The Link between Perceived Group Need Support and Thwarting and Personal Wellness: The Moderating Role of Identity Centrality

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Statements and Declarations

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Highlights and implications

- Individuals who perceive their group as supported by societal conditions experienced greater personal well-being through enhanced personal need satisfaction. In contrast, those who perceive their group as thwarted report higher levels of ill-being due to increased personal need frustration.
- Individuals with a stronger sense of group identity can be more sensitive to the benefits and costs of perceived group need conditions in some contexts.
- This research expands the Self-Determination Theory framework by identifying new determinants of personal need satisfaction while also reinforcing longstanding perspectives in Social Identity Theory regarding the role of group identification in individual well-being.

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Abstract

Objective. With a growing emphasis on making societies more inclusive, the present study examines how people's perceptions of whether their society provides basic psychological need support or thwarting to their group relate to group members' well-being and ill-being depending on to the extent to which group membership is central to their identity.

Method. Participants were Australians (N = 1994, M_{age} = 42.15, 51% female) and Americans (N = 1693, M_{age} = 41.48, 79.1% female) who self-described as members of either an ethnic, religious, political, or sexual orientation group.

Results. In both studies, perceived group need support (versus thwarting) statistically significantly influenced individual well-being (versus ill-being) through basic psychological need satisfaction (versus frustration), an effect that was magnified for sexuality-oriented and political groups in Study 2 when group identity was more central to self-concept.

Conclusions. These results highlight how societal conditions at the group level influence the fulfillment of personal basic psychological needs, illustrating the importance of group identification for individual well-being.

Keywords: *group need support, group need thwarting, basic psychological needs, self-determination theory; identity*

Over the past few decades, there has been a global trend towards recognizing and upholding the rights and freedoms of various social groups, including those that historically have been oppressed and stigmatized (Franck, 2001; Solomon, 2012). This shift towards greater inclusivity and freedoms is believed to enhance opportunities for individuals identifying with these marginalized groups to meet their basic psychological needs for autonomy, competence, and relatedness (Ryan & Deci, 2017). Indeed, *Self-Determination Theory* (SDT; Ryan & Deci, 2017) proposes that individuals thrive when they are free to pursue identities that resonate with their intrinsic values and when they perceive societal tolerance for expressing these identities (Legate et al., 2013). For instance, the legal recognition of rights for the LGBTQ+ community was found to significantly enhance the well-being of its members by providing opportunities to be authentic and to be included in society, conditions that refer to group autonomy and relatedness support (e.g., Kachanoff et al., 2019).

Despite the wealth of evidence in SDT documenting how interpersonal environments shape individuals' need-based functioning, research has insufficiently considered how macro-level, societal conditions are thought to support or thwart groups with which individuals identify. This represents a critical gap, as people's basic psychological needs are not only shaped interpersonally, but also through their embeddedness in broader social systems and their perception of how society treats the groups to which they belong. In pluralistic and increasingly polarized societies, group-based perceptions of inclusion, exclusion, empowerment, or marginalization are likely to be psychologically consequential. If a group is seen as being structurally excluded, its members may internalize this as a denial of autonomy, belonging, or efficacy, even in the absence of direct personal discrimination. Therefore, we aim to approach these dynamics from a theoretical perspective, focusing on the extent to which individuals

perceive their group to be supported by broader societal conditions in meeting its basic psychological needs (referred to here as *perceived group need support*) or, conversely, perceive their group as being actively obstructed or undermined in fulfilling these needs (i.e., *perceived group need thwarting*), topics that have received limited empirical attention to date.

In doing this, we draw on both SDT and Social Identity Theory (SIT; Tajfel, 1978) to examine whether the satisfaction and frustration of one's basic psychological needs can help explain the link between perceived group need support and thwarting and individuals' personal well-being and ill-being, referring to broad indicators of one's psychological functioning, such as feelings of vitality and depressive symptoms, respectively. First, we examine whether perceiving supportive and thwarting conditions for one's group affects people's personal well-being and ill-being via satisfaction and frustration of one's personal basic psychological needs. Second, we test the hypothesis that individuals for whom a specific group membership is more central to their self-concept (i.e., referred to as *identity centrality*) are more sensitive to the personal psychological consequences of perceived group need support and thwarting. These effects are examined in two samples (i.e., Australia, United States) and across four social groups (i.e., religious, ethnic, political, and sexual orientation).

Basic Psychological Needs as Antecedents of Well- and Ill-being

SDT posits that the basic psychological needs for autonomy, competence, and relatedness are essential for human flourishing, personal growth, and mental well-being (Ryan & Deci, 2017; Ryan & Vansteenkiste, 2023). The need for *autonomy* refers to the need to feel self-determined, authentic, and volitional, experiencing psychological freedom in one's actions. *Competence* involves the need to feel effective, masterful, and capable. *Relatedness* refers to the need for experiencing belonging and close relationships with important others. Although these needs are

interrelated, each uniquely contributes to an individual's flourishing and personal growth, a finding being confirmed through decades of research across diverse cultures and domains (Chen et al., 2015; Chirkov et al., 2003; Deci & Ryan, 2000; Vansteenkiste et al., 2010). Indeed, when individuals feel their needs are satisfied, they exhibit higher levels of intrinsic motivation, vitality, and life satisfaction (Slemp et al., 2024). In contrast, when these needs are frustrated, manifested as feelings of being controlled, failing, or experiencing cold and distant relationships, it results into higher levels of maladaptive functioning, including symptoms of anxiety, depression and disengagement (Bartholomew et al., 2011; Ryan et al. 2016).

Basic psychological need satisfaction and frustration are subject to variation by social contexts, as different environments more or less support or obstruct need satisfaction. To illustrate, teachers who explain the rationale behind tasks, listen to students' concerns, and allow them some degree of choice in their learning process are experienced by students as autonomy supportive (Reeve et al, 2023). Competence support involves the offering of positive feedback, opportunities for skill development, and optimal challenges that match the individual's abilities. When a coach provides constructive feedback and sets achievable goals, it helps athletes to feel more competent (Amorose & Anderson-Butcher, 2007). When one creates warm, caring, and connected relationships, it supports one's need for relatedness. For instance, relatives, colleagues, and friends who show genuine interest and support for each other foster relatedness (LaGuardia et al., 2000; Slemp et al., 2024).

Need thwarting contexts refer to the social and environmental conditions that obstruct one's needs. Thwarting one's autonomy involves controlling and pressuring behaviors that undermine an individual's sense of volition and choice, embodied by behaviors like micromanaging, imposing strict rules without explanation, and using threats or punishments to

motivate behavior (Slemp et al., 2017). Competence can be thwarted when individuals face environments that consistently provide negative feedback, overly challenging tasks, or lack of opportunities for skill development (Fong et. al., 2024). For example, a student who receives constant criticism without constructive feedback may feel incompetent and disengaged from learning (Bartholomew et al., 2011). Contexts characterized by cold, distant, or rejecting relationships are known to thwart one's need for relatedness. For instance, a workplace with a toxic culture where colleagues are hostile or indifferent can lead to feelings of social alienation (e.g., Trepanier, Fernet & Austin, 2016).

In general, the literature on supportive and thwarting conditions of the basic psychological needs has tended to focus on proximal interpersonal relationships (e.g., parents, teachers, managers, coaches, etc.). However, this interpersonal focus overlooks the fact that people live in broader social contexts, including as members of groups with which they identify, and that people may perceive certain social conditions as affecting whole groups rather than individuals. It is therefore important to consider the role played by people's perceptions of group-oriented conditions and the extent to which those perceptions, affect one's personal psychological functioning (Taylor et al., 1990).

Need-Supportive and Need-Thwarting Conditions Oriented to Groups

To capture people's experience of social conditions at the group level, we assess people's perceptions of *group need supportive* and *group need thwarting* conditions. For example, *group autonomy support* would be bolstered by perceiving societal conditions in which one's group is allowed to freely express its values, beliefs and identities, whereas the thwarting alternative would be fostered when groups are seen as being prevented from organizing and expressing their identities (Bradshaw et al., under review). Supporting *group competence* could be afforded when

groups are seen as being provided with opportunities to achieve their aims and goals, whereas thwarting concerns perceptions of obstacles and barriers being applied to the group (Shapiro & Neuberg, 2007). *Group relatedness* might be facilitated via the promotion of positive intergroup relations and the reduction of discrimination and social exclusion (Legault et al., 2009).

There is preliminary evidence that group need conditions affect the personal functioning of group members. For instance, Schmitt et al. (2014) showed that perceiving one's group as a target of discrimination negatively affects one's personal self-esteem (Leary et al., 1995). As more direct evidence in relation to SDT variables, Kachanoff et al. (2019) showed that individuals feel more personally frustrated in their autonomy when they perceived their national, ethnic, or racial identity group as unable to express its culture, which represents a perceived thwarting of group autonomy. This finding holds true across both individualistic and collectivistic cultures and similar results were found for members of the LGBTQ+ community (Kachanoff et al., 2020). For competence and relatedness, direct evidence is lacking, and thus we expand this idea of group need conditions to all three needs in the current study.

The Moderating Role of Identity Centrality

Defining what constitutes 'a group' is essential for this research. Rather than focusing on groups determined by a registered membership (e.g., a class, a sports team), we concentrate herein on collective identities, a topic that is central to SIT (Horsney, 2008; Tajfel & Turner, 1979). A *collective identity* refers to a shared sense of belonging to a group which is, in turn, characterized by common values, beliefs, and norms that are integral to the members' self-concept (Snow, 2001). Such a collective identity is derived from membership in social groups (Tajfel & Turner, 1986). For instance, a political social group forms around shared ideologies and beliefs, while an ethnic group is defined by shared cultural traits, language, ancestry, and

sometimes nationality. Then, individuals who identify with these beliefs and values embody to some extend the corresponding political or ethnic identity. Research suggests that identifying with social groups can be robustly associated with greater psychological need satisfaction (e.g., Greenaway et al., 2016). Indeed, identity-based behaviors may "feel right" because people integrate them into their self-concept, meeting the needs to feel authentic, capable and related (Haslam et al., 2009; Usborne & Taylor, 2010).

