Applying the MIMIC Model to Assess the Impact of Sociodemographic Background on Students' College Belongingness

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Abstract

This study examines how students' sociodemographic backgrounds influence their sense of college belongingness—a multidimensional psychological construct associated with students' integration into university life, academic success, and retention. Anchored in Tinto's Student Integration Theory, the research investigates the predictive roles of four sociodemographic factors: region of origin, parental education, distance from residence to campus, and living arrangement. These variables were categorised and treated as covariates within the analytical framework. The researchers assessed college belongingness as a latent variable using the College Belongingness Questionnaire (CBQ), which they adapted into Indonesian. Validation of the 10-item CBQ instrument using Aiken's V index and confirmatory factor analysis showed that all items met the criteria for content validity, construct validity, and reliability. The Multiple Indicators and Multiple Causes (MIMIC) model, a form of structural equation modeling suited for testing latent constructs influenced by observed covariate variables, were employed to analyse the data. A total of 400 undergraduate students from a public university in South Sumatra, Indonesia participated in the data collection conducted by the researchers. A non-probability sampling method, specifically convenience sampling, was employed to recruit participants. The findings indicate that students' region of origin significantly predicts both social inclusion and social exclusion dimensions of college belongingness. Distance from residence to campus was also a significant predictor, though only for social inclusion. Conversely, parental education and type of living arrangement did not significantly predict either dimension. These findings highlight the importance of considering regional background and commuting distance when designing student support, transition, and engagement programs. The study contributes to higher education practice by identifying sociodemographic factors that may place students at risk of reduced belongingness and, therefore, potentially higher dropout vulnerability.

Keywords

College belongingness; MIMIC model; Social inclusion; Social exclusion; Sociodemographic.

Introduction

According to the Ministry of Education, Culture, Research, and Technology (2023), the dropout rate in Indonesian higher education in 2021 reached 352,494 students, or 3.60% of the total student population. Students drop out at all levels of higher education due to various reasons, including exceeding the permitted study duration, academic dismissal, or voluntary withdrawal. Although the Indonesian government and universities have implemented several initiatives to address this issue, unfortunately, they have primarily focused on economic solutions, such as providing scholarships and reducing tuition fees. However, psychological aspects also significantly influence student dropout behavior, including college belongingness. Numerous studies have supported this assertion by demonstrating that college belongingness has both direct and indirect effects on students' intention to drop out (Alkan, 2016; Fourie, 2020; Kember et al., 2001; Menkor et al., 2021; Pedler et al., 2022; Suhlmann et al., 2018; Tinto, 1975).

Scholars define college belongingness as students' subjective feelings of connection and integration with their institution and campus community (Gillen-O'Neel, 2019; Hoffman et al., 2002; Maunder,

2017; Soria & Stubblefield, 2015). Arslan (2021), meanwhile, conceptualises college belongingness based on the construct of school belongingness (Arslan & Duru, 2017), which refers to the valued experience of involvement and the perceived fit between individuals and their environment—in this case, between students and their university. This definition also draws from earlier literature (Goodenow, 1993; Hagerty et al., 1992), which emphasises the importance of interaction and integration between students and the university, fostering a sense of being valued and appreciated. Successful integration fosters social inclusion, acceptance, and involvement, whereas failed integration leads to social exclusion and rejection (Arslan, 2021; Arslan & Duru, 2017).

According to Tinto's Student Integration Theory (Tinto, 1993), integration may be academic or social. Students who successfully integrate into the academic system demonstrate strong academic performance and intellectual development. Meanwhile, students who effectively integrate into the campus social system tend to interact positively with peers, groups, staff, faculty members, and the institution. When students fail to integrate into the academic and social systems, this failure may lead to dissatisfaction and poor adjustment, ultimately resulting in dropout (Kim, 2022). Student Integration Theory also posits that, before entering higher education, students bring a set of attributes, pre-college experiences, and family backgrounds that can directly or indirectly influence their performance in university (Tinto, 1993). Implicitly, this theory suggests that such attributes, experiences, and family backgrounds also affect students' integration and sense of college belongingness.

