2. The social-buffer pathway

As readers of this journal are well aware, there is a broad evolutionary consensus that religious cognition and culture have coevolved systems that can support cooperation by making cooperative commitments predictable. For example, costly commitment and signalling accounts propose that religious ritual and piety deter free-riding and strengthen trust within religious groups that share

such practices (Alcorta & Sosis, 2005; Sosis & Alcorta, 2003). If these processes operate, one expects stronger local cohesion and more reliable reciprocal support among co-religionists. Our baseline data are consistent with this possibility. Stronger religiosity corresponds with higher perceived neighbourhood community (+0.49). Neighbourhood cohesion is itself a plausible buffer under adversity (Helliwell & Putnam, 2004). Yet, at the same time, Muslims show a modest tendency towards lower generalized social support (−0.16), and this difference is less robust than the neighbourhood-cohesion contrast. One interpretation is that support is present but more faith-specific, and therefore less likely to manifest as broad, general support, particularly in settings where religious discrimination is manifest. This is an empirical question for later waves. It also points to a sharper measurement agenda, distinguishing support within faith communities from support that generalizes across the wider social network (Putnam, 2000).

3.3. The meaning-buffer pathway

A central premise of rejection–identification theories is that discrimination can strengthen minority identification, and that identification can buffer well-being (reviewed in Schmitt et al., 2014). In the psychology of religion, a complementary proposal is that religious worldviews protect well-being by supplying meaning-making resources. Under adversity, experiences may be reframed within a sacred narrative, preserving purpose and coherence when secular validation is threatened (Park, 2010; VanderWeele, 2017). On this view, discriminatory experiences are not denied. They are interpreted through a system that can sustain identity and self-worth. The baseline pattern we observe aligns with this pathway. Muslims report substantially higher purpose-in-life (+0.85) and higher self-esteem (+0.43). These differences are not evidence of causal effects of religion. They are, however, consistent with models in which shared beliefs and practices support a sense of meaning that stabilizes self-regard under threat. An evolutionary question then follows. Why should natural and cultural selection elaborate costly religious practices and beliefs that enhance well-being indirectly, rather than favouring cheaper routes to positive affect? One answer is that "meaning" is not merely hedonic. It can function as a coordination technology. In risky coordination problems, including classic "stag-hunts," mutual cooperation yields high payoffs but is vulnerable to fear of non-compliance. When trust is low, individuals often retreat to safer, independent strategies, stabilizing less cooperative outcomes even when joint action would benefit all (Binmore, 2008; Bulbulia, 2012; Rubinstein, 1989). In these settings, successful coordination requires shared ends and predictable partners (Skyrms, 2004). Evolutionary accounts propose that public rituals, shared narratives, and rule-governed roles help generate both. They can signal common goals, create common knowledge, and make intentions legible through commitment displays and synchrony (Bulbulia, 2012; Shaver, Troughton et al., 2016). Here, meaning plays a distinct strategic role. Meaning systems can supply intrinsic rewards for norm-consistent action, making cooperation feel obligatory or "right," rather than contingent on short-run extrinsic calculation. By reducing reliance on fragile expectations about a partner's next move, intrinsic motivation can increase willingness to take the cooperative risk. In line with this logic, groups can coordinate more effectively when members sustain cooperation despite uncertainty and heterogeneous beliefs about others' intentions (Gokhale et al., 2022). This coordination account links the meaning-buffer and social-buffer pathways. If religious practice helps generate meaning that motivates cooperative commitment, then meaning is not only a psychological resource. It is also part of the machinery by which groups sustain solidarity under threat. Consistent with this possibility, longitudinal causal modelling in the New Zealand Attitudes and Values Study (NZAVS) estimates modest gains in meaning-purpose and forgiveness with increases in religious service attendance (approximating an intervention that raises attendance to at least monthly, rather than none) (J. Bulbulia, Davis et al., 2024). This pattern suggests a plausible route by which meaning becomes entwined with religious engagement in cross-sectional data. As with the social-buffer pathway, the MDS baseline cannot adjudicate direction. Higher meaning may be a consequence of religious engagement, a cause of it, or both.

Testing the coordination hypothesis will require longitudinal designs that track within-person changes in practice, meaning, and solidarity, alongside changes in perceived discrimination. It will also need explicit estimands that specify the target population, the counterfactual shift in practice or meaning, and the time horizon over which coordination-relevant outcomes should respond.

