

# Belonging Matters: Pathways from Bullying and Family Support to Reading Literacy among Filipino Adolescents

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## ABSTRACT

Functional illiteracy continues to constrain students' academic and long-term opportunities in the Philippines. One factor that heightens this risk is bullying, which undermines both psychosocial well-being and academic achievement. This study used 2022 Programme for International Student Assessment (PISA) data to examine whether school belonging mediates the effect of bullying on reading literacy, and whether family support moderates these pathways. A moderated mediation model across ten plausible values, controlling for socioeconomic status, gender, and school risk, showed that bullying was negatively associated with reading literacy, partly through reduced belonging. The negative impact of bullying on belonging was stronger when family support was higher, but family support did not moderate the belonging-literacy link. These findings suggest that while families can buffer psychosocial harm, their role in mitigating bullying's academic consequences is more complex and context dependent.

**Keywords:** *Bullying, family support, reading literacy, school belonging*

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## INTRODUCTION

The Philippines faces a deepening educational crisis marked by persistent literacy challenges. A large majority of children cannot read and comprehend age-appropriate text by the end of primary school, a condition known as learning poverty. According to the World Bank and UNESCO Institute for Statistics (2022), around 90–91% of Filipino children experience learning poverty, one of the highest rates globally (World Bank, 2024). National data reinforce this concern: the 2024 Functional Literacy, Education, and Mass Media Survey (FLEMMS) reported that while 93.1% of Filipinos aged 10–64 possess basic literacy, only 70.8% demonstrate functional literacy, which requires the ability to interpret and integrate information effectively (Philippine Statistics Authority, 2024).

These difficulties extend into adolescence. Results from the Programme for International Student Assessment (PISA) show that in both 2018 and 2022, the Philippines ranked near the bottom in reading, mathematics, and science. Only about 24% of 15-year-olds reached minimum proficiency in reading, far below global benchmarks (Organisation for Economic Co-operation and Development [OECD], 2019, 2023b). These persistent gaps highlight the urgency of examining not only instructional quality but also psychosocial and contextual influences on literacy performance.

One critical but often overlooked factor is school bullying. In PISA 2018, 65% of Filipino students reported being bullied at least a few times per month, nearly triple the OECD average of 23%.

The trend continued in 2022, when about one in three students reported weekly bullying, with boys (53%) reporting higher prevalence than girls (43%) (OECD, 2019, 2023b). Bullying carries measurable academic costs: students who faced threats scored, on average, 56 points lower in reading, while those mocked by peers scored 13 points lower (OECD, 2023b). These patterns illustrate how bullying not only undermines social well-being but also compounds academic disadvantages.

The consequences of bullying extend beyond learning outcomes. Victimized students face increased risks of anxiety, depression, and diminished self-esteem (Balluerka et al., 2023; Han et al., 2025), which reduce motivation and engagement in schoolwork. Economically, bullying-related learning deficits are estimated to cost the Philippines ₱10–20 billion annually—an amount comparable to the Department of Education's 2024 allocations for textbooks and computerization (Abrigo et al., 2024; Philippine Institute for Development Studies, 2024). International evidence echoes these findings, linking bullying to long-term losses in earnings and productivity (Brimblecombe et al., 2018; Gimenez et al., 2024). These studies emphasize that bullying imposes not only educational and social costs but also significant economic burdens.

Despite the passage of the Anti-Bullying Act of 2013 (Republic Act No. 10627), implementation remains inconsistent. Many schools underreport cases, mandated anti-bullying committees are often non-functional, and administrators frequently underestimate bullying's academic impact (Pinera et al., 2022;

World Bank, 2020). This gap between student experiences and institutional responses reflects both policy weaknesses and limited awareness of bullying's broader consequences.