A systematic literature review conducted by Dias-Broens et al. (2024) found that ethnicity and generational status are among the most commonly examined background factors in studies of college belongingness. However, ethnic issues in Indonesia do not exhibit the same urgency as those in developed countries such as several European nations and the United States. In those countries, a history of racial discrimination and social segregation has significantly shaped students' experiences in higher education. In the Indonesian context, regional diversity brings variations in language, norms, culture, traditions, and customs—dimensions that mirror ethnic diversity in other countries. Therefore, this study focuses on students' regional origin, which is considered more relevant in the Indonesian setting. Ostini et al. (2020) argue that students from rural or remote areas often perceive themselves as "outsiders" within the university setting. This outsider status reduces their social inclusion and diminishes their sense of college belongingness. Similarly, Dawson et al. (2013) noted that students from different demographic backgrounds, such as rural, regional, and remote areas, may experience reduced social and emotional belonging in university settings.

From a theoretical perspective, place attachment theory further elucidates why students' regional origin may shape their early experiences of belongingness. The theory posits that emotional and geographic bonds to familiar environments develop through long-term residence and sustained social interaction (Altman & Low, 1992; Scannell & Gifford, 2010). When students relocate to a new setting—particularly one that differs geographically or culturally from their place of origin—they initially lack established attachment to that environment. This absence of prior attachment may hinder early social inclusion and delay the development of college belongingness during the transition to university life.

Parental education level can also function as a form of social capital that influences students' sense of college belongingness. Parents with higher education backgrounds generally possess a better understanding of the college system due to their own experiences. They also know colleges' academic performance expectations for students, enabling them to guide their children with practical strategies for succeeding in higher education. These insights and understandings are transferred to their children. In addition, they provide emotional support and foster a sense of confidence in their children. Conversely, students whose parents have not attained higher

education—or first-generation college students—tend to be more vulnerable to feelings of alienation and face greater challenges in navigating academic life. Numerous studies conducted in countries such as Germany, France, and the United States support this proposition, showing first-generation college students exhibit lower levels of college belongingness compared to continuing-generation students, who have at least one parent with a college education (Gopalan & Brady, 2020; Hausmann et al., 2009; Janke et al., 2024; Jury et al., 2017; Ostrove & Long, 2007; Soria & Stebleton, 2013).

Other studies suggest that the physical distance between a student's residence and the campus also influences college belongingness, particularly when learning is conducted on campus, as in this study. Drawing on National Survey of Student Engagement (NSSE) data, Sullivan (2013) found that students living within commuting distance of campus report lower-quality peer relationships than those residing on campus. This study highlights how residential distance can impact students' social engagement and affect their college belongingness. A mixed-methods study by Kirk and Lewis (2015) also found that commuter students (non-residential) tend to report lower levels of college belongingness than students living on or near campus. Low levels of college belongingness result from students' limited participation in extracurricular activities, which negatively affects their social and academic engagement. In line with these findings, a qualitative study by Pokorny et al. (2017) also demonstrated that students who travel to campus often struggle to develop a strong sense of college belongingness. Factors such as limited time spent on campus and minimal involvement in social activities contribute to their experiences of social exclusion.

Student living arrangement is also believed to influence college belongingness. Strayhorn (2019) emphasises that students' living environments—where daily interactions with peers and significant others occur—serve as important social and developmental contexts that shape their emotional, social, and academic experiences and, ultimately, their sense of belonging. Dumford et al. (2019) used data from the 2014 NSSE to examine whether students' place of residence and the people with whom they live shape their sense of belonging on campus, both toward peers and the university. Their findings show that living with parents or relatives tends to reduce students' social connectedness on campus, including both peer and institutional belonging. The study also found that living with a roommate offers greater social advantages compared with living alone. Other studies similarly indicate that students who live with their parents often experience greater financial and emotional stability due to increased parental support; however, they may have fewer spontaneous opportunities for campus engagement, particularly when commuting from home (Pokorny et al., 2017; Wilcox et al., 2005). Cook et al. (2021) also reported that students living independently in private rentals exhibit lower levels of social connectedness to the campus compared with those living with friends on campus.

Across these studies, it becomes evident that the operationalisation of the living arrangement variable is often conflated between who students live with (e.g., parents, independently, or with relatives/friends) and the type of housing they occupy (e.g., parental home, off-campus boarding or rental, or on-campus residence halls). This conflation obscures which factor more strongly influences college belongingness. Therefore, the present study aims to specifically examine the influence of who students live with on their college belongingness, thereby providing a clearer focus on the social-structural aspect of the living arrangement without confounding it with physical housing characteristics.

The aforementioned studies on four student sociodemographic factors—regional origin, parental education level, residential distance from campus, and living arrangement—demonstrate their respective influences on college belongingness. However, these studies were conducted separately and involved different populations. The present study aims to examine these four sociodemographic

variables simultaneously by categorising the data and treating them as observable, categorical covariates to investigate their influence on students' college belongingness. One analytical approach suitable for examining the effects of multiple covariate variables simultaneously is the Multiple Indicators and Multiple Causes (MIMIC) model.

