Multidimensional Deprivation and the Stress Pathway in Adolescence: Using Latent Class Analysis

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Introduction

In many societies, disadvantage has persisted despite rising material living standards, often in forms that conventional measures fail to capture (Bourguignon & Chakravarty, 2003). This has raised growing concerns about how deprivation should be conceptualized and measured (Townsend, 1979; Alkire & Foster, 2011). The way deprivation is defined determines who is identified as vulnerable and, ultimately, who becomes the target of policy (UNICEF, 2007; Glassman, 2021). Income-based measures alone cannot fully capture the disadvantage that shapes everyday life. Prior research has shown that disadvantage is constituted by interlocking life domains that income figures do not reflect, particularly in affluent societies where these domains may shape inequalities in well-being more strongly than income itself (Roberts & Duong, 2013; UNICEF, 2007; Glassman, 2021). In response, national governments and international organizations have developed multidimensional measures that assess living conditions directly rather than through income (UNICEF, 2007; Alkire & Kanagaratnam, 2020; Glassman, 2021).

Adolescence warrants particular attention for two reasons. First, adolescents are structurally vulnerable to deprivation, because the conditions that shape their quality of life—parental employment, housing, neighborhood environment, and educational access—are governed by parental and household decisions (Wickrama et al., 2014). Unlike adults, who can respond to disadvantages by changing employment, relocating, or drawing on their own resources, adolescents have no comparable means to alter or escape these circumstances. Deprivation in adolescence is therefore imposed rather than chosen, and when several such disadvantages overlap, it tends to become entrenched and difficult to overcome (Oberwittler, 2007).

Second, deprivation in adolescence has cumulative consequences: it does not end with adolescence but becomes embedded in developmental processes and shapes the longer-term life course. Early socioeconomic adversity has been shown to elevate depressive symptoms, which in turn raise the risk of physical illness in young adulthood (Wickrama et al., 2014). Deprivation within the family environment can also disrupt adolescents' schooling and limit their progression to higher education, which in turn constrains their economic prospects in adulthood (Oeri & Roebers, 2022). The disadvantage experienced during adolescence therefore accumulates, carrying consequences that reach well beyond the period itself and unfolding along a stress pathway that links early adversity to later well-being (Hayward & Gorman, 2004).

These pressures are especially acute in Seoul, where educational and residential inequalities intersect most sharply (Lee & Han, 2024). Driven by intense academic competition, families frequently relocate in pursuit of better school districts, reinforcing residential stratification (Kim & Hlasny, 2024). Yet this strain is not reflected in income statistics: Korea's child poverty rate has fallen by nearly half over the past decade (from 16.4% to 8.6%; Ministry of Data and Statistics, 2024), even as adolescent well-being has not improved accordingly—the youth suicide rate, for instance, remains among the highest in the OECD (OECD, 2024). This divergence shows that progress measured in income alone can mask persistent disadvantages, and that capturing adolescent well-being requires a more multidimensional approach.

Despite the significance of these issues, research on multidimensional deprivation has concentrated largely on adults, with applications to adolescents remaining limited (Alkire & Kanagaratnam, 2020). Moreover, the relevant question is not simply whether an adolescent is deprived, but which combinations of disadvantage co-occur. To address this gap, this study applies the multidimensional deprivation index (MDI) to adolescents in Seoul, with dimensions adjusted to reflect local conditions (Ntsalaze & Ikhide, 2018). Latent class analysis (LCA) is used to identify deprivation typologies, and logistic regression examines their association with economic stress, conceptualized as an early psychosocial manifestation of the stress pathway (Hayward & Gorman,

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2004). Two research questions guide the study:

RQ1. What latent classes of multidimensional deprivation can be identified among adolescents, and how do they differ in their deprivation patterns?

RQ2. How are these classes associated with economic stress as a subjectively experienced psychosocial burden?