The co-occurrence of low literacy and high bullying prevalence presents a particularly concerning challenge. Struggling readers may be more vulnerable to peer victimization, while bullying further erodes concentration, motivation, and reading engagement (Morgan et al., 2022; Turunen et al., 2017). However, research in the Philippines remains limited. Local studies often address either literacy or bullying in isolation (Marvas et al., 2024; Paguyan and Taoc, 2022; Samara et al., 2021; Tiauzon and Malquisto, 2019), leaving the intersection of these issues underexplored.

Recent PISA-based research highlights several psychosocial factors relevant to reading achievement. Bernardo and Mante-Estacio (2023) found that metacognitive strategies strongly predict reading proficiency, though Filipino students often lack awareness of the most effective approaches. Similarly, Bernardo (2023) showed that growth mindset positively influences reading outcomes, but its benefits are weaker among students from lower socioeconomic backgrounds, underscoring structural inequities. Haw et al. (2021) demonstrated that need-supportive teaching practices improve reading achievement across socioeconomic levels, while Haw and King (2023), using a bioecological framework and machine learning, identified school belonging as a critical predictor alongside socioeconomic status and mindset. These findings illustrate that literacy outcomes are shaped not only by individual dispositions but also by broader relational and contextual support. Yet little is known about how peer-level risks such as bullying interact with protective factors like belonging and family support. International evidence indicates that school belonging mediates the effects of bullying on academic outcomes (Arslan, 2018; Wormington et al., 2016), while family support can buffer negative effects, though findings are mixed (Hill and Tyson, 2009).

Accordingly, this study investigates the relationship between bullying and reading proficiency among Filipino adolescents using PISA 2022 data. It tests a moderated mediation model in which school belonging mediates the bullying–literacy link and family support moderates these pathways. By situating international frameworks within the Philippine context, this study aims to contribute both theoretically—by clarifying psychosocial processes underlying literacy—and practically—by providing evidence to inform interventions that enhance reading outcomes while fostering safer, more inclusive school environments.

## Theoretical framework

### Social-ecological theory

This study is grounded in Bronfenbrenner's social-ecological theory (1979), later expanded into the bioecological model (Bronfenbrenner and Morris), which emphasizes that student development is shaped by multiple interacting systems. Applied to bullying by (Espelage and Holt, 2013), this perspective underscores how peer victimization, school belonging, family support, and literacy outcomes are interconnected. Rather than viewing bullying as a dyadic exchange between perpetrators and victims, research demonstrates that it is a dynamic process influenced by family, peers, teachers, communities, and cultural contexts (Barboza et al., 2009; Espelage et al., 2014; Hong and Espelage, 2012; Hong and Garbarino, 2012; Patton et al., 2013; Rose et al., 2015).

Within this framework, bullying represents a peer-level risk factor that undermines school belonging. Peer victimization has been linked to diminished engagement, well-being, and academic performance (Hong and Espelage, 2012; Juvonen and Graham,

2014). Longitudinal evidence shows that bullying predicts emotional and behavioral difficulties, which lower achievement over time (Murphy et al., 2022). Conversely, school belonging functions as a key psychosocial resource that fosters motivation, persistence, and reading performance (Arslan, 2018; Tan et al., 2022). The (OECD, 2023c) identifies belonging as one of the strongest psychosocial correlates of student achievement in PISA.

Family contexts further shape these processes. Supportive family involvement—through communication, expectations, and monitoring—has been linked to literacy and socioemotional outcomes (Borgonovi and Montt, 2012; Wilder, 2014). Family contexts further shape these processes. Supportive family involvement—through communication, expectations, and monitoring—has been linked to literacy and socioemotional outcomes (Estell and Perdue, 2013; Xiang et al., 2025). However, recent studies show mixed or non-significant effects (Tan et al., 2022), suggesting the need for deeper contextual investigation. Building on the reviewed literature, this study examines how bullying, school belonging, and family support jointly shape reading literacy in the Philippines, where challenges of low performance and functional illiteracy persist. In addressing these gaps, the present study is guided by the following research questions and hypotheses.

RQ1: To what extent does bullying victimization negatively affect students' reading literacy?

RQ2: How does school belonging influence the relationship between bullying and reading literacy?