Methods

Participants

Four hundred undergraduate students from a public university in Palembang City, South Sumatra, Indonesia participated in this study. The researchers included only participants who were actively enrolled and aged between 18 and 23. A non-probability sampling technique, specifically convenience sampling, was used to recruit participants.

The convenience sampling procedure involved recruiting participants from all 10 faculties within the university. Data collection was conducted from November 15th to 27th 2023 by visiting each faculty, during scheduled lectures. With the course instructors' prior permission, the researcher briefly introduced the study and invited students to participate before the class began. Although the researcher met the participants in person during class visits, all data were collected online using Google Forms to facilitate data management and analysis. As the researcher is a faculty member at the same university, this facilitated access to classrooms and coordination with teaching staff. However, this relationship may have introduced bias, as students might have been more inclined to participate because of the researcher's institutional affiliation.

Ethical approval for data collection and publication was obtained from the Research Ethics Committee of the Faculty of Psychology, Universitas Gadjah Mada (Approval No: 10774/UN1/FPSi.1.3/SD/PT.01.04/2023, Date: September 4th, 2023). All procedures were conducted in accordance with the committee's ethical guidelines, and participants provided informed consent prior to data collection. Table 1 presents the participant characteristics.

Table 1

Participant Characteristics

	Frequency (*n*)	**Percentage (%)**
Sex		
Male	104	26
Female	296	74
Age (*M*=19.422, *SD*=1.288)		
18 years	106	26.50
19 years	89	22.25
20 years	122	30.50
21 years	70	17.50
22 years	10	2.50
23 years	3	0.75
Year of Study (*M*=2.43, *SD*=1.117)		
First year	103	25.75
Second year	119	29.75
Third year	81	20.25
Fourth year	97	24.25

Research model

This study employed a structural equation modeling (SEM) approach using the MIMIC model. According to Muthén (1989), the MIMIC model facilitates population heterogeneity by incorporating a set of predictors or covariates. The MIMIC model was introduced by Jöreskog and Goldberger (1975). Like other SEM variants (e.g., Covariance-Based Structural Equation Modeling [CB-SEM], Partial Least Squares Structural Equation Modeling [PLS-SEM], and Generalized Structural Equation Modeling [GSEM]), the MIMIC model incorporates both measurement and structural components to analyse the effect of multiple covariate (exogenous) variables on a single latent (endogenous) construct. However, unlike other SEM approaches, the covariate data in MIMIC models are typically directly observable and often categorical, such as sociodemographic data.

The MIMIC model is widely used in psychology to examine whether a psychological construct is measured equivalently across different groups (i.e., to test for measurement invariance). This model ensures that observed scores reflect actual differences in the construct rather than measurement bias. Numerous studies have employed the MIMIC model for this purpose (e.g., Arlianto & Geshica, 2022; Brown et al., 2020; Cheng et al., 2016; Cheung et al., 2023; Chun et al., 2016; Jamali et al., 2017; Jin & Chen, 2020; McKenna et al., 2016; Montoya & Jeon, 2020; Normand et al., 2020; Rubio et al., 2003; Sasmita, 2022; Tsaousis et al., 2018; Tsaousis et al., 2023; Uğurlu & Atar, 2020; Woods et al., 2009).

Researchers can apply the MIMIC model to test measurement invariance and examine whether multiple covariate variables influence a latent construct with multiple indicators simultaneously. The results of such analyses can be interpreted similarly to regression analysis. Several studies have adopted this approach across diverse research contexts. For example, Ríos-Bedoya et al. (2009) examined the effect of early smoking experiences on current smoking behaviour, and Hsu et al. (2010) investigated the influence of paternal and maternal involvement on adolescents' academic achievement. Normand et al. (2020) tested whether comorbidities predicted the quality of friendships among children with attention deficit hyperactivity disorder (ADHD)/hyperactivity, while McKenna et al. (2016) examined the relationship between maltreatment exposure and ADHD symptom severity. Chaudhuri et al. (2016) also applied the MIMIC model to assess corporate performance.

The MIMIC approach involves two main stages. First, researchers construct a measurement model for the endogenous or latent variable, which the observed indicators reflect. Second, they include covariates to examine their direct effects on the measured endogenous variable.