Some studies have, however, shown that the impact of group need conditions on well-being might differ as a function of *identity centrality*, or the relative importance an individual ascribes to a collective identity (Stryker & Serpe, 1994). Higher identity centrality means that the collective identity is more central to one's self-definition, potentially making the individual more sensitive to how their group is treated in society (Settles, 2004). That is, identity centrality may moderate the impact of perceived social conditions on psychological outcomes. For example, when people perceive their group as being thwarted in its autonomy, competence or relatedness, they may experience greater personal need frustration and, thereby, more ill-being (Leach et al., 2008). Conversely, in contexts where groups are supported in their basic psychological needs, individuals' who more strongly identify with those groups (i.e., those with higher identity centrality) may experience higher wellness via less personal need frustration and more personal need satisfaction. This dynamic underscore the potential importance of considering identity centrality when examining the links between perceptions of societal conditions for groups on people's personal well-being.

The Present Study

While preliminary studies (e.g., Thomas et al., 2017) have demonstrated links between group-based need experiences and individual need frustration, these studies have focused

primarily on the role of autonomy. Our research aims to meaningfully extend this emerging evidence in three important ways. First, we broaden the focus to include all three basic psychological needs (i.e., autonomy, competence, and relatedness) providing a more holistic test of SDT mechanisms. Second, we introduce and test a novel instrument that operationalizes perceived group-level need support and thwarting, allowing future research to systematically assess this dimension. Third, we examine the moderating role of identity centrality, and whether centrality captures who is most affected by group-level societal perceptions. Together, the current research contributes a more nuanced, empirically grounded framework for understanding how the perceived social conditions for a group with which one identifies translate into individual wellness or ill-being through need-based mechanisms.

First, we hypothesize that group need supportive conditions will be linked positively to personal need satisfaction and well-being (Hypothesis 1A), while group need thwarting will be positively associated with personal need frustration and ill-being (H1B). Personal need satisfaction/frustration is expected to account for these relationships, with indirect effects from group need support to well-being (H1C) and from group need thwarting to ill-being (H1D). We also expect the effects of group need support/thwarting to be stronger for individuals with higher identity centrality (H2). Figure 1 provides an overview of these hypotheses.

We investigated our hypotheses in Australian (Study 1) and American (Study 2) samples, focusing on ethnic, religious, political, and sexual orientation groups. These groups were selected due to their strong collective identities and societal challenges, such as discrimination faced by non-heteronormative orientations (Herek, 2009), political polarization and persecution (Jost et al., 2003), ethnic discrimination and cultural assimilation pressures (Portes & Rumbaut, 2001), and religious discrimination in areas of intolerance (Hodge, 2007). Similar tensions were present

in a variety of countries during this period, though we sought to examine the associations of interest in American and Australia for convenience.

Study 1

Methods

Sample and Procedure

Data for Study 1 was collected online in Australia by a professional survey platform, Qualtrics. At the time of data collection (2018), Australia was experiencing political instability under Prime Minister Malcolm Turnbull's leadership, with growing internal tensions within the Liberal Party. Culturally, debates around immigration, Indigenous rights, and same-sex marriage (legalized in 2017) were still prominent in public discourse.

Participants were informed via the study's information letter that the research was interested in surveying individuals who identified with one of four social group categories: religious group, political group, ethnic minority, or sexual minority. The sheet stated: "If you don't identify with any of these groups, this research may not be relevant to you." However, identification with a group did not automatically determine inclusion or exclusion. After selecting one of the four categories, participants manually entered the specific groups with which they identified. To ensure conceptual validity, the qualitative responses were screened to exclude participants who entered phrases like "I am not a member of any group" or "None".

Of the four social group categories, participants could select only the one with which they most identified. These categories were intentionally broad and not limited to specific minority or marginalized groups. For the sexual and ethnic minority groups, the perception of minority was subjective (i.e., no groups were specified). For example, a heterosexual or White participant could select the sexual minority or ethnic minority groups if they considered that dimension of

identity central to their self-concept. Their perception of minority status was implied by their selection of the category, regardless of the specific sexual or ethnic group.

After selecting their group category and providing demographic information (age, gender, education), participants completed two randomized blocks of questions, including one assessing group-based need experiences, and one assessing individual needs and well-being. The two blocks were also presented randomly.

Of the initial 4991 participants, 2997 (60%) were excluded based on the screening criteria described above (e.g., having selected none of the four categories or having selected a category but qualitatively described not belonging to any group), resulting in a final sample of 1994 participants (40%). Among this final sample, 19.4% identified with a sexual minority group, 23.8% with an ethnic minority group, 19.0% with a political group, and 37.8% with a religious group. The average age was 42.15 years, with a roughly equal gender distribution, including a small number identifying as non-binary, third gender, or unspecified. Educational attainment varied, with most participants having completed secondary education (year 12). Additional sample characteristics are reported in Table 1S.

Informed consent covered participation, withdrawal rights, survey duration (10-15 minutes), and data use for research and publication. Due to the exploratory nature of the internal and predictive validation of the group need support and thwarting constructs, this research was not preregistered with specific hypotheses. Data and syntax are available on the Open Science Framework (osf.io/j4cka). This research was reviewed and approved by the ethical committee of the Australian Catholic University under approval number 2018-114E.

Materials

Group Need Support Versus Thwarting. We developed a 30-item survey to assess participants' perceptions of their group's need support and thwarting across autonomy, competence, and relatedness (e.g., "My group is free to live according to our beliefs"). Participants rated their experiences on a scale from 1 ("Not true at all") to 10 ("Completely true"). Since these items were new, we conducted both exploratory and confirmatory factor analyses, supporting two- and six-factor models (see Supplementary Materials). The final aggregated scores for group need support ($\alpha = .94$) and thwarting ($\alpha = .93$) demonstrated strong internal consistency.

Personal Need Satisfaction versus Frustration. Basic psychological need satisfaction and frustration were measured using the 24-item Basic Psychological Need Satisfaction and Frustration Scale (Chen et al., 2015), which assesses autonomy (e.g., "I feel a sense of choice and freedom in the things I undertake"), competence (e.g., "I feel confident that I can do things well."), and relatedness (e.g., "I feel that the people I care about also care about me.") with four items each.

Internal consistencies were acceptable: autonomy satisfaction ($\alpha = .84$), autonomy frustration ($\alpha = .84$), competence satisfaction ($\alpha = .86$), competence frustration ($\alpha = .81$), relatedness satisfaction ($\alpha = .89$), and relatedness frustration ($\alpha = .85$). A higher-order structure yielded composite scores for need satisfaction ($\alpha = .92$) and frustration ($\alpha = .93$). Participants rated their experiences on a Likert scale from 1 ("Not true at all") to 10 ("Completely true").

Identity Centrality. Identity centrality was measured using items adapted from the Cultural Identity Scale (Kuroda et al., 2017), where participants rated their experiences with their identified group (e.g., "How involved are you in group activities?") on a scale from 1 ("Not at all") to 10 ("Very much so"). The scale showed high reliability ($\alpha = .93$).

Well-Being. Well-being was measured using two scales. The first, the Scale of General Wellbeing (Longo et al., 2018), had 14 items (e.g., "I feel energetic") rated on a Likert scale from 1 ("Not at all true") to 10 ("Very true"), with high internal consistency (α = .96). The second was the Personal Well-being Index (Cummins, 2013), where participants rated satisfaction with eight life domains (e.g., standard of living, health) on the same 1–10 scale, also showing good reliability (α = .89).

Depressive symptoms. Depressive symptoms were assessed with the *Center for Epidemiologic Studies Depression Scale Revised* scale (CESD-R-10; Miller et al., 2008), where participants rated how often they experienced feelings or behaviors (e.g., "felt depressed", "everything was an effort") in the past week on a scale from 1 ("Rarely") to 10 ("All the time"). Internal consistency was acceptable (α = .82).

Plan of Analysis

Missing values ranged from 0.09% to 1.59% among the study variables, being not Missing Completely At Random (Little's MCAR test: $\chi^2(233) = 4829$, $p < .001$). Two patterns emerged: participants with missing values on both well-being variables and perceived group need conditions and identity centrality, or solely on values of depression. Using a Kruskal Wallis test (for continuous predictors) and a chi-squared test (for categorical predictors), we found support for MAR (i.e., Missing At Random) as missing values on well-being outcomes were predicted by higher scores on personal need frustration. Given the low percentage of missing values (<10%), multiple imputation was deemed unnecessary (Newman, 2014).

Preliminary analyses were done to examine the unique predictive role of the sociodemographic variables (i.e., age, gender, education level, described group) on the current study variables using Multivariate Analysis of Covariance (MANCOVA) with Wilks' lambda Λ

and univariate analyses (ANOVA) to check on which of the study variables which sociodemographic variable had a statistically significant effect. For categorical variables with more than two levels, Tukey post-hoc analyses were performed for interpretation. In addition to the study variables, age, as a continuous variable, is included in a Pearson correlation matrix.

To examine the indirect effect of both personal need satisfaction and frustration in the association of group need support and thwarting with the current set of outcomes (Hypotheses 1a -1d), a structural equation model (SEM) was constructed using the 'lavaan' package (Rosseel, 2022) in R. All primary continuous variables in the model (i.e., group need support, group need thwarting, personal need satisfaction, personal need frustration, and well-being/ill-being outcomes) were modeled as latent constructs. Each latent variable was estimated using multiple observed indicators corresponding to the validated multi-item scales used in the survey. Covariates were modeled as observed variables.

The goodness of fit for these models was evaluated using the Root-Mean-Square Error of Approximation (RMSEA), the Standardized Root Mean Square Residual (SRMR), and the Comparative Fit Index (CFI). A combination of an RMSEA below 0.06, an SRMR value below 0.09, and a CFI of at least 0.90 indicated a good model fit (Kline, 2015). The output visualizes the model including standardized coefficients and significance asteriks, including both the coefficients of the total effects (in brackets) and direct effects. Indirect effects are described in the text.

The moderating effect of identity centrality on the association between perceived group need support/thwarting and individual need satisfaction/frustration (Hypothesis 2) is analyzed using linear regression models, thereby controlling for sociodemographic variables and standardizing continuous predictors. The model outputs include standardized regression

coefficients, *p*-values for statistical significance, and partial eta-squared values (η^2_p) for practical significance (Richardson, 2011). Effect sizes in these models are interpreted as small ($\eta^2_p >$ .0099), medium ($\eta^2_p >$ .0588), and large ($\eta^2_p >$ .1379) (Cohen, 1969). We also report the Variance Inflation Factor (VIF) as an indicator of multicollinearity (with VIF > 4 indicating concern) and the R^2 to represent the proportion of explained variance in the outcome.