RQ3: Does family support moderate the relationship between bullying, belonging, and reading literacy?

H1: Bullying victimization is negatively associated with students' academic performance, including reading literacy.

H2: Bullying victimization is negatively associated with students' sense of school belonging.

H3: Sense of school belonging mediates the relationship between bullying victimization and reading literacy.

H4a: Family support would moderate the negative association between bullying and school belonging.

H4b: Family support would moderate the association between school belonging and reading literacy.

Furthermore, Figure 1 presents the study's conceptual framework. It outlines the hypothesized relationships among key constructs: bullying, school belonging, and reading literacy including the proposed moderating role of family support.

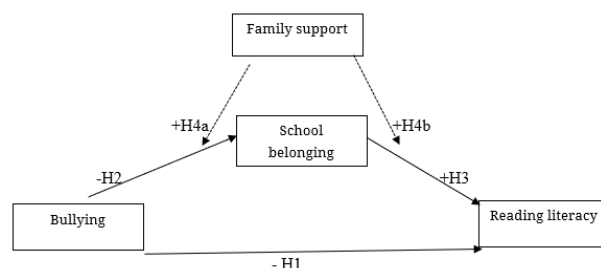


Figure 1. Conceptual framework of the study.

## MATERIALS AND METHODS

### Data source and sample

This study used data from the Philippine sample of the 2022 Programme for International Student Assessment (PISA), coordinated by the Organisation for Economic Co-operation and

Development (OECD). PISA evaluates the competencies of 15-year-old students in reading, mathematics, and science, as well as their backgrounds, through a two-stage stratified sampling design that ensures national representativeness. In the Philippines, 7,193 students participated in 2022. After listwise deletion due to missing data on background indices and covariates, the analytic sample included 4,226 students. When applying PISA's student weights, this corresponds to a nationally representative population estimate of 1 million 15-year-old students (OECD, 2023a). Thus, weighted population figures should be interpreted as nationally representative, while unweighted sample sizes reflect the actual number of cases included in the analysis.

## Measures

Bullying, school belonging, and family support were measured using weighted likelihood estimates (WLEs) provided in the PISA database. Reading literacy served as the primary outcome variable and was represented by ten plausible values (PVs) generated through Item Response Theory (IRT) scaling. These PVs are not single test scores but multiple imputed estimates of student proficiency that capture measurement error and uncertainty. Following OECD guidelines (OECD, 2009, 2023a), all ten PVs were used in analyses to obtain unbiased estimates.

Covariates included socioeconomic status (ESCS), gender (ST004D01T, coded 1 = female, 2 = male), and the school risk index. ESCS and school risk were retained in their standardized PISA metric form (OECD mean = 0, SD = 1) without re-centering, as they were used strictly as control variables.

## Analytic strategy

Analyses were conducted using the IEA IDB Analyzer and SPSS version 28. To account for PISA's complex sampling design, final student weights (W\_FSTUWT) and 80 replicate weights (W\_FSTR1–W\_FSTR80) were applied using Fay's method ( $p = 0.5$ ), producing unbiased point estimates and design-adjusted standard errors (Judkins, 1990).

Because reading literacy is represented by ten plausible values, regression analyses were performed separately for each PV dataset. The IEA IDB Analyzer generated the necessary SPSS syntax, which was executed to run the regression models. The resulting coefficients and standard errors were then combined using Rubin's (1987) rules. This procedure accounts for two sources of uncertainty: sampling error within each PV dataset and variability across the ten imputed datasets. The pooled estimates therefore provide statistically valid results that reflect both sampling and imputation processes.

## Moderated mediation framework

The study employed a moderated mediation framework to examine the role of school belonging and family support in the

relationship between bullying and reading literacy. Mediation was assessed through the following pathways:

- Path a: bullying  $\rightarrow$  belonging (expected negative association).
- Path b: belonging  $\rightarrow$  literacy, controlling for bullying.
- Path c: total effect of bullying on literacy.
- Path c': direct effect of bullying on literacy after accounting for belonging.