Method

Research Procedure

Figure 1 summarizes the procedure of this study. We used the 2023 Seoul Comprehensive Children's Survey, and the analytic sample comprised 704 adolescents aged 13 to 17 (Table A1, Appendix). The analysis addressed the two research questions in turn. For RQ1, latent class analysis (LCA) was used to identify unobserved typologies of co-occurring deprivation (Vermunt & Magidson, 2004); the number of classes was selected by considering both model fit statistics and the interpretability of the resulting classes. For RQ2, logistic regression was used to examine how the deprivation classes were associated with economic stress, with the non-deprived class as the reference group and age and gender included as control variables. All analyses were conducted using R.

Based on prior research, we adjusted MDI frameworks to reflect Korean adolescents' living conditions; the resulting domains and cutoffs are presented in Table A2 (Appendix). As individual employment and health status are less relevant, adolescent deprivation should be understood through family and community contexts shaping developmental opportunities.

Parental employment stability not only provides economic resources but also creates an emotionally secure environment in which adolescents can pursue education without interruption (Wickrama et al, 2014). Neighborhood environment shapes adolescents' access to supportive facilities and opportunities, while simultaneously exposing youth to harmful surroundings and risks (O'Donnell et al., 2022). Housing quality provides foundations for learning and daily life; instability or inadequacy can undermine adolescents' confidence, particularly during a period of heightened peer comparison. Education plays a central role, as gaps in learning opportunities shape future prospects (Kim & Hlasny, 2024).

Results

Model fit statistics for the 2 to 8 class solutions are reported in Table A3 (Appendix). Although the 3-class model had a slightly lower BIC, the 4-class model was selected for further analysis because it yielded a lower AIC, showed substantial improvement in fit, retained adequate classification quality (entropy score), and produced more distinct and interpretable classes (Nylund-Gibson & Choi, 2018).

As a result of LCA, one non-deprived and three deprived classes were identified (Figure 2; Table A4 in the appendix). The key difference concerns who is identified as disadvantaged, since income-based criteria identified 9.4% of adolescents as deprived, whereas the multidimensional approach classified 31.2% as disadvantaged through non-monetary domains. Moreover, this 31.2% reflects heterogeneous patterns of disadvantage rather than a single, uniform form of vulnerability.

Class 3 (Generally Non-deprived, 68.8%) showed minimal deprivation across all domains, with only education modestly elevated, suggesting that educational pressure is a common stressor even among otherwise advantaged adolescents.

Class 1 (Living-environment Deprived, 16.3%) faced disadvantages concentrated in housing and neighborhood conditions despite stable economic and educational resources. Because Seoul is generally regarded as having a favorable living environment, a class of this size points to meaningful spatial inequality within a single metropolitan area.

Class 2 (Educational-economic Deprived, 4.6%) combined high educational deprivation with parental economic instability, a combination that may carry elevated risk, as constrained learning opportunities and precarious family conditions can reinforce one another and entrench disadvantage across generations.

Class 4 (Multidimensional Non-monetary Deprived, 10.3%) showed severe, overlapping deprivation in education, housing, and neighborhood, yet near-zero deprivation in income and parental economic status. This class represents a policy blind spot: its members appear economically stable by income-based criteria even though they are multiply deprived.

Logistic regression showed that all three deprived classes had significantly higher odds of economic stress than the reference group, Class 3 (Generally Non-deprived), with odds ratios of 2.92,

2.32, and 1.82 for Class 2 (Educational-economic Deprived), Class 4 (Multidimensional Non-monetary Deprived), and Class 1 (Living-environment Deprived), respectively (Table A5, Appendix).

The elevation in stress risk was significant even for the classes that income-based measures would classify as non-poor. This indicates that non-monetary deprivation substantially raises psychosocial stress, and that structural constraints rooted in household conditions carry over into adolescents' subjective psychological burden.