3.4. Strengths and limitations

This study has several strengths. It uses a large booster sample embedded within a national probability panel, census-weighted estimates, and robust imputation for missing data. These features improve precision and reduce small-sample bias. However, several limitations remain. First, community-based recruitment through mosques, student associations, and cultural organizations may over-represent Muslims who are more engaged, socially connected, and comfortable participating in research. Second, surveys were administered in English. This likely under-represents more marginalized Muslims with lower English proficiency. Post-stratification weights address age, gender, and ethnicity. Still, they cannot remove selection on unobserved traits that may lead to a non-representative section, such as intense adversity or mistrust of scientists. Inferences to the entire population of Muslims in New Zealand from the Muslim Diversity Study data would be unwarranted. Third, we did not conduct measurement invariance tests across Muslims and non-Muslims. For constructed psychosocial measures, invariance testing itself rests on strong assumptions about what it means to measure "the same construct" across groups. In short, evaluating systematic biases from measurement error relies on assumptions rather than tests (Bulbulia, 2024c; VanderWeele, 2022). Here, we assume that the differences reported in this study mostly reflect underlying differences in psychological and cultural conditions. However, this assumption is unverifiable. Readers should exercise caution when interpreting between-group differences at face value; future research should undertake a systematic analysis of the systematic error arising from measurement error (Lash et al., 2020). Fourth, the Muslim sample is much smaller than the non-Muslim benchmark (effective n 456 vs 17,168). Uncertainty in contrasts is driven mainly by the Muslim subgroup. As a robustness test, we report a balanced bootstrap that forces equal group sizes and yields similar inferences (Supplement S4). Finally, as we repeatedly emphasized above, the baseline wave is cross-sectional. It cannot support causal inferences, which are the object of most scientific and policy interests.

3.5. Implications

Methodologically, this study shows how targeted oversampling within an established panel can illuminate the lives of small minority groups, as detailed in Afzali et al. (2025). Substantively, the most direct policy implication is that Islamophobia and racism remain urgent targets for prevention and intervention. The presence of resilience signals community assets, not the absence of harm. It also does not imply that discrimination "balances out" or that it is acceptable. A further practical implication concerns specificity. In our data, differences in perceived discrimination were concentrated in domains plausibly linked to Muslim identity, rather than showing a uniform elevation across identities. This suggests that responses may benefit by directly addressing Islamophobia, rather than generalized prejudice. In parallel, if religious buffering is established, supporting community-led programmes that strengthen protective ties and meaning-making resources may help to buffer harms while broader structural changes take effect. Overall, the inaugural wave of the Muslim Diversity Study portrays a community confronting religious and ethnic prejudice without being defined by deficit. New Zealand Muslims report deep faith, high meaning, robust self-esteem, and strong local cohesion. These assets may contribute to sustained well-being under stress. Whether they do so by building cooperative social capital, by stabilizing meaning and self-worth, through pathways linking these domains, or through other pathways is now a central agenda for the study's longitudinal phase. Crucially, we should not treat these mechanisms as uniquely

Muslim. Costly rituals, credible commitments, and shared meaning systems are widespread human solutions. Cultural evolution has shaped them to support cooperation in groups (Alcorta, 2011; Alcorta & Sosis, 2005; Norenzayan et al., 2016; Park, 2005). In that light, former New Zealand Prime Minister Jacinda Ardern's declaration, "They are us" (Ardern, 2019), is also an analytical proposition. It points to continuity, not exception. By tracing how faith, meaning-making, and local solidarity co-evolve, we may identify resources that support flourishing across the wider social fabric. These baseline results do not overturn minority-stress theory. They instead sharpen questions about when discrimination erodes health, and when culturally evolved resources help hold it steady. More generally, they invite scholars and policy-makers to learn from, rather than only about, one of New Zealand's most stigmatized communities.

Author contributions

UA led MDS data collection and community outreach. JB prepared the models, tables and graphs and wrote the first draft. CS led the New Zealand Attitudes and Values Study data collection, including integrating MDS data. GT, KY, and AR contributed to the interpretation. All authors contributed to the writing of this manuscript.

Disclosure statement

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Ethics statement

The University of Auckland Human Participants Ethics Committee reviews the NZAVS every three years. Our most recent ethics approval statement is as follows: The New Zealand Attitudes and Values Study was approved by the University of Auckland Human Participants Ethics Committee on 26/05/2021 for six years until 26/05/2027, Reference Number UAHPEC22576.

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Data availability statement

The data described in the paper are part of the New Zealand Attitudes and Values Study. NZAVS data are not publicly available because participant consent and ethics approvals restrict open release of potentially identifiable longitudinal survey data. Members of the NZAVS management team and research group hold complete copies of the NZAVS data. A de-identified dataset containing only the variables analyzed in this manuscript is available upon reasonable request from the corresponding author or any member of the NZAVS advisory board for replication or checking of any published study using NZAVS data. The code for the analysis using simulated data can be found at: https://osf.io/75snb/files/osfstorage#: folder: `Supplementary Materials for Review/2025-muslim-diversity-study-baseline-analysis-study`.

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