The indirect effect of bullying on literacy ( $a \times b$ ) captured the mediation pathway. Moderation was tested by interaction terms with family support. Specifically, the bullying  $\times$  family support interaction tested moderation on Path a (bullying  $\rightarrow$  belonging), while the belonging  $\times$  family support interaction tested moderation on Path b (belonging  $\rightarrow$  literacy). Significant interactions were probed using simple slopes analysis to examine how effects varied across different levels of family support.

For reading literacy, regression paths involving PVs (Paths b, c, and c') were estimated separately for each plausible value, and the results were pooled using Rubin's rules. Path a was estimated directly from a single regression because belonging was measured as a single WLE index. All models adjusted for gender, ESCS, and school risk index. Indirect and conditional indirect effects were derived from pooled coefficients, with standard errors estimated via the delta method.

## RESULTS

### Descriptive statistics

Table 1 presents descriptive statistics for the study variables. On average, Filipino students reported a lower sense of school belonging ( $M = -0.34$ ,  $SE = .01$ ) relative to the international mean of zero, with moderate variability ( $SD = 0.73$ ,  $SE = .02$ ). Reports of bullying victimization were above the OECD average ( $M = 0.47$ ,  $SE = .03$ ), with relatively high variability ( $SD = 1.20$ ,  $SE = .01$ ). In contrast, students reported slightly higher family support compared to the OECD average ( $M = 0.29$ ,  $SE = .02$ ;  $SD = 0.84$ ,  $SE = .01$ ).

With respect to achievement, the mean reading literacy score was 366.90 ( $SE = 3.73$ ), substantially below the OECD average of 476, consistent with the persistent performance gap highlighted in the PISA 2022 report. The relatively large standard deviation ( $SD = 88.03$ ,  $SE = 2.52$ ) further suggests significant heterogeneity in students' literacy outcomes.

These findings underscore the importance of psychosocial constructs in the learning environment. Filipino students are navigating school with weaker feelings of belonging and higher levels of bullying exposure, both of which are known to hinder motivation, engagement, and cognitive performance. Although family support appears relatively strong, it may not be sufficient to compensate for the adverse effects of low belonging and high bullying on reading literacy (OECD, 2019; World Bank, 2020). These descriptive patterns set the stage for further testing of the hypothesized mediation and moderation processes involving

**Table 1.** Descriptive statistics for study variables (Philippines, PISA 2022).

Variable	N	Population	Mean	SE Mean
Sense of Belonging (WLE)	4,226	1,049,025	-0.34	0.01
Bullying (WLE)	4,226	1,049,025	0.47	0.03
Family Support (WLE)	4,226	1,049,025	0.29	0.02
Reading Literacy (PV)	4,226	1,049,025	366.9	3.73

#### Notes:

1. Weighted descriptive statistics are based on the final analytic sample ( $n = 4,226$ ) after listwise deletion as implemented by IEA IDB Analyzer. Because students with missing background data were excluded, the analytic sample mean for reading literacy ( $M = 366.9$ ) is higher than the Philippine average score reported in the official PISA 2022 report ( $M = 347$ ).

2. Unweighted sample size = 4,226 students. Weighted population estimate ( $N = 1,049,025$ ).

## Correlation analysis

Table 2 presents the bivariate correlations among the key study variables. As expected, bullying victimization was negatively associated with both sense of belonging ( $r = -.24, p < .001$ ) and reading literacy ( $r = -.43, p < .001$ ), whereas belonging was positively related to reading literacy ( $r = .22, p < .001$ ). On the other hand, family support showed a small positive correlation with belonging ( $r = .09, p < .001$ ) but a negative association with reading literacy ( $r = -.14, p < .001$ ). This counterintuitive result may reflect the contextual meaning of the PISA family support index, which

often captures parental involvement in school-related activities. In many educational systems, including the Philippines, parents may become more involved when students are struggling academically, creating a negative bivariate association with achievement. However, as shown in the regression and moderated mediation models, the functional role of family support is clarified when adjusting for covariates (ESCS, gender, and school risk), where it operates as a significant buffer in the pathway from bullying to belonging rather than as a direct predictor of literacy outcomes.