Research instruments

Endogenous variables

The endogenous variable in this study is college belongingness, measured using the College Belongingness Questionnaire (CBQ) developed by Arslan (2021) and adapted into Indonesian. The CBQ consists of 10 items derived from two dimensions: social acceptance or inclusion (SI), which comprises five items (items 1, 3, 5, 7, 9), and social exclusion (SE), which also comprises five items (items 2, 4, 6, 8, 10). The conceptual definitions of these two dimensions are drawn from Arslan (2021) and Arslan and Duru (2017), as detailed in Table 2.

Table 2

Definitions of College Belongingness Concepts

Dimension	Definition
Social Inclusion	Students' perceptions of being valued by the university and feeling important and appreciated as part of the institution are rooted in experiences of acceptance and inclusion within the campus environment.
Social Exclusion	Students base their perceptions of not being valued, feeling unimportant, and feeling unappreciated within the university community on experiences of rejection or exclusion from the university environment.

This study modified the response options of the CBQ instrument. The original CBQ employed a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), which was modified to a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree).

Covariate variables

The covariate variables in this study consist of two domains: social background and demographic background. Table 3 presents the two domains and their covariate variables, accompanied by the corresponding codes for analysis.

Table 3

Covariate Variables and Response Code

Domain	Covariate variables	Code
Social Background	Parental education	
	Never attended college	1
	Attended college but did not graduate	2
	Graduated from college	3
Demographic Background	Region of origin	
	Palembang city	1
	Areas within South Sumatra	2
	Outside South Sumatra	3
	Distance from residence to campus	
	Less than 5 km	1
	5 km–10 km	2
	10 km–20 km	3
	20 km–30 km	4
	More than 30 km	5
	Living arrangement during studies	
	Living with parents	1
	Living independently by renting a boarding house or leasing a house	2
	Living with relatives/family's/friends' home	3

CBQ adaptation

The adaptation process in this study followed the guidelines proposed by Gudmundsson (2009).

CBQ validation and reliability

The Indonesian-adapted version of the CBQ was validated through content validity testing using Aiken's V index and construct validity testing via confirmatory factor analysis (CFA). Construct validity was evaluated through convergent validity and construct reliability. Convergent validity assesses the degree to which individual items explain the variance of the overall construct (Hair et al., 2014). It is determined based on the factor loadings of each item, where Hair et al. (2014)

recommend acceptable loadings to be above 0.5. However, factor loadings as low as 0.4 can still be considered acceptable, provided the sample size is at least 200.

Furthermore, this study assessed internal consistency reliability using McDonald's omega coefficient (ω). Zinbarg et al. (2005) noted that Cronbach's alpha is only one of several reliability coefficients and that its widespread use may be problematic when its underlying assumptions are not met. As an alternative, they discussed omega-based reliability estimates derived from factor-analytic models, which can provide a more appropriate representation of reliability in many applied research contexts (Zinbarg et al., 2005).

In addition, the researchers employed CFA to evaluate the measurement model's goodness-of-fit indices. The indices used include chi-square (χ^2), comparative fit index (CFI), Tucker-Lewis index (TLI), goodness of fit index (GFI), and root mean square error of approximation (RMSEA). The researchers interpreted model fit according to criteria proposed by Hu and Bentler (1999), indicating acceptable fit when CFI, TLI, and GFI values exceed 0.90 and RMSEA is less than 0.08 (Browne & Cudeck, 1992).

Results

Statistical descriptive

Data were analysed using JASP software to obtain the college belongingness variables' mean and standard deviation values, and frequency and percentage of the covariate variable. The results indicated that the social inclusion dimension had a mean score of 15.242 with a standard deviation of 1.843. Meanwhile, the social exclusion dimension yielded a mean score of 9.010 with a standard deviation of 2.348.

The researchers present the data on the covariate variables in frequency and percentage. Regarding parental education level, participants whose parents did not pursue higher education constituted the highest frequency. Similarly, participants originating from Palembang City recorded the highest frequency compared to other regions. Students living less than 5 kilometres from campus showed a higher frequency regarding residential distance. Additionally, students residing in rented rooms or boarding houses were the predominant living arrangement. Table 4 presents a complete statistical description of the participants.