The same procedure is used to examine the extent to which the interaction effect of identity centrality differed across the four identity groups. For interpretation, we do not present the output in a table but only report the F-test (with *p*-values and η^2_p) of the three-way interaction effect, indicating its (respectively statistical and practical) significance in explaining variance in the outcome. When significant, indicating that the two-way interaction effect of centrality differs across groups, we visualize these group-specific interaction effects separately.

Results

Preliminary Analyses

MANCOVAs showed statistically significant multivariate effects for age (Λ = .83, F(1, 1849) = 49.86, p<.001), gender (Λ = .97, F(2, 1849) = 3.80, p<.001), education (Λ = .93, F(1, 1849) = 3.97, p<.001), and group (Λ = .92, F(3, 1849) = 6.70, p<.001). Univariate analyses revealed that females perceived higher group need thwarting, while males reported better general and personal well-being and lower depressive symptoms. The 'other' category reported lower well-being and higher depression (Table 3S). For groups, Table 1 shows that the religious group reported the highest levels of group need support, personal need satisfaction, identity centrality, and well-being, along with the lowest group need thwarting, personal need frustration, and depression. Conversely, the sexual orientation group reported the lowest well-being and highest

need thwarting, frustration, and depression, while the ethnic and political groups fall in between across most variables.

Pearson correlations in Table 2 show that older participants reported less group need thwarting, personal need frustration, and ill-being, while experiencing more group need support, personal need satisfaction, identity centrality, and general well-being. Higher education is positively correlated with personal and general well-being.

Additionally, Table 2 shows that group need support correlates positively with personal need satisfaction, identity centrality, and well-being (i.e., general and personal), and negatively with group need thwarting and personal need frustration. Group need thwarting correlates positively with personal need frustration and ill-being, while also moderately linking to personal need satisfaction and well-being. Personal need satisfaction is positively related to identity centrality and well-being, whereas personal need frustration is negatively correlated with well-being and positively associated with ill-being.

The Role of Personal Need Satisfaction and Frustration in the Link between Group Need Support and Thwarting and Personal Well- and Ill-being

Total effects of the SEM in Figure 2, having an acceptable fit (see Figure 2), demonstrated a unique predictive role of group need support in predicting well-being outcomes, whereas group need thwarting was related to ill-being. Including personal need satisfaction and frustration rendered two direct effects non-significant, except for group need support predicting general well-being and personal well-being. Here, indirect effects showed group need support being strongly related to personal need satisfaction, which was positively associated with general ($\beta = .29$, $p < .001$) and personal well-being ($\beta = .21$, $p < .001$). In turn, group need thwarting had

a statistically significant indirect effect on ill-being (β = .27, $p < .001$) and general well-being (β = .11, $p = .01$) via personal need frustration.

The Moderating Role of Identity Centrality

Linear regression results (Table 3) revealed significant main effects. Both group need support and identity centrality were uniquely associated with greater personal need satisfaction and lower personal need frustration. Additionally, group need thwarting was positively related to personal need frustration. No significant interaction effects were observed.

The Moderating Role of Identity Centrality Across Social Groups

In the previous set of analyses, we controlled for differences between described social groups. Now, we aim to explore the extent to which the expected moderating effect of identity centrality differs among these groups. We performed a linear regression model including two three-way interaction effects (centrality × described group) for both group need support and group need thwarting. The ANOVA results indicated no statistically significant effect in predicting personal need satisfaction ($F_{support}(3, 1872) = 2.47$, $p = .09$, $\eta^2_p = .00$; $F_{thwarting}(3, 1872) = 1.44$, $p = .23$, $\eta^2_p = .00$) and personal need frustration ($F_{support}(3, 1872) = 1.97$, $p = .14$, $\eta^2_p = .00$; $F_{thwarting}(3, 1872) = 0.67$, $p = .57$, $\eta^2_p = .00$). These findings suggest that the three-way interaction effects do not significantly contribute to explaining the variance in the outcomes.

Brief Discussion

The results of this initial study largely supported our hypotheses that perceptions of group need support (vs. thwarting) would positively predict individual wellness. This effect was not moderated by the strength of the individual's group identity. The results also pointed to the benefits, highlighted within SIT, of feeling identified with socially accepted groups. For example, those strongly identifying with their religion largely perceived societal support for their

group, and this was associated with gains in personal wellness. Conversely, members of the sexual-orientation group reported less group need support and more thwarting, which was associated with negative effects. Although there are some limitations to this evidence (to be detailed in the General Discussion), these results suggested general support for the model in Figure 1. Thus, in Study 2, we aimed to extend confidence in this model via replication.

Study 2

Methods

Sample and Procedure

The procedure of Study 2 mirrored Study 1, but targeted USA citizens. In November 2018, the USA held midterm elections that resulted in a divided Congress, with Democrats gaining control of the House and Republicans retaining the Senate. The political climate was highly polarized, with intense debates on immigration, healthcare, and Trump administration policies.

Participants were informed via the information sheet that the study focused on four group categories (i.e., religious, political, ethnic minority, or sexual minority) and may not be relevant if they did not identify with any of them. To assess participant suitability, the questionnaire began with a screening question asking whether participants identified with a group from one of these categories. Of the 3273 individuals who began the questionnaire, 1730 participants (53.0%) answered "Yes" to this question. Those who answered "No" were screened out of the study. Another 37 (2%) participants selected a group but mentioned qualitatively that they do not belong to one of these groups. In the final sample (N = 1693), 22.7% identified as members of a sexual minority group, 17.5% as members of an ethnic minority group, 16.8% as part of a political group, and 43% as part of a religious group. This sample was predominantly female,

had a mean age of 41.48 years (range 18–86), and most participants had completed a year 12 education or equivalent. The social groups were fairly balanced, with the majority identifying with a religious orientation. Detailed sample information can be found in Table 1S. This research was reviewed and approved by the ethical committee of the Australian Catholic University under approval number 2018-114E.

Materials

The same set of instruments as in Study 1 was used, showing an acceptable internal consistency for personal need satisfaction (α = .90), personal need frustration (α = .92), general well-being (α = .93), personal well-being (α = .85), and identity centrality (α = .89). We conducted a similar procedure as in Study 1 confirming the internal validation of the Perceived Group Need Support and Thwarting Survey ($\alpha_{support}$ = .90, $\alpha_{thwarting}$ = .93; see Supplementary Materials). In Study 2 we also included new measures of life satisfaction and ill-being.

Life Satisfaction. Life satisfaction (Diener et al., 2013) was assessed by 5 items (e.g., “In most ways, my life is close to my ideal”) that needed to be rated on a 7-point Likert scale going from 1 (“Strongly disagree”) to 7 (“Strongly agree”). Internal consistency was acceptable (α = 88).

Ill-being. Ill-being was measured using anxiety and depressive symptoms from the CES-D (Radloff, 1977) and *General Health Questionnaire* (Goldberg & Hillier, 1979). Participants rated 7 anxiety items (e.g., "I had trouble sleeping due to worry"; α = .91) and 6 depression items (e.g., "I felt depressed"; α = .92) based on frequency. Since the two constructs were highly correlated (r = .85, p < .001), they were combined into a single ill-being score (α = .95).

Plan of Analysis

In general, we followed the same plan of analyses as in Study 1. Different from Study 2, more missing values were found in the study variables, ranging between 3.58% and 11.79%, being not MCAR (Little's test: χ^2 (123) = 1855, $p < .001$). Evidence was found for the mechanism of MAR as missing values on the well-being scales were related to values of personal need frustration. Because more than 10% of the sample is composed of partial respondents (i.e., reporting at least one construct but also missing at least one construct), the multiple imputation approach (i.e., 50 times in the current study) using the predictive mean matching algorithm was used as the missing data treatment. Multiple imputation has the advantage of generating unbiased and accurate standard errors under MAR which is appropriate for hypothesis testing (Newman, 2014). In doing this, we included all study variables, including missing data, as well as sociodemographic. All subsequent analyses and reported results are based on this (pooled) imputed dataset.

Results

Preliminary Analyses

MANCOVA results were consistent with Study 1, showing statistically significant effects for age ($\Lambda = .82$, $F(1, 1459) = 35.46$, $p<.001$), gender ($\Lambda = .91$, $F(1, 1459) = 8.22$, $p<.001$), and group ($\Lambda = .86$, $F(1, 1459) = 8.17$, $p<.001$). Univariate analyses reveal that, similar to Study 1, males reported higher (general and personal) well-being and life satisfaction than females and the 'other' group, who showed the lowest levels of group need support and personal need satisfaction, and the highest levels of personal need frustration, identity centrality, and ill-being (Table 4S).

Table 4 presents the descriptive statistics and univariate analyses for described groups, showing that religious and political groups tend to report higher well-being (both general and

personal) and life satisfaction, as well as lower personal need frustration and group need thwarting, and ill-being compared to sexual-oriented and ethnical groups. The sexual-orientation and ethnic groups generally reported similar levels of well-being, which were lower than those reported by the religious and political groups.

The correlations for the continuous variable age (see Table 5) followed a similar pattern to those in Study 1, with the same set of study variables exhibiting consistent links across both studies. A notable addition in Study 2 is the positive correlation between group need support and life satisfaction, while group need thwarting showed no significant correlation.

The Role of Personal Need Satisfaction and Frustration in the Link between Group Need Support and Thwarting and Personal Well- and Ill-being

The SEM in Figure 3 show an acceptable fit and a similar set of findings as in Study 1. The total effects, with group need support predicting well-being outcomes and group need thwarting predicting ill-being outcomes, are mostly translated into non-significant direct effects after including personal need satisfaction and frustration in the model, with only the effects for group need support to general well-being and life satisfaction remaining. Indeed, via personal need satisfaction, group need support is related to higher general well-being (β = .27, p <.001), higher personal well-being (β = .19, p <.001), higher life satisfaction (β = .19, p <.001), and lower ill-being (β = -.06, p <.001) while, via need frustration, group need thwarting is related to lower general well-being (β = .04, p = .02) and higher ill-being (β = .24, p <.001).

The Moderating Role of Identity Centrality

Linear regression models (Table 6) revealed a significant interaction showing that the positive association between perceived group need thwarting and personal need frustration was stronger among individuals with higher levels of identity centrality. This moderation effect is

illustrated in Figure 4, which displays the association across the full range of the moderator, from low (red) to high (blue) identity centrality. Notably, the Johnson-Neyman analysis indicated that the positive association between perceived group need thwarting and personal need frustration was significant across all levels of identity centrality (i.e., for 100% of participants). More details on the Johnson-Neyman interval can be found in the notes of the figures. This figure also includes density plots to illustrate the distribution of participants across values of the moderator. For interpretative clarity, three prototypical lines corresponding to the mean and ±1 SD of identity centrality are depicted, with standardized simple slope coefficients reported.