**Table 2.** Correlation matrix among key variables (Philippines, PISA 2022).

Variables	Belong	Bullied	FamSup	PV_Read
1. Belong	1.00	-.24 (.02)***	.09 (.02)***	.22 (.01)***
2. Bullied	-.24 (.02)***	1.00	.04 (.02)*	-.43 (.01)***
3. FamSup	.09 (.02)***	.04 (.02)*	1.00	-.14 (.02)***
4. PV_Read	.22 (.01)***	-.43 (.01)***	-.14 (.02)***	1.00

Notes:

1. BELONG = sense of school belonging (BELONG\_WLE1); BULLIED = bullying victimization (BULLIED\_WLE1); FAMSUP = family support (FAMSUP\_WLE1); PV\_READ = reading literacy plausible values (PISA 2022).

2. Values below the diagonal are correlation coefficients; values in parentheses are standard errors. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$  (two-tailed).

3. All correlations are weighted using final student weights (W\_FSTUWT) and replicate weights following PISA methodology (BRR with Fay's adjustment,  $k = 0.5$ ).

## Analysis of moderation and mediation effect

A moderated mediation analysis was conducted to examine the relationships among bullying victimization, school belonging, family support, and reading literacy. Reading literacy was estimated using all ten plausible values, and coefficients and standard errors were pooled across ten plausible values using Rubin's (1987) rule, following PISA guidelines.

### RQ1 / Hypothesis 1: Bullying and Reading Literacy

Bullying victimization showed a robust negative association with students' reading literacy. After accounting for socioeconomic status (ESCS), gender, and school risk, the regression results indicated that higher levels of bullying were associated with significantly lower reading performance ( $B = -20.50, SE = 1.11, t = -18.49, p < .001, \beta = -0.28$ ). This effect remained strong even when covariates were included, highlighting that bullying exerts a unique and detrimental impact on literacy outcomes beyond demographic and contextual background factors.

### RQ2 / Hypotheses 2 and 3: Mediation via Sense of School Belonging

The mediating role of school belonging was supported. Consistent with expectations, bullying was negatively associated with belonging ( $B = -0.12, SE = 0.01, t = -9.71, p < .001, \beta = -0.19$ ), while belonging was positively related to reading literacy ( $B = 14.95, SE = 2.03, t = 7.36, p < .001, \beta = 0.12$ ). When both bullying and belonging were entered as predictors of literacy, the direct negative effect of bullying on reading

( $B = -20.50, SE = 1.11, t = -18.49, p < .001, \beta = -0.28$ ) remained substantial but was somewhat reduced, confirming partial mediation (Baron and Kenny, 1986). Importantly, this pattern persisted even after adjusting for ESCS, gender, and school risk, suggesting that the mediating role of belonging is not simply explained by background influences but represents a substantive psychosocial pathway linking bullying to literacy.

### RQ3 / Hypotheses 4a and 4b

Family support was further examined as a moderator. In the bullying  $\rightarrow$  belonging pathway, the interaction between bullying and family support was significant ( $B = -0.03, SE = 0.01, t = -2.97, p = .003, \beta = -0.05$ ). This indicates that the negative impact of bullying on belonging was more pronounced under high family support, contrary to the expected buffering role. In the belonging  $\rightarrow$  literacy pathway, the interaction was non-significant ( $B = 0.36, SE = 1.98, t = 0.18, p = .85, \beta = 0$ ), suggesting that family support did not alter the strength of belonging's effect on reading achievement. Thus, moderated mediation results revealed that the indirect effect of bullying on literacy via belonging varied with levels of family support, but not in the anticipated protective direction. These effects were estimated while adjusting for ESCS, gender, and school risk, underscoring the robustness of the findings.