Conclusions

This study identified four typologies of adolescent multidimensional deprivation in Seoul and examined their associations with economic stress. By moving beyond a simple poverty/non-poverty distinction, the findings reveal how both monetary and non-monetary disadvantages shape adolescents' lives in distinct ways. All three deprived classes reported significantly higher economic stress than the non-deprived class, and this held even for classes that income-based measures would not identify as poor. Non-monetary deprivation alone can therefore elevate adolescents' psychosocial stress in some cases, approaching that of the economically deprived class. The Multidimensional Non-monetary Deprived class illustrates this most clearly: although these adolescents appear economically stable by income criteria, they are severely and multiply deprived, and they would remain a policy blind spot for any support system that screens by income alone.

More broadly, these findings show that a multidimensional typology is not merely descriptive: because the deprivation classes were significantly associated with a subjectively experienced outcome, the framework carries diagnostic value that income-based measurement alone does not. This carries two policy implications. First, because adolescent deprivation cannot be reduced to income, financial transfers alone are insufficient; intervention must also address housing, neighborhood safety, and educational opportunity. Second, because the deprived classes differ in both composition and stress levels, class-specific strategies are needed—particularly screening that does not rely on income thresholds to reach the Multidimensional Non-monetary Deprived class. Ultimately, adolescent well-being depends not on household income alone but on the broader social and spatial environment in which young people live.

Limitations and Future Research

Several limitations should be acknowledged. First, the deprivation dimensions may not capture the full breadth of adolescents' living conditions; future work could incorporate additional domains such as digital access or peer networks. Second, the study focused on Seoul, an urban setting, and the findings may not fully reflect the experiences of adolescents in other regions or rural areas. Third, the cross-sectional design restricts causal inference, and longitudinal data would help clarify how these disadvantages unfold over time. Finally, economic stress was the only outcome examined; future research could consider additional outcomes to capture the broader consequences of deprivation.

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Figure 1
Research Procedure: Measurement of Multidimensional Deprivation

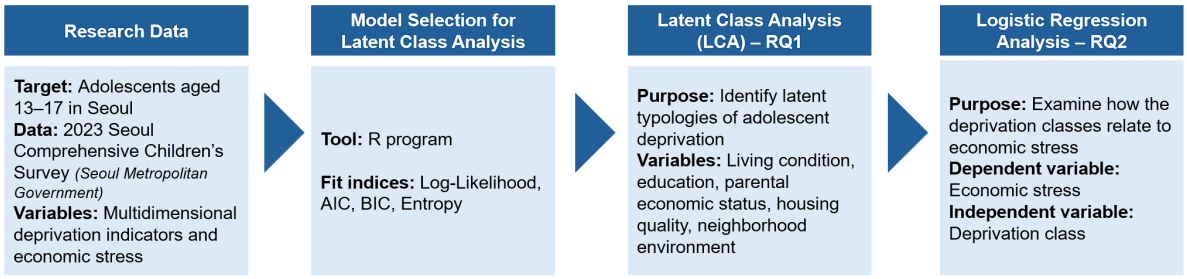
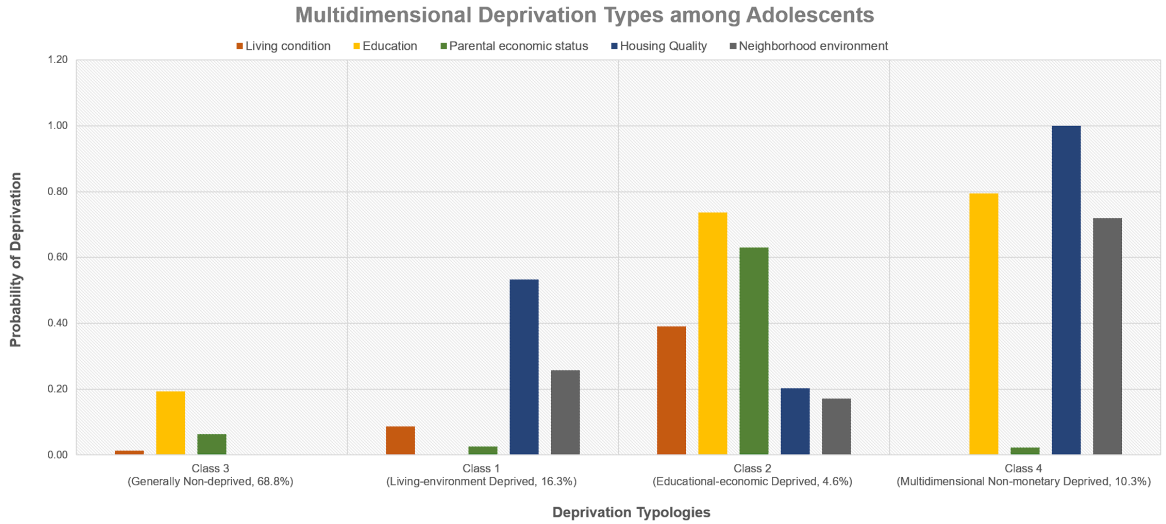