Table 4

Descriptive Statistics

Variable	Frequency (*n*)	Percentage (%)
Education		
Father		
1. Never attended college	209	52.25
2. Attended but did not complete college	28	7
3. College Graduate	163	40.75
Mother		
1. Never attended college	218	54.50
2. Attended but did not complete college	21	5.25
3. College Graduate	161	40.25
Region of Origin		
1. Palembang City	167	41.75
2. Other areas in South Sumatra	131	32.75
3. Outside South Sumatra	102	25.50
Distance from Campus		
1. <5 km	172	43
2. 5–10 km	50	12.50
3. 10–20 km	18	4.50
4. 20–30 km	28	7
5. >30 km	132	33
Living Arrangement		
1. With parents	157	39.25
2. Independently in rented accommodation	214	53.50
3. With relatives or friends	29	7.25
College Belongingness (mean, standard deviation)		
Social Inclusion	(*M*=15.242, *SD*=1.843)	
Social Exclusion	(*M*=9.010, *SD*=2.348)	

CBQ's content validity

The content validity test was conducted by 10 experts using Aiken's V index. The results showed that all items met the content validity criteria, with Aiken's V values exceeding 0.78 and ranging from 0.85 to 0.95. Table 5 presents the detailed results of the content validity test based on Aiken's V index. Furthermore, the readability analysis conducted on 60 students indicated that all items were easily understood.

Table 5

Content Validity

Item number	Aiken's V
1	0.95
2	0.9
3	0.925
4	0.925
5	0.95
6	0.85
7	0.95
8	0.85
9	0.95
10	0.9

CBQ's construct validity

CFA was conducted on the CBQ instrument, yielding a chi-square (χ^2) value of 112.420 with $p<0.001$. Although the chi-square test was significant, this result is common in large samples and should be interpreted alongside other goodness-of-fit indices. A nonsignificant chi-square value ($p>0.05$) is preferred in structural modeling, suggesting no significant difference between the sample and model covariance matrix. Jöreskog and Sörbom (1993) noted that a large sample size tends to cause the chi-square test to reject the model. Therefore, Kline (2016) recommends that model fit evaluation not only rely on the chi-square value but also consider other goodness-of-fit indices. The additional fit indices in this study indicated an acceptable model fit, with RMSEA=0.076, CFI=0.936, TLI=0.915, and GFI=0.942. Standardised factor loadings ranged from 0.466 to 0.850. Table 6 presents detailed results of the convergent validity analysis.

Table 6

Factor Loadings of CBQ

Dimension	Item	*p*-value	Standardised estimate	Statistical inference
Social Inclusion	CB_si1	0.000	0.509	Significant
	CB_si3	0.000	0.592	Significant
	CB_si5	0.000	0.511	Significant
	CB_si7	0.000	0.754	Significant
	CB_si9	0.000	0.700	Significant
Social Exclusion	CB_se2r	0.000	0.789	Significant
	CB_se4r	0.000	0.466	Significant
	CB_se6r	0.000	0.494	Significant
	CB_se8r	0.000	0.850	Significant
	CB_se10r	0.000	0.799	Significant

Meanwhile, the construct reliability test using McDonald's omega coefficient (ω) showed that the CBQ's total scale reliability was 0.752, with the social inclusion dimension (SIω) at 0.748 and the social exclusion dimension (SEω) at 0.804.

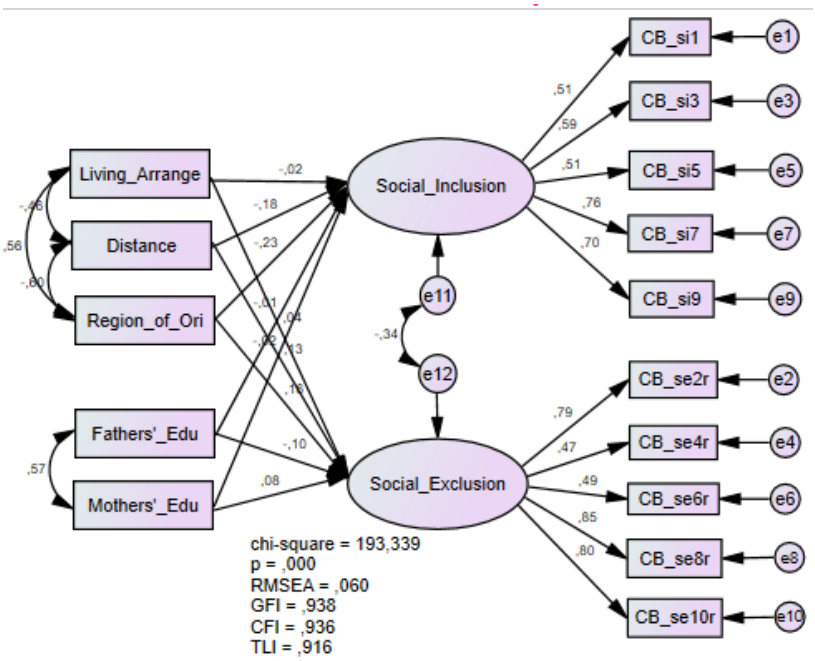
Based on the model fit indices, the factor loadings of each item, and the construct reliability test results, the measurement model of the Indonesian version of the CBQ instrument was acceptable and could proceed to SEM.