Table 3 presents the pooled coefficients, variances, and significance levels for all hypothesized paths and interactions using Rubin's rules. As shown, bullying was negatively associated with both belonging and reading literacy, while ESCS and family support emerged as positive predictors. The interaction between bullying and family support was significant in predicting belonging, supporting H4a.

**Table 3.** Pooled regression coefficients for moderated mediation of bullying on reading literacy via sense of belonging, with family support as moderator (Philippines, PISA 2022), 10 plausible values,  $N = 1,049,025$ .

Predictor	B	SE	t	$\beta$ (Std.)	95% C.I.	p
<b>Equation 1 (Mediator: Sense of Belonging)</b>						
Bullying (BULLIED_WLE1)	-0.12	0.01	-9.71	-0.19	[-0.14, -0.10]	< .001 ***
ESCS	-0.02	0.01	-1.68	-0.03	[-0.04, 0.00]	0.094
Family Support (FAMSUP_WLE1)	0.1	0.02	6.41	0.12	[0.07, 0.13]	< .001 ***
Bullying $\times$ Family Support (INT_BULLYFAM)	-0.03	0.01	-2.97	0.05	[-0.05, -0.01]	.003 **
School Risk (SCHRISK)	-0.05	0.01	-5.16	-0.08	[-0.07, -0.03]	< .001 ***
Gender (ST004D01T_D2)	-0.05	0.02	-2.17	-0.04	[-0.09, -0.01]	.030 *



Constant	-0.28	0.02	-14.31	—	[-0.32, -0.24]	< .001 ***
<b>Equation 2 (Outcome: Reading Literacy)</b>						
Sense of Belonging (BELONG_WLE1)	14.95	2.03	7.36	0.12	[10.96, 18.94]	< .001 ***
Bullying (BULLIED_WLE1)	-20.50	1.11	-18.49	-0.28	[-22.67, -18.33]	< .001 ***
ESCS	21.94	1.78	12.35	0.28	[18.46, 25.42]	< .001 ***
Family Support (FAMSUP_WLE1)	-13.51	2.06	-6.57	-0.13	[-17.53, -9.49]	< .001 ***
Belonging × Family Support (INT_BELFAM)	0.36	1.98	0.18	0.00	[-3.52, 4.24]	0.854
School Risk (SCHRISK)	-14.80	1.29	-11.49	-0.20	[-17.32, -12.28]	< .001 ***
Gender (ST004D01T_D2)	-22.91	2.27	-10.10	-0.13	[-27.35, -18.47]	< .001 ***
Constant	429.74	4.85	88.67	—	[420.23, 439.25]	< .001 ***

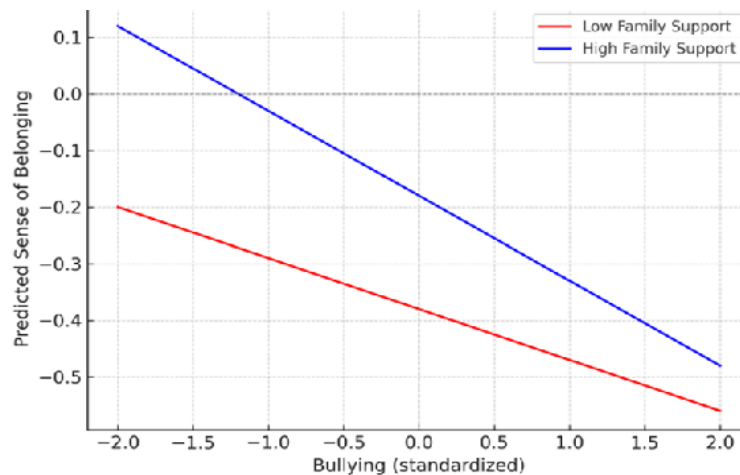
Notes.

1. *B* = unstandardized coefficient;  $\beta$  = standardized coefficient. All estimates are pooled across 10 plausible values using Rubin's rules.