The Moderation of Identity Centrality Across Social Groups

There was a statistically significant interaction between group need support and identity centrality specifically within the sexual orientation (β = .19, $p < .001$) and political (β = .12, $p = .01$) groups, but not within the ethnic (β = -.01, $p = .85$) and religious (β = -.05, $p = .15$) groups. As illustrated in Figure 5, the association between perceived group need support and personal need satisfaction was significant among individuals with higher identity centrality in both the sexual orientation groups (Figure 5A) and the political group (Figure 5B). In contrast, for individuals with low identity centrality, comprising 16.12% of participants in the sexual orientation group and 2.66% in the political group, this association was not statistically significant (visualized with grey slopes).

General Discussion

Given the global trend towards more inclusive societies (Welzel, 2013), the present study aimed to examine the relationship between perceptions of societal support (or lack thereof) for their identity group and their personal well-being and ill-being. Using SDT as the primary theoretical framework, we focused on the basic psychological needs for autonomy, competence,

and relatedness, both at the group and individual level. Specifically, we investigated to what extent perceptions of need-supportive and need-thwarting societal conditions (at the group level) related to a group members' well-being and ill-being, testing this with personal need satisfaction and frustration as intermediate mechanisms. We also drew on SIT (Tajfel, 1978) in arguing for the influence of group identifications on wellness, and the potential for moderating effects of identity centrality on the effects of perceived societal thwarting or support for one's group.

Consistent with our expectations, results indicate that individuals who perceive their group as supported by societal conditions report higher personal well-being via increased personal need satisfaction. Conversely, individuals who perceive their group as thwarted by societal conditions experience greater ill-being via heightened personal need frustration. These findings are found robust across both American and Australian samples, underscoring the cross-national relevance of basic psychological needs in relation to group-based experiences.

In examining the concept of 'groups' as collectives based on shared identity, we also explored whether the impact of perceived group need conditions on personal need satisfaction and frustration was uniform across individuals. Consistent with SIT, our findings in study 2 indicated that individuals for whom group identity is more central to their personal sense of self may be more sensitive to the costs and benefits of perceived group need conditions. In other words, stronger group identification amplified both the positive and negative consequences of perceiving one's group as either supported or thwarted by societal structures. Yet again, this moderating effect was found only in Study 2 and varied between different identity groups.

Group Need Support and Thwarting Sensitivity Across Different Identity Groups

In the American sample (Study 2), the psychological need satisfaction of individuals who identified strongly with sexually- or political-oriented identities (e.g., LGBTQ+ or political

affiliations) was particularly sensitive to societal perceptions of support. Individuals with these identities experience significant variations in personal need satisfaction and frustration based on how society treated their group in terms of authenticity, capabilities, and inclusion. This sensitivity was less pronounced among individuals identifying with religious or ethnic identities, a pattern that aligns with previous findings (Ysseldyk et al., 2014). These identities are also sometimes perceived as more fluid, agentic, or subject to change, which may heighten individuals' attunement to how external social conditions reflect on their chosen self-concept.

In contrast, religious and ethnic identities tend to be perceived as more stable or ascribed, often inherited and reinforced through longstanding cultural, familial, or community traditions. This greater perceived permanence may lead to a different relational stance toward the group, wherein individuals are less reactive to societal evaluations or are buffered by stronger institutional and within-group support systems. In our data, this distinction was reflected in the pattern whereby members of religious groups reported the highest levels of perceived group need support and the lowest levels of need thwarting, while sexual minority groups reported the opposite. Future research could explore how the perceived stability or voluntariness of group identity modulates the psychological consequences of societal support and thwarting.

Conceptualizing Group-Level Psychological Needs

The present study highlights the need for further conceptualization of basic psychological needs at the group level. While substantial work has been done on individual need satisfaction and frustration (e.g., Vansteenkiste et al., 2023), there is a growing body of literature suggesting that groups themselves may have collective basic psychological needs (Kachanoff et al., 2019, 2020). Our findings extend this work by illustrating how perceptions of group need support or thwarting affect individual members, particularly those with a strong sense of group identity.

However, the conceptualization and operationalization of group-level needs are still in their infancy, and more research is required to refine these constructs.

Limitations

The current study acknowledges several important limitations regarding the sampling of populations and group identities. Our analysis, limited to a small number of groups, revealed considerable variation in both the perceived treatment of group members and the impact of group identification on individuals. To refine and validate these initial findings, future research could include a broader range of identity groups. In particular, our study suggests that groups with lower societal acceptance or support may be more sensitive to perceived societal supports and barriers. Expanding the sample to include a more diverse set of groups, especially those that are more marginalized, would allow for a clearer understanding of these patterns across different sociocultural contexts.

Moreover, an important conceptual limitation lies in the fact that our study inherently investigates these processes among individuals who already self-identify with a particular social group. As such, the sample is likely to include individuals with a relatively high level of identity centrality by design, which may restrict the observed variability in identity centrality. This restriction of range may, in turn, limit our ability to detect more nuanced moderation effects, particularly regarding how group need support and thwarting influence personal need satisfaction and frustration depending on the salience of group identity.

A further limitation is that our survey data were restricted to English-speaking participants with internet access, sourced from only two countries. This sample bias limits the generalizability of our findings, as cultural and linguistic factors likely shape the experiences of

group identification and societal support in other regions. Therefore, it would be premature to apply our conclusions to populations beyond those represented in the study.

Moreover, it is crucial to highlight the cross-sectional nature of the data, which precludes the examination of temporal relationships between the variables. As such, the current analysis cannot confirm causal mechanisms, and references to indirect effects should be treated cautiously. Future research should prioritize longitudinal designs to explore these dynamics more robustly.

In addition to sampling and methodological limitations, the complexity of intersecting and permanent identities must also be considered. As Crenshaw (1991) proposed, individuals may simultaneously identify with multiple social categories, such as sexual orientation, religion, ethnicity, and political ideology, which can evolve. For example, a person identifying as both gay and Christian or as a conservative Hispanic may face unique challenges that are not easily captured by examining a single identity. These intersections create distinct experiences and require nuanced approaches to understanding the impact of group identification and perceived societal support. Addressing these intersections is critical for informing policies and interventions tailored to the diverse needs of marginalized communities. Also for the current study, our inability to speak to these questions limits the conclusions we can draw, and is a ripe opportunity for future research.

Future research should also explore the balance of dynamics within and between identity groups. For example, LGBTQ+ communities often vary in the availability of supportive networks. In more inclusive societies, these networks may be strong, fostering solidarity and resilience. However, in less inclusive environments, individuals may experience isolation or internal divisions within their group, leading to increased vulnerability to discrimination and

societal rejection. Understanding how within-group support systems interact with external societal pressures is essential for advancing the literature on group identification and well-being.

Additionally, as noted in recent studies (e.g., Fabian et al., 2020), the degree of perceived need-support within identity groups may moderate the effects of external threats. In groups characterized by high solidarity and mutual support, internal cohesion may buffer against the negative consequences of societal rejection. Conversely, groups with greater internal divisions may struggle to form a unified response to external pressures, amplifying the psychological toll of societal exclusion. This moderating role of within-group dynamics remains an underexplored area in the current literature and represents a critical direction for future research. Specifically, investigating how internal group support interacts with external perceptions of societal acceptance could provide deeper insights into the mechanisms influencing personal well-being.

Conclusion

Findings from these two studies suggest that perceived societal support (versus thwarting) of important identify groups impacts individual wellness via frustration or satisfaction of basic psychological needs. This effect is amplified by identity centrality; the more important the group is to one's self-definition, the more one's well-being is affected by perceived societal acceptance and support for the group. This research extends both the SDT framework to a new set of determinants of personal need satisfaction and supports longstanding views within SIT concerning the importance of identification with groups to individual functioning.

References

Anderson-Butcher, D., Bates, S., Wade-Mdivanian, R., & Mack, S. (2024). Community sport as a context for positive youth development. In will need the Editor/s *Positive Youth Development through Sport* (pp. 269-287). Routledge. http://dx.doi.org/10.4324/9781003395867-25

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, *37*(11), 1459-1473. http://dx.doi.org/10.1177/0146167211413125

Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., ... & Verstuyf, J. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion*, *39*, 216-236. http://dx.doi.org/10.1007/s11031-014-9450-1

Chirkov, V., Ryan, R. M., Kim, Y., & Kaplan, U. (2003). Differentiating autonomy from individualism and independence: a self-determination theory perspective on internalization of cultural orientations and well-being. *Journal of Personality and Social Psychology*, *84*(1), 97. http://dx.doi.org/10.1037/0022-3514.84.1.97

Cummins, R. A. (2018). *Measuring and interpreting subjective wellbeing in different cultural contexts: A review and way forward*. Cambridge University Press. http://dx.doi.org/10.1017/9781108685580

Diener, E., Inglehart, R., & Tay, L. (2013). Theory and validity of life satisfaction scales. *Social indicators research*, *112*, 497-527. http://dx.doi.org/10.1007/s11205-012-0076-y

Fong, C. J., Altan, S., Gonzales, C., Kirmizi, M., Adelugba, S. F., & Kim, Y. E. (2024). Stay motivated and carry on: A meta-analytic investigation of motivational regulation

strategies and academic achievement, motivation, and self-regulation correlates. *Journal of Educational Psychology*, *116*(6), 997. http://dx.doi.org/10.1037/edu0000886

Goldberg, D. P., & Hillier, V. F. (1979). A scaled version of the General Health Questionnaire. *Psychological medicine*, *9*(1), 139–145. https://doi.org/10.1017/s0033291700021644

Greenaway, K. H., Cruwys, T., Haslam, S. A., & Jetten, J. (2016). Social identities promote well-being because they satisfy global psychological needs. *European Journal of Social Psychology, 46*(3), 294–307. https://doi.org/10.1002/ejsp.2169

Haslam, S. A., Jetten, J., Postmes, T., & Haslam, C. (2009). Social identity, health and well-being: An emerging agenda for applied psychology. *Applied Psychology: An International Review, 58*(1), 1–23. https://doi.org/10.1111/j.1464-0597.2008.00379.x