Structural modeling test using the MIMIC model

The structural modeling test using the standardised MIMIC model yielded goodness-of-fit indices that met the acceptable criteria, namely chi-square=193.339 (p=0.000), RMSEA=0.060, GFI=0.938, CFI=0.936, and TLI=0.916. These indices indicated that the model adequately fit the data, supporting its use in examining the hypothesised effects of covariate variables—parental education, region of origin, residential distance, and living arrangement—on students' sense of college belongingness. Figure 1 illustrates the specified MIMIC model, in which the four sociodemographic covariates were modelled as predictors of the social inclusion and social exclusion dimensions of college belongingness.

Figure 1

MIMIC Model of College Belongingness Influenced by Covariates



The results of the MIMIC model test also revealed the roles of each covariate variable on students' college belongingness. The data analysis showed that the covariate of parental education had no significant effect on the dimensions of social inclusion and social exclusion (p>0.05). Similarly, the current living arrangement covariate did not significantly influence social inclusion or exclusion (p>0.05). The distance from residence to campus covariate had no significant effect on social exclusion (p>0.05), but it significantly affected social inclusion (p<0.05). Furthermore, students' region of origin significantly impacted social inclusion and social exclusion (p<0.05), with a negative correlation observed between region of origin and social inclusion. Table 7 presents detailed data regarding the roles of the covariate variables on the endogenous variables.

Table 7

Significance Testing Among Variables

Covariate → Outcome	SE	CR	*p*-value	Standardised estimate	Statistical inference
Father's Edu → Social Inclusion	0.019	-0.202	0.840	-0.014	Not sig
Mother's Edu → Social Inclusion	0.019	-0.288	0.773	-0.020	Not sig
Region of Origin → Social Inclusion	0.026	-2.841	**0.004**	-0.225	Sig
Distance → Social Inclusion	0.011	-2.418	**0.016**	-0.177	Sig
Living Arrange → Social Inclusion	0.030	-0.300	0.764	-0.021	Not sig
Father's Edu → Social Exclusion	0.033	-1.550	0.121	-0.101	Not sig
Mother's Edu → Social Exclusion	0.033	1.213	0.225	0.079	Not sig
Region of Origin → Social Exclusion	0.044	2.132	**0.033**	0.155	Sig
Distance → Social Exclusion	0.019	1.855	0.064	0.126	Not sig
Living Arrange → Social Exclusion	0.053	0.629	0.529	0.041	Not sig

Discussion

The findings of this study indicate that students' region of origin significantly influences college belongingness, affecting both the dimensions of social inclusion and social exclusion. The analysis

found a negative correlation between the region of origin and social inclusion. These findings suggest that students from the same area as the campus location tend to feel more accepted and involved in the campus environment, enhancing their overall sense of college belongingness. This result is consistent with the social exclusion dimension, where students from regions farther from the campus tend to experience higher feelings of alienation within the university environment, ultimately leading to a lower level of college belongingness.

Students from the same region as the campus are more likely to feel valued or recognised due to shared cultural and linguistic backgrounds (cultural congruence). Shared cultural and local language backgrounds can accelerate students' adaptation process, reducing communication barriers and feelings of incompatibility with people on campus. These shared backgrounds contribute to a higher sense of college belonging among local students compared to those from regions farther away from the campus. This view aligns with Hurtado and Carter's (1997) notion of cognitive mapping related to students' sense of belonging. It emphasises the importance of students' initial geographic orientation to the campus in fostering their college belongingness. Supporting this, Heinisch's (2018) qualitative study demonstrated that students from rural areas face greater challenges in developing a sense of belonging on urban campuses.

Furthermore, place attachment theory explains that individuals with positive emotional and geographic bonds to a familiar place are likelier to experience a sense of belonging there (Altman & Low, 1992; Brown et al., 2011). This theory suggests that students from the same region as the campus may have already established emotional attachments to that location before entering university. Such emotional bonds facilitate the internalisation of campus social identity as part of the self. Although the population differs, Millán-franco et al. (2019) found evidence of place attachment among long-term immigrants living in Spain. Immigrants from Asia, Africa, Eastern Europe, and Latin America who had lived in Spain for an extended period showed increased social inclusion as a result of their accumulated attachment to place. Ultimately, this study supports place attachment theory, in which long-term residence in a particular setting can foster a sense of attachment that, in turn, enhances social inclusion.