2. All models adjusted for ESCS, gender, and school risk; *p*-values: \**p* < .05, \*\**p* < .01, \*\*\**p* < .001.

To illustrate this interaction effect, Figure 2 plots the predicted values of belonging across levels of bullying, separately for students with high versus low family support. The figure indicates that the

association between bullying and belonging varied by levels of family support, with a steeper negative slope observed among students reporting higher support.

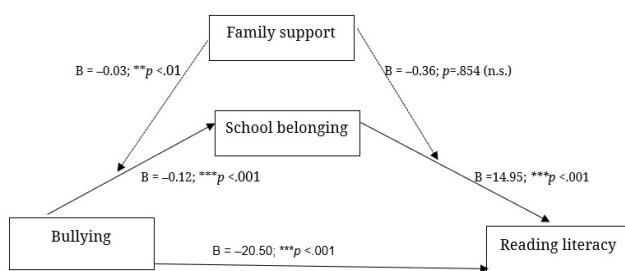


**Figure 2.** Interaction effect of family support on the relationship between bullying and belonging.

Notes:

Interaction plot showing the moderating effect of family support on the relationship between bullying and sense of belonging. Students with higher family support (blue line) showed a weaker negative association between bullying victimization and belonging compared to those with lower family support (red line). All models adjusted for ESCS, gender, and school risk

Furthermore, to visually summarize the overall findings, Figure 3 presents the tested path model, including the estimated coefficients for direct, indirect, and moderated effects.



**Figure 3.** Path diagram.

## DISCUSSIONS

The regression analysis examined the effects of bullying, school belonging, and family support on reading literacy, as well as their interactions. Consistent with extensive prior research, bullying emerged as a strong negative predictor of reading literacy, suggesting that students who experience higher levels of bullying tend to achieve lower reading literacy scores. This aligns with studies highlighting the detrimental impact of peer

victimization on cognitive engagement, motivation, and overall academic outcomes (Espelage et al., 2014; Juvonen and Graham, 2014).

In contrast, a greater sense of belonging positively predicted reading literacy, indicating that students who feel connected and accepted in their school environment are more likely to achieve higher academic performance. This finding corroborates previous evidence that belonging enhances motivation, engagement, and performance (Allen et al., 2018; Goodenow and Grady, 1993), underscoring the protective role of supportive peer and school environments in promoting literacy.

My findings further suggest that family support moderates the bullying–belonging pathway but does not significantly influence the belonging–literacy link. This implies that its role is expressed more through psychosocial resilience than through direct cognitive outcomes. This implies that its role is expressed more through psychosocial resilience than through direct cognitive outcomes. From a social ecological perspective (Bronfenbrenner, 1979), the family microsystem provides emotional resources that help students cope with adversity. However, the significant interaction effect indicates that students with higher family support may experience a sharper decline in belonging when bullied. Drawing on Self-Determination Theory (Deci and Ryan, 2000), this pattern can be interpreted as a reaction to violated expectations: strong relational support at home fosters a sense of relatedness and autonomy, but bullying

at school undermines these needs, creating a more pronounced gap. This suggests that while relational forms of family involvement generally enhance intrinsic motivation, the incongruence between secure family ties and hostile peer contexts may intensify the negative impact of bullying on belonging. Consistent with prior work, achievement-focused or controlling forms of support may further limit direct academic benefits (Cheung and Pomerantz, 2012; Soenens and Vansteenkiste, 2010), while parent-oriented motivation does not independently predict achievement among Filipino students (Bernardo, 2008).

Cultural context further explains these dynamics. In Southeast Asia, parental involvement often emphasizes moral guidance, emotional closeness, and home-based support rather than school-based engagement (Bartolome et al., 2020; Langputeh et al., 2023). Thus, family support may effectively buffer students' belonging but exert weaker and less consistent influence on literacy. Moreover, in the Philippines, the availability of family support varies with socioeconomic conditions such as conditional cash transfer membership, community participation, and parental education (Jabar et al., 2023).