Herek, G. M. (2009). Sexual stigma and sexual prejudice in the United States: A conceptual framework. In D. A. Hope (Ed.), *Contemporary perspectives on lesbian, gay, and bisexual identities* (pp. 65–111). Springer Science + Business Media. https://doi.org/10.1007/978-0-387-09556-1_4

Hodge, D. R. (2007). Religious Discrimination and Ethical Compliance: Exploring Perceptions Among a Professionally Affiliated Sample of Graduate Students. *Journal of Religion & Spirituality in Social Work: Social Thought*, *26*(2), 91–113. https://doi.org/10.1300/J377v26n02_05

Hoffmann, F. (2002). The Empowered Self: Law and Society in the Age of Individualism, by Thomas M. Franck, Oxford University Press, Oxford, 2000, ISBN 0-19-829841-2 (hardback), 312 pp., 35. *Leiden Journal of International Law*, *15*(3), 725-732. doi:10.1017/S0922156502240339

Hornsey, M. J. (2008). Social identity theory and self-categorization theory: A historical review. *Social and Personality Psychology Compass, 2*(1), 204–222. https://doi.org/10.1111/j.1751-9004.2007.00066.x

Jost, J. T., Glaser, J., Kruglanski, A. W., & Sulloway, F. J. (2003). Exceptions that prove the rule--Using a theory of motivated social cognition to account for ideological incongruities and political anomalies: Reply to Greenberg and Jonas (2003). *Psychological Bulletin, 129*(3), 383–393. https://doi.org/10.1037/0033-2909.129.3.383

Kachanoff, F. J., Taylor, D. M., Caouette, J., Khullar, T. H., & Wohl, M. J. A. (2019). The chains on all my people are the chains on me: Restrictions to collective autonomy undermine the personal autonomy and psychological well-being of group members. *Journal of Personality and Social Psychology, 116*(1), 141–165. https://doi.org/10.1037/pspp0000177

Kachanoff, F. J., Wohl, M. J. A., Koestner, R., & Taylor, D. M. (2020). Them, us, and I: How group contexts influence basic psychological needs. *Current Directions in Psychological Science, 29*(1), 47–54. https://doi.org/10.1177/0963721419884318

La Guardia, J. G., Ryan, R. M., Couchman, C. E., & Deci, E. L. (2000). Within-person variation in security of attachment: A self-determination theory perspective on attachment, need fulfillment, and well-being. *Journal of Personality and Social Psychology, 79*(3), 367–384. https://doi.org/10.1037/0022-3514.79.3.367

Leach, C. W., van Zomeren, M., Zebel, S., Vliek, M. L. W., Pennekamp, S. F., Doosje, B., Ouwerkerk, J. W., & Spears, R. (2008). Group-level self-definition and self-investment: A hierarchical (multicomponent) model of in-group identification. *Journal of Personality and Social Psychology, 95*(1), 144–165. https://doi.org/10.1037/0022-3514.95.1.144

Leary, M. R., Schreindorfer, L. S., & Haupt, A. L. (1995). The role of low self-esteem in emotional and behavioral problems: Why is low self-esteem dysfunctional?. *Journal of social and clinical psychology*, *14*(3), 297-314. https://doi.org/10.1521/jscp.1995.14.3.297

Legate, N., DeHaan, C. R., Weinstein, N., & Ryan, R. M. (2013). Hurting you hurts me too: the psychological costs of complying with ostracism. *Psychological science*, *24*(4), 583–588. https://doi.org/10.1177/0956797612457951

Longo, Y., Coyne, I., & Joseph, S. (2018). Development of the short version of the scales of general well-being: The 14-item SGWB. *Personality and Individual Differences*, *124*, 31-34. https://doi.org/10.1016/j.paid.2017.11.042

Miller, W. C., Anton, H. A., & Townson, A. F. (2008). Measurement properties of the CESD scale among individuals with spinal cord injury. *Spinal cord*, *46*(4), 287-292. https://doi.org/10.1038/sj.sc.3102127

Portes, A., & Rumbaut, R. G. (2001). *Legacies: The story of the immigrant second generation*. Univ of California Press.

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385–401. https://doi.org/10.1177/014662167700100306

Reeve, J., & Cheon, S. H. (2024). Learning how to become an autonomy-supportive teacher begins with perspective taking: A randomized control trial and model test. *Teaching and Teacher Education*, *148*, 104702. https://doi.org/10.1016/j.tate.2024.104702

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness.* The Guilford Press. https://doi.org/10.1521/978.14625/28806

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary educational psychology*, *25*(1), 54-67. https://doi.org/10.1006/ceps.1999.1020

Ryan, R. M., & Vansteenkiste, M. (2023). Self-determination theory: Metatheory, methods, and meaning. In R. M. Ryan (Ed.), *The Oxford handbook of self-determination theory* (pp. 3–30). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780197600047.013.2

Ryan, R. M., Deci, E. L., & Vansteenkiste, M. (2016). Autonomy and autonomy disturbances in self-development and psychopathology: Research on motivation, attachment, and clinical process. In D. Cicchetti (Ed.), *Developmental psychopathology: Theory and method* (3rd ed., pp. 385–438). John Wiley & Sons, Inc.. https://doi.org/10.1002/9781119125556.devpsy109

Schmitt, M. T., Branscombe, N. R., Postmes, T., & Garcia, A. (2014). The consequences of perceived discrimination for psychological well-being: A meta-analytic review. *Psychological Bulletin, 140*(4), 921–948. https://doi.org/10.1037/a0035754

Settles I. H. (2004). When multiple identities interfere: the role of identity centrality. *Personality & social psychology bulletin*, *30*(4), 487–500. https://doi.org/10.1177/0146167203261885

Shapiro, J. R., & Neuberg, S. L. (2007). From stereotype threat to stereotype threats: implications of a multi-threat framework for causes, moderators, mediators, consequences, and interventions. *Personality and social psychology review: an official journal of the Society for Personality and Social Psychology, Inc*, *11*(2), 107–130. https://doi.org/10.1177/1088868306294790

Slemp, G. R., Field, J. G., Ryan, R. M., Forner, V. W., Van den Broeck, A., & Lewis, K. J. (2024). Interpersonal supports for basic psychological needs and their relations with

motivation, well-being, and performance: A meta-analysis. *Journal of personality and social psychology*, 10.1037/pspi0000459. Advance online publication. https://doi.org/10.1037/pspi0000459

Snow, D.A. (2001). Collective Identity and Expressive Forms. *Center for the Study of Democracy*, 2212-2219. Doi:10.1016/B0-08-043076-7/04094-8

Stryker, S., & Serpe, R. T. (1994). Identity salience and psychological centrality: Equivalent, overlapping, or complementary concepts? *Social Psychology Quarterly, 57*(1), 16–35. https://doi.org/10.2307/2786972

Tajfel, H. (1978). Intergroup Behavior. In C. Tajfel, & H. Fraser (Eds.), Introducing Social Psychology (pp. 401-466). NY: Penguin Books.

Taylor, D. M., Wright, S. C., Moghaddam, F. M., & Lalonde, R. N. (1990). The personal/group discrimination discrepancy: Perceiving my group, but not myself, to be a target for discrimination. *Personality and Social Psychology Bulletin, 16*(2), 254–262. https://doi.org/10.1177/0146167290162006

Thomas, E. F., Amiot, C. E., Louis, W. R., & Goddard, A. (2017). Collective self-determination: How the agent of help promotes pride, well-being, and support for intergroup helping. *Personality and Social Psychology Bulletin*, *43*(5), 662-677. https://doi.org/10.1177/0146167217695553

Trépanier, S.-G., Fernet, C., & Austin, S. (2016). Longitudinal relationships between workplace bullying, basic psychological needs, and employee functioning: A simultaneous investigation of psychological need satisfaction and frustration. *European Journal of Work and Organizational Psychology, 25*(5), 690–706. https://doi.org/10.1080/1359432X.2015.1132200

Turner, J. C., Brown, R. J., & Tajfel, H. (1979). Social comparison and group interest in ingroup favouritism. *European Journal of Social Psychology, 9*(2), 187–204. https://doi.org/10.1002/ejsp.2420090207

Usborne, E., & Taylor, D. M. (2010). The role of cultural identity clarity for self-concept clarity, self-esteem, and subjective well-being. *Personality & social psychology bulletin*, *36*(7), 883–897. https://doi.org/10.1177/0146167210372215

Vansteenkiste, M., Niemiec, C. P., & Soenens, B. (2010). The Development of the Five Mini-Theories of Self-Determination Theory: An Historical Overview, Emerging Trends, and Future Directions. In T. C. Urdan, & S. A. Karabenick (Eds.), Advances in Motivation and Achievement, v. 16A - *The Decade Ahead: Theoretical Perspectives on Motivation and Achievement* (pp. 105-165). London: Emerald Group Publishing Limited. https://doi.org/10.1108/S0749-7423(2010)000016A007

Vansteenkiste, M., Soenens, B., & Ryan, R. M. (2023). Basic psychological needs theory: A conceptual and empirical review of key criteria. In R. M. Ryan (Ed.), *The Oxford handbook of self-determination theory* (pp. 84–123). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780197600047.013.5

Waterschoot, J., Bradshaw, E. L., Duineveld, J., & Ryan, R. M. (2025, August 7). The Link between Perceived Group Need Support and Thwarting and Personal Wellness: The Moderating Role of Identity Centrality. Retrieved from osf.io/j4cka

Welzel, C. (2013). *Freedom rising*. Cambridge University Press. https://doi.org/10.1017/CBO9781139540919

Ysseldyk, R., Talebi, M., Matheson, K., Bloemraad, I., & Anisman, H. (2014). Religious and ethnic discrimination: Differential implications for social support engagement, civic

involvement, and political consciousness. *Journal of Social and Political Psychology*, *2*(1), 347-376. https://doi.org/10.5964/jspp.v2i1.232

Tables

Table 1. *Univariate analyses of identity groups on study variables with descriptives and post hoc tests in Study 1*