On the other hand, students from outside the local area may experience social or cultural minority status, especially if their language, lifestyle, or social norms differ from those of the local majority. These regional identity differences can create social distance and feelings of being an "outsider" for non-local students. This condition complicates social integration and increases the risk of social exclusion, ultimately weakening their college belongingness. This opinion aligns with Crawford and McKenzie's (2023) findings, which indicate that students from regional and remote areas in Australia often face challenges in belonging at their universities due to geographic and cultural differences from their home regions.

Another study finding shows that the distance between students' residences and the campus affects social inclusion. Specifically, the closer students live to the campus, the stronger their sense of belonging at the university. A negative correlation between residential distance and social inclusion evidences this. A plausible explanation is that students living closer to campus have easier access to academic and non-academic activities, such as extracurriculars; student organisations; and informal campus spaces like cafeterias, libraries, and gardens. Such accessibility enables students to be physically present on campus more frequently and engage in various social activities, fostering acceptance, involvement, and community membership (Pinto et al., 2024; Sedaghatnia et al., 2015).

Furthermore, according to Putnam's social capital theory (Häuberer, 2011), geographic proximity as a form of social capital facilitates more frequent social interactions, contributing to the formation of stronger social networks and active participation. The more often students interact within the campus environment, the more their sense of attachment grows (Strayhorn, 2019). Therefore,

students residing closer to campus have more opportunities to form micro-interactions, such as spontaneous peer greetings, informal invitations to join discussions, or brief conversations with lecturers. Collectively, these interactions build feelings of being valued and included within the academic community (social inclusion).

Conversely, students living farther from campus often face barriers such as long commuting times, relatively high transportation costs, and physical fatigue, which reduce their likelihood of attending and engaging in campus life beyond mandatory academic activities (Kenyon, 2011). As a result, although the students formally register as active, they tend to limit their social involvement. This situation may explain why their feelings of social inclusion are lower than those of peers living closer to campus.

An interesting finding of this study is that the distance of students' residence from campus did not significantly affect social exclusion. This finding is inconsistent with the college belongingness theory outlined by Arslan (2021), which posits social exclusion as the antithesis of social inclusion: students' perceptions of being unvalued, unimportant, or rejected by the university community. Although students living farther from campus may have fewer opportunities to engage in campus life, reduced engagement does not automatically result in feelings of rejection or marginalisation. In other words, not feeling "included" does not necessarily mean feeling "excluded." Structural barriers such as long travel distances, transportation costs, or physical fatigue may limit students' presence on campus, but these do not inherently generate interpersonal behaviours that constitute social exclusion.

This explanation aligns with research distinguishing between the absence of participation and experiences of exclusion. Social exclusion—which is conceptually parallel to ostracism (see Janke et al., 2024)—typically arises from direct interpersonal behaviours, such as being ignored, rejected, discriminated against, or marginalised from desired groups (Hutchison et al., 2007). Wesselmann et al. (2016) further emphasise that social exclusion requires active components of rejection or neglect, which are not a natural consequence of living farther from campus.

Findings from Soylemez-Karakoc et al. (2024) support this interpretation. Their study of married international students showed that while residential distance did contribute to lower social inclusion by limiting participation, social exclusion experienced by these students was primarily driven by interpersonal and institutional factors. Examples include visa regulations restricting partners' activities (e.g., F-2 visa holders prohibited from working), invisibility of partners within university policies, limited access to information and language training, and financial burdens and shifts in gender roles within households. These findings indicate that social exclusion is shaped more by relational and institutional dynamics than by geographic distance alone.

Overall, the nonsignificant effect of residential distance on social exclusion suggests that living farther from campus does limit opportunities for students to feel valued, but it does not inherently produce the interpersonal rejection necessary to generate experiences of exclusion. This distinction emphasises the importance of treating social inclusion and social exclusion as related but distinct constructs.