Figure 2

Visualization of Multidimensional Deprivations Patterns among Adolescents



Appendix

Table A1

Demographic characteristics of the sample(N = 704)

Variables		N(%) / M(SD)
Gender	Male	333(47.30)
	Female	371(52.70)
Age	13	93(13.21)
	14	108(15.34)
	15	141(20.03)
	16	143(20.31)
	17	219(31.11)
Household members		3.29(0.61)
Monthly income (KRW)		6.32 million (190.80)

Note. KRW 1 million = USD 713

Table A2

MDI Dimensions and Deprivation Thresholds

Dimension	Indicator	Cut-off Criterion (Deprived = 1)
Living condition	Perceived household income adequacy	Household income below 60% of national median (relative poverty line)
Education	Academic opportunity/access	Reports of lacking necessary learning opportunities compared to peers (e.g., limited after-school support, private tutoring, or academic resources)
	School engagement	Frequent absence or disengagement from school learning activities
Parental economic status	Employment stability	Parents unemployed or in irregular/unstable jobs
Housing quality	Housing quality	Living in substandard housing (below minimum housing standards, e.g., overcrowding, poor ventilation, sanitation issues)
Neighborhood environment	Local safety & environment	Living in neighborhoods with perceived safety risks or presence of harmful/undesirable facilities

Table A3

Model Fit Table for LCA

K	N	npar	logLik	G^2	AIC	BIC	Entropy
2	704	11	-1210.61	62.48	2443.22	2493.34	0.925
3	704	17	-1196.96	35.18	2427.91	2505.38	0.897
4	704	23	-1190.37	22	2426.73	2531.54	0.771
5	704	29	-1185.22	11.71	2428.44	2560.59	0.651
6	704	35	-1183.84	8.94	2437.67	2597.16	0.72
7	704	41	-1183.45	8.16	2448.9	2635.72	0.817
8	704	47	-1182.01	5.28	2458.01	2672.18	0.804

Note. K = number of classes; npar = number of parameters; logLik = log-likelihood; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion.

Table A4

Result of LCA

Class Number Types of Deprivation	Class 3 Generally Non-deprived Groups	Class 1 Living Environment Deprived Groups	Class 2 Educational -Economic Deprived Groups	Class 4 Multidimensional Non-monetary Deprived Groups
Proportion (%)	68.80%	16.30%	4.60%	10.30%
Living condition	0.013	0.086	0.391	0.000
Education	0.193	0.000	0.736	0.794
Parental economic status	0.064	0.025	0.630	0.022
Housing Quality	0.000	0.533	0.203	1.000
Neighborhood environment	0.000	0.257	0.172	0.720

Table A5

Result of logistic regression analysis

Variables	B	S.E.	Odds Ratio
Ref: Class 3(Generally Non-deprived)	–	–	–
Class 1(Living Environment Deprived)	0.598*	0.237	1.82
Class 2(Educational–Economic Deprived)	1.072**	0.363	2.92
Class 4(Multidimensional Non-monetary Deprived)	0.842**	0.28	2.32
Age	0.022	0.059	1.02
Gender (Male = 1)	0.182	0.166	1.2
Constant	-1.628	0.96	0.2
Log likelihood		-427.17	
LR χ^2		20.15	
McFadden R^2		0.023	

Note. *p < .05, **p < .01