Variables	Sexual	Ethnic	Political	Religious	F-value (*p*-value)
Group need support	6.87 $_{A}$	6.82 $_{A}$	7.07 $_{A}$	7.37 $_{B}$	14.72 (<.001***)
Group need thwarting	5.93 $_{C}$	5.40 $_{B}$	5.35 $_{B}$	4.94 $_{A}$	24.11 (<.001***)
Personal need satisfaction	7.10 $_{A}$	7.33 $_{AB}$	7.47 $_{B}$	7.47 $_{B}$	5.44 (<.001***)
Personal need frustration	5.15 $_{B}$	5.09 $_{B}$	4.44 $_{A}$	4.60 $_{A}$	13.12 (<.001***)
Identity centrality	7.16 $_{A}$	7.11 $_{A}$	7.12 $_{A}$	7.53 $_{B}$	7.62 (<.001***)
General well-being	6.58 $_{A}$	7.05 $_{B}$	7.15 $_{B}$	7.20 $_{B}$	10.20 (<.001***)
Personal well-being	6.10 $_{A}$	6.56 $_{B}$	6.43 $_{AB}$	6.67 $_{B}$	8.64 (<.001***)
Depressive symptoms	5.79 $_{C}$	5.46 $_{B}$	5.03 $_{A}$	5.31 $_{B}$	13.17 (<.001***)

*Note. * p<.05, **p<.01, ***p<.001;* statistically significant differences between levels are annotated by varying letters

Table 2. *Descriptive Statistics and Pearson Correlations in Study 1*

Variables	***M***	***SD***	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1. Age	42.15	14.92									
2. Education	6.57	0.92	-.17*								
3. Group need support	7.08	1.59	.10*	-.06*							
4. Group need thwarting	5.32	1.86	-.12*	.03	-.42*						
5. Personal need satisfaction	7.37	1.52	.21*	.02	.47*	-.16*					
6. Personal need frustration	4.79	2.04	-.33*	.01	-.20*	.46*	-.50*				
7. Identity centrality	7.28	1.79	.15*	.00	.44*	-.02	.52*	-.50*			
8. General well-being	7.04	1.83	.18*	.04	.44*	-.17*	.77*	.52*	.41*		
9. Personal well-being	6.49	1.77	-.03	.08*	.43*	-.19*	.56*	.77*	.31*	.71*	
10. Depressive symptoms	5.38	1.7	-.24*	-.04	-.10*	.37*	-.35*	.56*	-.11*	-.46*	-.32*

*Note. * p<.001; M = Mean, SD = Standard Deviation*

Table 3. *Linear regression models on personal need satisfaction and personal need frustration in Study 1*

Predictors	**Personal need satisfaction**				**Personal need frustration**			
	β	***p*-value**	**η^2_p**	**VIF**	**β**	***p*-value**	**η^2_p**	**VIF**
1. Age	.13	<.001 ***	.07	1.11	-.24	<.001 ***	.13	1.11
2. Gender [female]								
vs Male	-.01	.37	.00	1.07	-.02	.50	.00	1.07
vs Other	-.02	.09			.01	.36		
3. Described group [sexual-oriented]								
vs ethnic	.06	.14	.00	1.15	.06	.05	.01	1.13
vs political	.05	.19			-.03	.27		
vs religious	-.01	.53			.03	.24		
4. Group need support	.30	<.001 ***	.26	1.63	-.11	<.001 ***	.01	1.59
5. Group need thwarting	-.01	.68	.00	1.40	.47	<.001 ***	.20	1.38
6. Identity centrality	.38	<.001 ***	.12	1.51	-.20	<.001 ***	.00	1.41
Interaction 4. X 6.	.02	.41	.00	1.12	.00	.81	.00	1.12
Interaction 5. X 6.	.03	.16	.00	1.15	.03	.19	.00	1.12
	R^2= 0.37, Adj. R^2 = 0.36				R^2 = 0.31, Adj. R^2 = 0.31			

*Note. * p<.05, **p<.01, ***p<.001; VIF = Variance Inflation Factor;* η^2_p = partial eta squared

Table 4. *Univariate analyses of identity groups on study variables with descriptives and post hoc tests in Study 2*

Variables	Sexual	Ethnic	Political	Religious	F-value (*p*-value)
Group need support	6.84 $_{A}$	6.73 $_{A}$	7.41 $_{B}$	7.55 $_{B}$	18.84 (<.001***)
Group need thwarting	6.07 $_{C}$	6.22 $_{C}$	5.34 $_{B}$	4.80 $_{A}$	46.53 (<.001***)
Personal need satisfaction	7.25	7.49	7.64	7.58	1.29 (.28)
Personal need frustration	5.47 $_{B}$	5.36 $_{B}$	4.64 $_{A}$	4.63 $_{A}$	4.85 (.002**)
Identity centrality	7.67	7.79	7.83	7.99	1.59 (.19)
General well-being	6.34 $_{A}$	6.64 $_{A}$	6.78 $_{B}$	6.87 $_{B}$	3.42 (.02)
Personal well-being	5.60 $_{A}$	5.78 $_{AB}$	6.07 $_{BC}$	6.40 $_{C}$	15.3 (<.001***)
Life satisfaction	3.86 $_{A}$	3.86 $_{A}$	4.02 $_{B}$	4.18 $_{B}$	5.32 (.001**)
Ill-being	5.93 $_{B}$	5.92 $_{B}$	5.27 $_{A}$	5.02 $_{A}$	4.83 (.002**)

*Note. * p<.05, **p<.01, ***p<.001*; statistically significant differences between levels are annotated by varying letters

Table 5. *Descriptive statistics and Pearson correlations in Study 2*

	M	***SD***	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1. Age	41.4	17.4									
2. Group need support	7.22	1.53	.15*								
3. Group need thwarting	5.43	1.81	-.20*	-.32*							
4. Personal need satisfaction	7.50	1.47	.18*	.46*	-.07						
5. Personal need frustration	4.96	2.03	-.33*	-.18*	.47*	-.40*					
6. Identity centrality	7.86	1.53	.16*	.46*	-.03	.49*	-.21*				
7. General well-being	6.69	1.74	.16*	.39*	-.10*	.69*	-.36*	.37*			
8. Personal well-being	6.05	1.81	.08	.38*	-.05	.49*	-.18*	.27*	.67*		
9. Life satisfaction	4.02	1.47	.01	.29*	-.02	.46*	-.18*	.19*	.65*	.67*	
10. Ill-being	5.43	2.41	-.33*	-.15*	.35*	-.36*	.69*	-.14*	-.54*	-.36*	-.35*

*Note. * p<.001; M = Mean, SD = Standard Deviation*

Table 6. *Linear regression models on personal need satisfaction and personal need frustration in Study 2*

Predictors	**Personal need satisfaction**					**Personal need frustration**				
	β	*p*-value		η^2_p	VIF	β	*p*-value		η^2_p	VIF
1.Age	.10	<.001	***	.05	1.18	-.22	<.001	***	.15	1.18
2. Gender [female]										
vs. male	.01	.52		.01	1.14	.02	.43		.02	1.14
vs. other	-.04	.04	*			.04	.06			
3. Described group [sexual-oriented]										
vs. ethnic	.05	.04	*	.00	1.25	-.02	.42		.01	1.25
vs. political	.02	.43				-.03	.24			
vs. religious	.00	.91				.02	.54			
4. Group need support	.31	<.001	***	.22	1.50	-.11	<.001	***	.01	1.50
5. Group need thwarting	-.06	.01	**	.00	1.39	.44	<.001	***	.19	1.39
6. Identity centrality	.34	<.001	***	.11	1.48	-.21	<.001	***	.02	1.48
Interaction 4. X 6.	.03	.20		.00	1.17	-.01	.72		.00	1.17
Interaction 5. X 6.	-.04	.08		.00	1.09	.07	<.001	***	.02	1.09
	R^2= 0.33, Adj. R^2 = 0.33					R^2 = 0.32, Adj. R^2 = 0.32				

*Note. * p<.05, **p<.01, ***p<.001; VIF = Variance Inflation Factor;* η^2_p = partial eta squared