Thus, these findings suggest that while families provide critical motivational and emotional resources, school-embedded processes may exert greater influence on reading literacy. Meta-analytic and cross-national research shows that school and classroom climate strongly predict achievement (Erdem and Kaya, 2024; Maxwell et al., 2017). In the Philippine context, need-supportive teaching has been shown to enhance reading outcomes (Haw et al., 2021), echoing PISA 2022 evidence that bullying, safety, and belonging are central to literacy performance (OECD, 2023c).

## CONCLUSION

This study shows that functional illiteracy among Filipino 15-year-olds is shaped not only by academic factors but also by psychosocial experiences, particularly bullying and school belonging. Bullying consistently undermined belonging and, in turn, reading literacy. Unexpectedly, the negative effect of bullying on belonging was stronger under higher family support, while the belonging-literacy pathway was not moderated. This suggests that certain parental practices may heighten adolescents' sensitivity to peer rejection, especially when support is experienced as controlling rather than autonomy supportive. From a social-ecological and self-determination perspective, family resources provide coping mechanisms but their impact is nuanced and context-dependent. In the Philippines, school climate, safety, and pedagogical quality remain more decisive for literacy outcomes than family support. This study has several limitations. First, the cross-sectional PISA 2022 design restricts causal inferences. Second, self-reported measures of bullying and belonging may be subject to bias. Third, although family support was examined as a moderator, other contextual factors (e.g., instructional practices, peer influences) were not fully addressed. Fourth, findings are specific to 15-year-olds and may not generalize to other groups. Finally, while plausible values captured literacy, unmeasured variables such as motivation or mental health may also play roles. Future research should (a) use culturally grounded measures of family support, (b) integrate multi-informant data from parents, teachers, and students, and (c) examine cross-level interactions between family and school contexts. Mixed methods designs would capture cultural nuances and clarify whether family support moderates bullying-belonging-literacy relationships in diverse settings.

Based on the findings, several recommendations can be drawn to inform both education policy and school-level practice in the Philippines. 1. Strengthen anti-bullying initiatives. Bullying

showed the strongest negative association with reading literacy, underscoring the need for robust implementation of the Anti-Bullying Act of 2013. Schools should adopt evidence-based interventions that not only punish bullying but also promote positive peer relationships and restorative practices. 2. Foster a culture of belonging. Because school belonging emerged as a key mediator between bullying and literacy, schools should prioritize creating safe, inclusive, and supportive learning environments. Programs that encourage peer mentoring, collaborative learning, and teacher-student connectedness can reinforce students' sense of acceptance and engagement. 3. Support families in providing autonomy-supportive involvement. While family support buffered the bullying-belonging pathway, its academic influence was uneven. Policies should focus on parent education programs that emphasize relational forms of involvement (e.g., communication, emotional support) rather than solely achievement pressure. This aligns with Self-Determination Theory's emphasis on autonomy-supportive practices. 4. Integrate psychosocial and academic interventions. Literacy initiatives should not be limited to pedagogy and curriculum but should also include social-emotional learning (SEL), resilience training, and teacher capacity building to address both academic and psychosocial needs. 5. Contextualize support for disadvantaged households. Given socioeconomic disparities in family involvement, policies should provide targeted support to low-income families, such as parenting workshops, community partnerships, and resource access, to reduce inequalities in both home- and school-based engagement. 6. Enhance school climate and teacher practices. Consistent with international evidence, improving classroom climate, teacher support, and instructional quality should remain central to literacy reforms, ensuring that all learners benefit from equitable, need-supportive education.

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## AUTHOR CONTRIBUTIONS

M. D. S: Conception and design of the study, data acquisition and analysis, interpretation of results, drafting of the manuscript, and final approval of the version to be published.

## DECLARATION

### Conflict of interest

The author declares that there are no conflicts of interest—financial or non-financial—that are relevant to the content of this manuscript. It is further affirmed that there are no affiliations, funding sources, or personal relationships that could have influenced the research, analysis, or presentation of findings.

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