Another notable finding of this study reveals that parental education level did not significantly affect students' college belongingness in either the social inclusion or social exclusion dimension. The findings of this study differ from those of previous research. The discrepancy between the findings of this study and previous research that identified an effect of parental education on college belongingness can be explained by two main possibilities. First, this study examined multiple covariates simultaneously within the same student population, allowing for the identification of the contribution of each variable. With this analytical approach, it is possible that the correlations

reported in earlier studies were influenced by confounding variables, such as residential location. Families with higher parental education levels are generally more likely to reside in urban areas or closer to the university (see, for example, Imeraj et al., 2022; Nieuwenhuis & Xu, 2021; Yin et al., 2025), which, in turn, increases students' access to campus activities and opportunities for social interaction (see, for example, Jorgenson et al., 2018; Tomás-Miquel & Capó-Vicedo, 2022; Xu et al., 2015). Second, the relationship between parental education and college belongingness may also be mediated by the quality of parent–child attachment, rather than by parental education per se. Although parental education is often associated with supportive parenting styles, open communication, and academic motivation (Peng, 2023), these characteristics exert their influence primarily through the attachment processes they help shape. The literature consistently demonstrates that warm, responsive, and supportive parent–child relationships play a more substantial role in shaping students' psychological well-being, adjustment, engagement, and sense of belonging than parental education alone (Furrer & Skinner, 2003; Gana et al., 2024; Mattanah et al., 2011; Wilson & Gore, 2013; Zhang et al., 2024). Accordingly, when multiple sociodemographic variables are analysed concurrently, the effect of parental education may become nonsignificant because its primary influence likely operates through patterns of attachment rather than through educational background itself.

Living arrangement type during college also did not significantly influence students' college belongingness in either the social inclusion or social exclusion dimension. One possible explanation is that the quality of social interactions on campus, community support, and active participation in campus life may influence college belongingness (Freeman et al., 2007; Hausmann et al., 2007; Strayhorn, 2019) more strongly than the student living arrangement. The developmental tasks of emerging adulthood, particularly increasing autonomy and expanding social relationships, may also have contributed to this finding.

As noted by Arnett (2000), students in the stage of emerging adulthood begin to develop independence, including identity exploration, increased autonomy, and broader social relationships. Therefore, living arrangements—whether with parents, peers, or relatives or independently in rented accommodation—do not significantly affect their feelings of social inclusion or exclusion. With growing independence, students are more likely to build college belongingness through active involvement and social engagement on campus rather than through the influence of co-residents.

This interpretation aligns with the perspective of Chickering and Reisser (1993), who argue that most students possess a high degree of social adaptability. This adaptive capacity enables them to maintain a sense of connection and engagement (social inclusion) or to avoid feelings of alienation (social exclusion), regardless of who they live with.

Ultimately, this study's use of the MIMIC model successfully supported the theoretical framework developed from empirical findings. Although the MIMIC model is not designed explicitly for comparing group differences across covariates, this approach offers analytical efficiency by allowing multiple covariates to be analysed simultaneously in relation to the latent variable. Muthén (1989) states that the MIMIC model accommodates heterogeneity within a population by integrating several predictors or covariates into the analysis model.

Conclusion

This study demonstrates the utility of the MIMIC model in assessing how students' sociodemographic backgrounds—including region of origin, parental education, residential distance from campus, and living arrangements—influence college belongingness. The findings show that the region of origin significantly affects both dimensions of belongingness, namely social inclusion and social exclusion. Residential distance was found to play a meaningful role in predicting social

inclusion, although it did not significantly influence social exclusion. In contrast, neither parental education nor students' living arrangements demonstrated significant effects on either dimension.

These findings provide important implications for higher education institutions. The significant roles of regional origin and commuting distance indicate that non-local and commuter students may face additional challenges in developing a strong sense of belonging. Universities may therefore benefit from implementing more targeted transition and engagement programs—such as tailored orientation activities, structured peer mentoring, and community-building initiatives—to support these students. Consistent with Tinto's Student Integration Theory, enhancing belongingness among geographically or socially distant students may contribute to reducing their vulnerability to disengagement and dropout. These results underscore the importance of designing student support strategies that recognise the sociodemographic diversity of the student population.

Future research may extend these findings by incorporating psychosocial factors or longitudinal designs to further illuminate how belongingness develops over time and how institutional interventions shape students' trajectories.

Acknowledgments

The authors thank the participants who took part in the study.

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Please cite this paper as:

Rachmawati, R., Juniarly, A., & Prapto Nugroho, I. (2026). Applying the MIMIC model to assess the impact of sociodemographic background on students' college belongingness. *Journal of the Australian and New Zealand Student Services Association*, *34*(2), 233–252. https://doi.org/10.30688/janzssa.2026-2-02



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