Figures

Figure 1. Overview figure

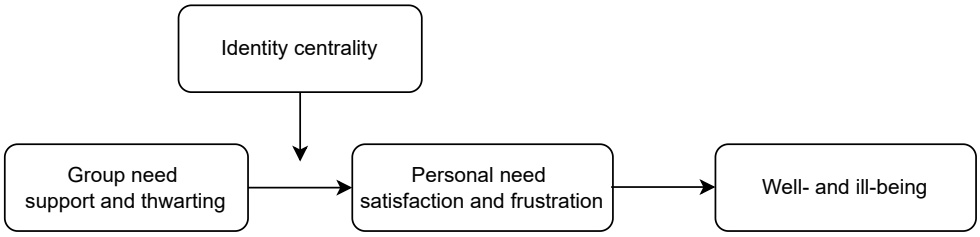
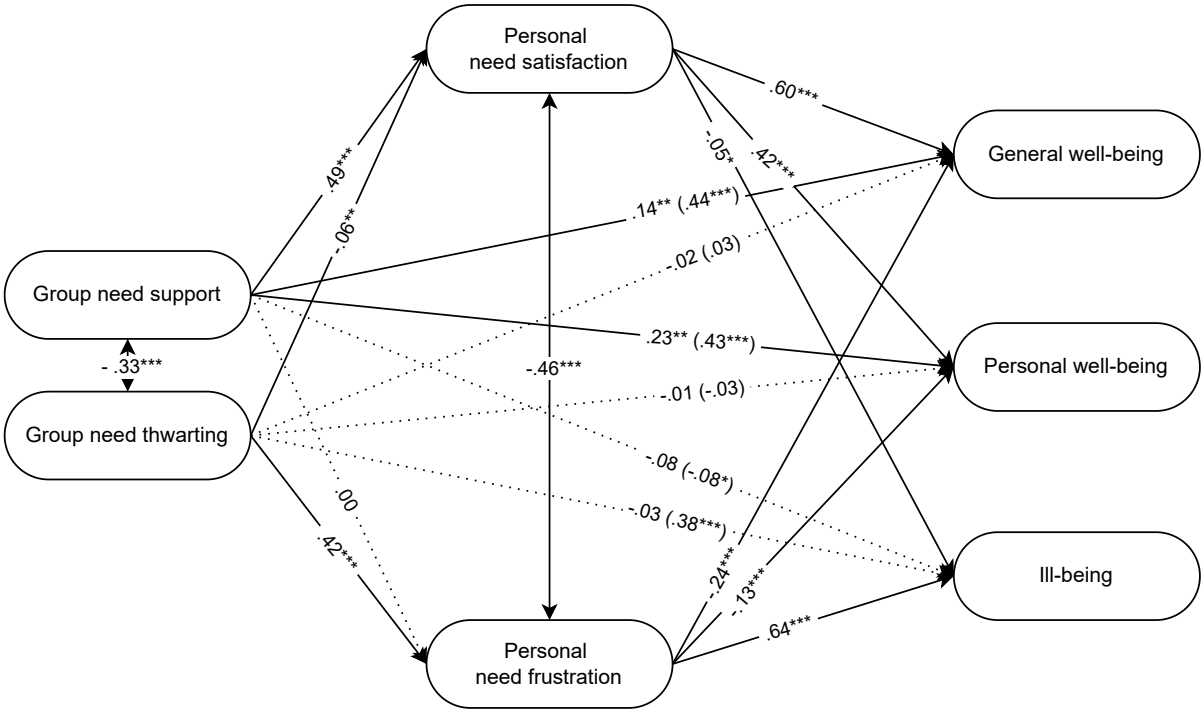
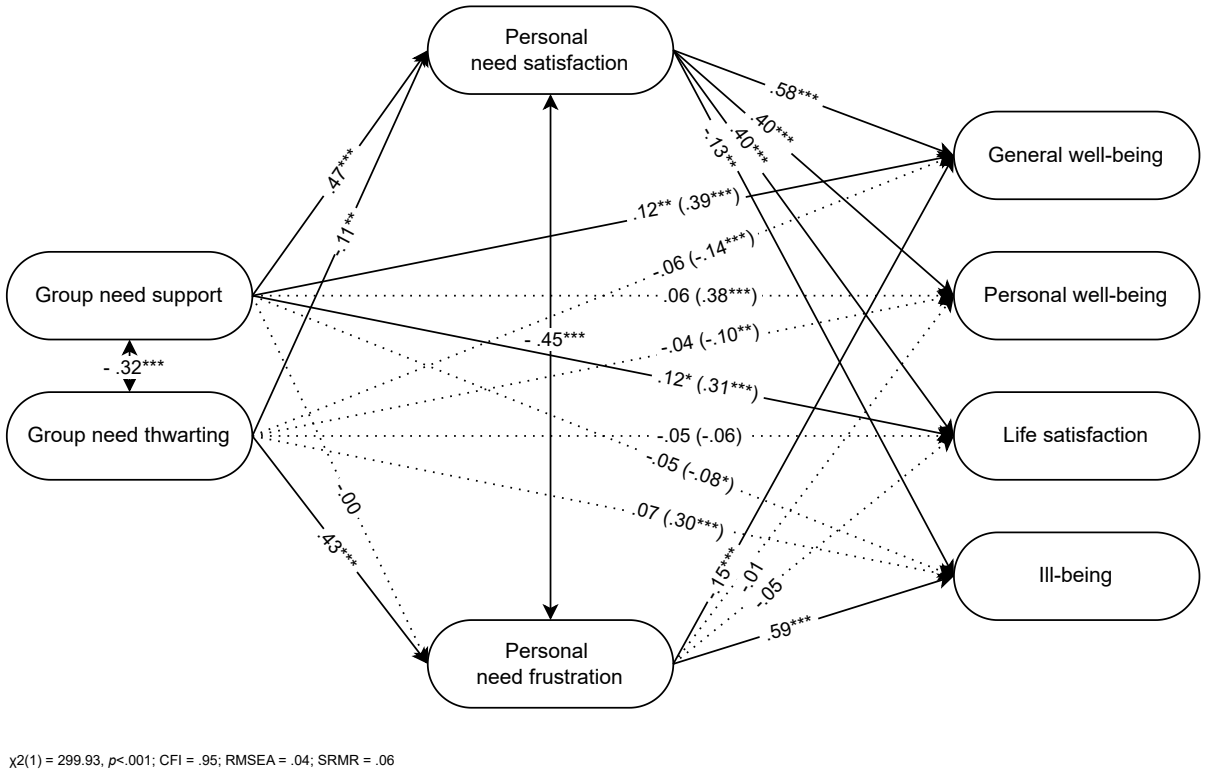


Figure 2. Structural Equation Model in Study 1



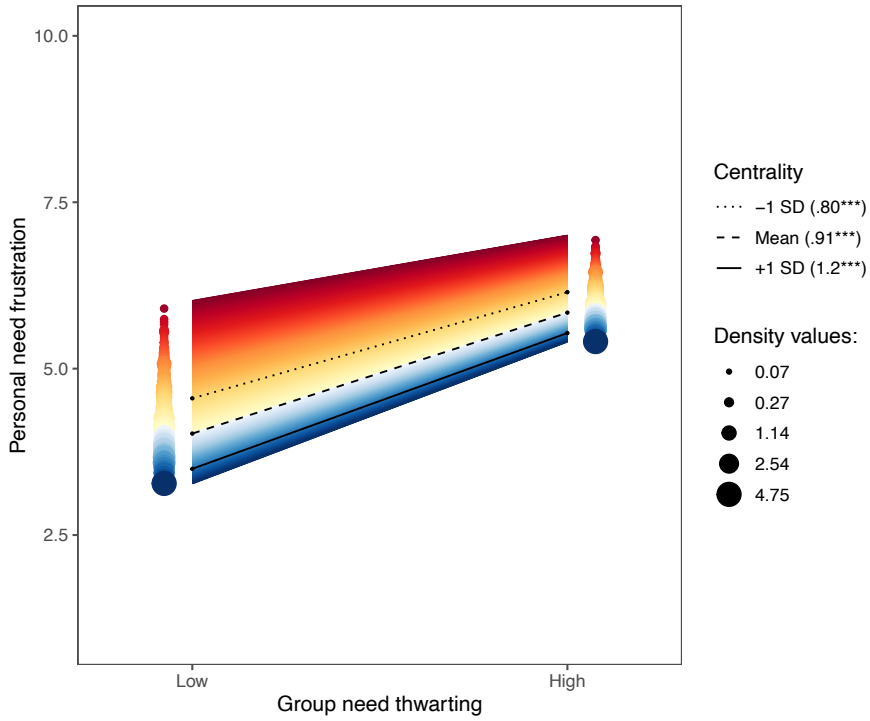
*Note. * p<.05, **p<.01, ***p<.001; solid lines represent significant pathways while dotted lines represent non-significant pathways*

Figure 3. Structural Equation Model in Study 2



*Note. * p<.05, **p<.01, ***p<.001; solid lines represent significant pathways while dotted lines represent non-significant pathways*

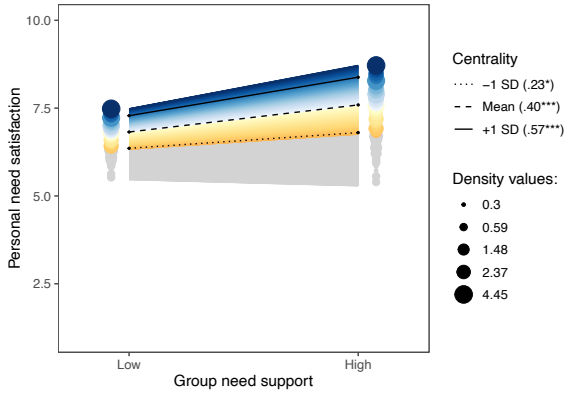
Figure 4. Visualization of interaction effect in prediction of personal need frustration in Study 2



Note. * *p*<.05, ** *p*<.01, *** *p*<.001; Moderator values going from [-3.75, 1.40], represented by red to blue slopes respectively, with 100% of the slopes being significant

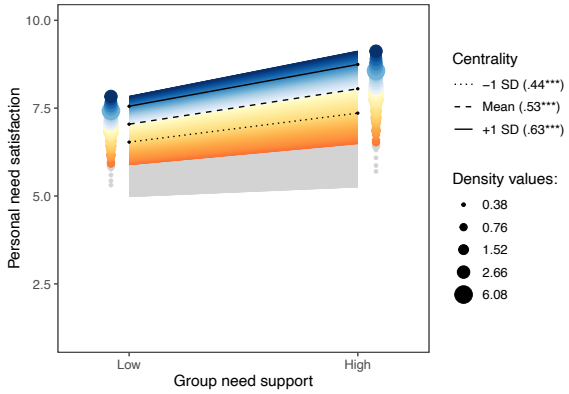
Figure 5. Visualization of interaction effects in prediction of personal need satisfaction for sexual-oriented and political groups in Study 2

A. Sexual-oriented group



Note. * *p*<.05, ** *p*<.01, *** *p*<.001; Moderator values going from [-3.24, 1.40], represented by red to blue slopes respectively, with non-significant slopes going from [-3.23, -1.25] representing 16.12% of the participants

B. Political group



Note. * *p*<.05, ** *p*<.01, *** *p*<.001; Moderator values going from [-3.68, 1.40], represented by red to blue slopes respectively, with non-significant slopes going from [-3.68, -2.06] representing 2.66% of the participants

The Link between Perceived Group Need Support and Thwarting and Personal Wellness: The Moderating Role of Identity Centrality

Supplementary materials

The Supplementary Materials provide a comprehensive overview, including the sociodemographic profiles for both studies, a detailed validation of the group need support versus thwarting questionnaire developed in this study, and univariate analyses along with descriptive statistics for sociodemographic and study variables.

Tables: 5

Figures: 0

Table S1. *Sociodemographics and output of MANCO in both Australian (Study 1) and USA (Study 2) sample*

Variable		**Study 1 Australia**	**Study 2 USA**
Age	Mean age	42.15	41.38
	(range)	(18 - 88)	(18 – 86)
Gender			
	Female	51%	79.1%
	Male	48%	19.3%
	Other (non-binary, third gender or preference not to say)	1%	1.6%
Education level			
	Year 12 or equivalent	78.2%	91.9%
	Year 11 or equivalent	6.4%	2.4%
	Year 10 or equivalent	12.0%	1.3%
	Year 9 or equivalent	2.2%	0.8%
	Year 8 or below, or not at school	1.4%	3.6%
Qualification level			
	Postgraduate degree	13.3%	12.5%
	Graduate diploma/Graduate certificate	7.8%	24.3%
	Bachelor degree with honours	10.6%	13.8%
	Bachelor degree without honours	16.7%	12.9%
	Advanced diploma/diploma	11.9%	8.9%
	Certificate III/IV (including trade certificate)	18.5%	5.8%
	Certificate not otherwise defined	3.2%	4.4%
	Certificate I/II	4.9%	2.1%
	Other non-school qualification	13.1%	15.4%
Identified groups			
	Sexual	19.4%	22.8%
	Ethnic	23.8%	17.6%
	Political	19.0%	17%
	Religious	37.8%	42.6%

Validation of Group Need Support and Thwarting Questionnaire

Study 1. The survey items were based on established constructs and comprised 10 items for each psychological need: 5 items assessing support and 5 items assessing thwarting. The full list of items can be found in table 2SA. Participants were instructed to reflect on their actual experiences within their described group and rate each item on a scale from 1 ("Not true at all") to 10 ("Completely true").

Given that the internal validity of these items had not been previously examined, we first explored their internal structure using an exploratory factor analysis (EFA) with varimax rotation. The EFA suggested evidence for four factors based on the Eigenvalues and two factors based on the Acceleration factor. The four-factor solution included two components explaining 42% of the variance (representing all items of autonomy, competence, and relatedness support), a third factor explaining 10% (representing all items of competence thwarting), and a fourth factor explaining 9% of the variance (representing three items of relatedness support with a maximum factor loading of .43).

To confirm the hypothesized structure (i.e., six factors) and the one emerging from the EFA (i.e., two meaningful factors), we conducted a confirmatory factor analysis (CFA). The CFA results indicated an acceptable fit for the hypothesized model (χ^2 (390) = 3042.88, CFI = .93, RMSEA = .06, SRMR = .05, AIC = 262707.46, BIC = 263133.92) and a moderate fit for the EFA-derived model (χ^2 (484) = 5220.28, CFI = .89, RMSEA = .07, SRMR = .06, AIC = 264856.86, BIC = 265203.71). Comparing the two CFA models using an analysis of variance showed that the six-factor model had a significantly better fit than the two-factor model (χ^2_{diff} (14) = 1985, p<.001).

Since both the two-factor and six-factor models were supported by the EFA and CFA, respectively, we calculated internal consistencies for both structures (see Table 2SA). For the two-factor solution, all indices showed acceptable values based on their cutoffs: Cronbach's alpha above .70, the Average Variance Extracted (AVE) above .50, the range of item difficulties between .20 and .80, and the range of item discriminations above .70. The mean inter-item correlation was slightly high (ideally between .20 and .40). Similar findings were observed for each of the six constructs in the six-factor solution, with acceptable Cronbach's alphas, acceptable AVE (except for competence thwarting, which slightly missed the .50 cut-off), acceptable item difficulties, acceptable item discrimination, and slightly high mean inter-item correlations.

In summary, both the two-factor solution from the EFA and the six-factor solution from the CFA were acceptable in terms of internal validity. It is plausible that the two-factor

solution represents a higher-order analysis, with the six factors loading onto two higher-order factors: group need support and group need thwarting. This interpretation was supported by an EFA including the six factors, which showed evidence for two higher-order factors based on Eigenvalues and the Acceleration factor (see Table 2SB for factor loadings). Therefore, based on the EFA output and the supported internal consistencies of the six factors, we decided to use the two higher-order factors - group need support and group need thwarting - in the subsequent analyses.

Study 2. Similar to Study 1, the six-factor model provided a good fit (χ^2 (390) = 2554.61, CFI = .91, RMSEA = .06, SRMR = .06, AIC = 194210.56, BIC = 194611.32), being significantly better than the two-factor model (χ^2 (404) = 4971.47, CFI = .84, RMSEA = .09, SRMR = .08, AIC = 196599.42, BIC = 196925.37; χ^2_{diff} (14) = 2416.9, p<.001). Also here, we found evidence for a higher-order structure, with one component 'group need support' including group autonomy support (λ = .92), group competence support (λ = .91) and group relatedness support (λ = .81) and another component 'group need thwarting' including group autonomy support (λ = .91), group competence support (λ = .76) and group relatedness support (λ = .91). Internal consistencies are comparable for Study 1 for both group need support (α = .92; AVE = .57; Idiff = .65 - .78; Idiscr = ..59 - .71; $M_{inter\text{-}item}r$ = .44) and group need thwarting (α = .91; AVE = .56; Idiff = .49 - .69 ; Idiscr = .51 - .64; $M_{inter\text{-}item}r$ = .40), with even more acceptable values for the mean inter-item correlations.

Table 2SA. *Output of 2-factor explanatory factor analysis with varimax rotation and reliability measures for Study 1*

Items	Group need support	Group need thwarting
Group autonomy support (α = .86; AVE = .54; Idiff = .66-.73 ; Idiscr = .62 - .73; $M_{inter\text{-}item}r$ = .54)		
My group is free to live in accordance with our beliefs	.72	-.19
My group is able to determine our identity for ourselves	.70	-.01
My group can express our core values	.76	-.06
My group is able to pursue what matters most to us	.80	-.08
My group has a clear voice within the larger culture	.76	-.14
Group autonomy thwarting (α = .85; AVE = .53; Idiff = .48 - .60 ; Idiscr = .58-.70; $M_{inter\text{-}item}r$ = .53)		
My group remains oppressed in many ways	-.05	.76
My group's opinions and concerns are often ignored	-.09	.77
My group is not free to live according to our central values	-.14	.68
My group is held back by other forces in society	-.03	.76
My group often suffers from external pressures and controls	.03	.71
Group competence support (α = .88; AVE = .59; Idiff = .69 - .71 ; Idiscr = .67 - .76; $M_{inter\text{-}item}r$ = .59)		
My group is effective in protecting our values and practices	.75	-.06
My group is able to accomplish our aims	.80	-.11
My group is successful in pursing what is important to us	.79	-.09
My group is capable of advocating for itself	.75	-.05
My group can make things happen when we need to	.74	-.07
Group competence thwarting (α = .82; AVE = .47; Idiff = .49 - .53 ; Idiscr = .55 - .63; $M_{inter\text{-}item}r$ = .47)		
My group has little power or influence	-.17	.62
My group is helpless amidst other social forces	-.15	.73
My group is not very effective in achieving our goals	-.17	.58
My group is often incapable of acting as a whole	-.10	.56
My group can't make any real change happen	-.16	.58
Group relatedness support (α = .89; AVE = .63; Idiff = .64 - .68; Idiscr = .68 - .76; $M_{inter\text{-}item}r$ = .63)		
My group is included in the larger culture	.70	-.13
My group is generally accepted within society	.70	-.27
My group has gained a sense of belonging within country and society	.78	-.17
My group is valued and respected	.73	-.24
My group is positively recognized by other groups and organizations.	.73	-.21
Group relatedness thwarting (α = .85; AVE = .54; Idiff = .44 - .61 ; Idiscr = .60 - .72; $M_{inter\text{-}item}r$ = .54)		
My group has been isolated and often rejected by other groups	-.08	.78
My group faces ongoing prejudice and stigma	.00	.73
My group is disconnected from society	-.23	.69
My group is often not accepted or recognized as important	-.08	.74
My group is not cared about in our society	-.17	.75
	α = .95 AVE = .55 Idiff = .64 - .73 Idiscr = .63 - .75 $M_{inter\text{-}item}r$ = .54	α = .93 AVE = .50 Idiff = .50 - .61 Idiscr = .63 - .72 $M_{inter\text{-}item}r$ = .46

Note. α = Cronbach's alpha; AVE = Average Variance Extracted; Idiff = item difficulty; Idiscr = item discrimination; $M_{inter\text{-}item}r$ = Mean inter-item correlation

Table 2SB. *Higher-order explanatory factor analysis*

Variables	Group need support	Group need thwarting
Group autonomy support	.94	-.11
Group autonomy thwarting	-.08	.93
Group competence support	.94	-.08
Group competence thwarting	-.20	.83
Group relatedness support	.87	-.22
Group relatedness thwarting	-.15	.92
Proportion of Variance	*54.94 %*	*29.32 %*
Cronbach's α	*.92*	*.89*

Table 3S. *Univariate analyses of gender on study variables with descriptives and post hoc tests in Study 1*

Variables	Female	Male	Other	F-value (*p*-value)
Group need support	7.15 (±1.55) A	7.02 (±1.63) A	7.09 (±1.66) A	1.58 (.21)
Group need thwarting	5.17 (±1.81) A	5.47 (±1.90) B	5.34 (±2.11) AB	6.24 (<.001***)
Personal need satisfaction	7.34 (±1.49) A	7.40 (±1.55) A	6.74 (±1.92) A	2.02 (.13)
Personal need frustration	4.85 (±2.00) A	4.72 (±2.09) A	5.25 (±2.27) A	1.40 (.25)
Centrality	7.22 (±1.80) A	7.34 (±1.79) A	7.25 (±1.92) A	1.04 (.35)
General well-being	6.96 (±1.83) B	7.14 (±1.80) B	5.75 (±2.10) A	6.97 (<.001***)
Personal well-being	6.42 (±1.74) AB	6.58 (±1.81) B	5.50 (±1.64) A	4.91 (.01**)
Depressive symptoms	5.47 (±1.67) B	5.27 (±1.72) A	6.54 (±1.75) C	7.80 (<.001***)

*Note. * p<.05, **p<.01, ***p<.001;* statistically significant differences between levels are annotated by varying letters

Table 4S. *Univariate analyses of gender on study variables with descriptives and post hoc tests in Study 2*

Variables	Female	Male	Other	F-value (*p*-value)
Group need support	7.25 (±1.52) B	7.22 (±1.55) B	5.94 (±1.72) A	6.87 (.001**)
Group need thwarting	5.25 (±1.77) A	6.02 (±1.84) B	6.81 (±1.49) B	39.95 (<.001***)
Personal need satisfaction	7.48 (±1.47) B	7.64 (±1.39) B	6.17 (±1.74) A	3.26 (.04*)
Personal need frustration	4.89 (±1.95) A	5.16 (±2.29) A	6.25 (±1.96) B	13.11 (<.001***)
Centrality	7.87 (±1.54)	7.78 (±1.51)	8.17 (±1.18)	2.94 (.05)
General well-being	6.66 (±1.74) B	6.96 (±1.65) C	5.06 (±2.08) A	7.24 (<.001***)
Personal well-being	5.97 (±1.80) B	6.50 (±1.70) C	4.30 (±2.05) A	16.68 (<.001***)
Life satisfaction	3.97 (±1.46) B	4.28 (±1.46) C	3.04 (±1.47) A	8.6 (<.001***)
Il-being	5.44 (±2.41) A	5.25 (±2.40) A	7.21 (±2.24) B	3.99 (.02*)

*Note. * p<.05, **p<.01, ***p<.001;* statistically significant differences between levels are annotated by varying letters