



Family Educational Capital and Smartphone Dependence Among Upper-Grade Primary School Students: Evidence from a Survey of One Primary School in China

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Abstract. This study examines how family educational capital relates to smartphone dependence among upper-grade primary school students. Using questionnaire data from 647 students in Grades 4-6 at Z Primary School in Shangrao, Jiangxi Province, and interviews as supplementary material, smartphone dependence was assessed with the Chinese version of the Smartphone Dependence Index(SDI).A total of 317 students(49.0%)met the study cutoff, which should be interpreted cautiously as a sample-specific classification result rather than a population prevalence estimate. Baseline correlation and regression analyses showed significant positive associations between economic, cultural, and social capital and smartphone dependence. However, hierarchical regression indicated that, after controlling for gender, grade, class-cadre experience, and only-child status, the relatively stable incremental explanatory effect was mainly observed for economic capital. The findings suggest that children's smartphone dependence should be understood as a family-situated phenomenon shaped by material resources, cultural practices, and family interaction patterns.

Keywords: family educational capital; upper-grade primary school students; smartphone dependence; family intervention; questionnaire survey

1 Introduction

Smartphones have become routine tools for learning, entertainment, and social interaction in children's daily lives, but excessive and poorly bounded use has also been linked to lower well-being, learning difficulties, and weakened face-to-face interaction^{[1][2][3][4][5]}.Existing research increasingly shows that children's problematic smartphone use is not merely an individual self-control issue; it is embedded in the family context, including parental behavior, resource provision, and everyday interaction patterns^{[2][6]}.

Within this literature, however, the role of family educational capital has not been sufficiently examined through an integrated analytical framework. Studies often focus on single parental factors or general family environment, whereas the joint effects of

economic capital, cultural capital, and social capital on school-age children's smartphone dependence remain underexplored^{[6][7][8][9]}. Clarifying these relationships is important not only for explaining how family conditions shape children's smartphone use, but also for designing more differentiated family intervention strategies. This study therefore examines whether these three dimensions are significantly associated with smartphone dependence among students in Grades 4-6 at Z Primary School in a district of Shangrao City, Jiangxi Province.

2 Theoretical Framework and Method

Family educational capital was conceptualized through three dimensions: economic capital (income and durable assets), cultural capital (parents' educational background, reading resources, learning tools, and cultural participation), and social capital (parent-child interaction, educational expectations, learning guidance, and ties with teachers and other parents)^{[7][8][9]}. Using stratified sampling, data were collected from 647 students in Grades 4-6 at Z Primary School in Shangrao, Jiangxi Province, and their parents. The sample showed a relatively resource-advantaged profile. Smartphone dependence was measured with the Chinese version of the Smartphone Dependence Index (SDI)^[10], a 17-item scale covering loss of control, withdrawal, avoidance, and inefficiency. Following prior Chinese studies involving child and school-age samples^{[4][11]}, Items 3, 5, 6, 7, 8, 10, 15, and 16 served as screening items, and students with five or more "often" or "always" responses on these items were classified into the higher-dependence group. Family educational capital was operationalized through indicators of household income, cars and properties, parents' educational attainment, family book collections, learning tools, participation in tours and visits, reading practices, occupations, educational expectations, learning guidance, parent-child communication, and communication with teachers and other parents. Reliability and construct validity were acceptable for both instruments (smartphone-use questionnaire: Cronbach's $\alpha=0.878$, KMO=0.927; family educational capital questionnaire: Cronbach's $\alpha=0.968$, KMO=0.986; Bartlett's tests $p<.001$). Descriptive statistics, Pearson correlations, and multiple linear regression were first used to examine baseline relationships, followed by hierarchical regression to test whether family educational capital retained incremental explanatory power after controlling for gender, grade, class-cadre experience, and only-child status.

3 Results

Among the 647 students, 317 met the study cutoff for smartphone dependence, accounting for 49.0% of the sample. This figure should be interpreted cautiously as a sample-specific classification result rather than a population prevalence estimate.

Table 1 presents the core correlation and regression results. All three indicators of economic capital were positively associated with smartphone dependence, and the economic capital model was significant ($R^2=.541$, $F=252.706$, $p<.001$), with number of properties showing the largest standardized coefficient ($\beta=.311$). The cultural capital

model was also significant($R^2=.585, F=150.650, p<.001$); participation in tours and visits($\beta=.344$) and family book collection($\beta=.198$) showed comparatively larger coefficients, whereas spouse's educational attainment was not significant. The social capital model likewise reached significance($R^2=.577, F=124.351, p<.001$); parental learning guidance showed the largest standardized coefficient($\beta=.231$), followed by communication with other parents and parent-teacher communication.

Table 1. Core Correlation and Regression Results for Family Educational Capital and Smartphone Dependence.

Indicator	r	beta	p
Economic capital(Model: $R^2=.541, F=252.706, p<.001$)			
Household income	0.653**	0.270	<.001
Cars	0.627**	0.255	<.001
Properties	0.661**	0.311	<.001
Cultural capital(Model: $R^2=.585, F=150.650, p<.001$)			
Respondent's education	0.638**	0.130	.001
Spouse's education	0.628**	0.046	.295
Book collection	0.649**	0.198	<.001
Learning tools	0.607**	0.085	.032
Tours/visits	0.710**	0.344	<.001
Reading practices	0.610**	0.081	.047
Social capital(Model: $R^2=.577, F=124.351, p<.001$)			
Respondent's occupation	0.605**	0.038	.367
Spouse's occupation	0.661**	0.132	.004
Educational expectations	0.625**	0.113	.006
Learning guidance	0.670**	0.231	<.001
Parent-child communication	0.598**	0.069	.083
Parent-teacher communication	0.652**	0.152	<.001
Communication with other parents	0.620**	0.161	<.001

Note. Dep. var.=smartphone dependence; r=Pearson correlation; beta=standardized coefficient.
** $p<.01$.

Table 2. Hierarchical Regression Results After Controlling for Individual Background Variables.

Model	Variables Entered	R ²	Adjusted R ²	F	p	ΔR^2	ΔF	Δp
Model 1	Gender, grade, class-cadre experience, only-child status	0.010	-0.003	0.805	0.523	-	-	-
Model 2	Model 1+economic capital	0.043	0.028	2.752	0.019	0.033	10.438	0.001
Model 3	Model 2+cultural capital	0.084	0.040	1.931	0.023	0.041	1.454	0.165
Model 4	Model 3+social capital	0.116	0.035	1.430	0.085	0.032	0.859	0.590

Note. Model 1 includes only control variables. ΔR^2 indicates the increase in explained variance relative to the previous model; ΔF and Δp test the incremental contribution of each newly entered block.

Hierarchical regression was then conducted to examine whether family educational capital retained incremental explanatory power after controlling for individual back-

ground variables. Model 1 included gender, grade, class-cadre experience, and only-child status; Model 2 additionally entered economic capital variables; Model 3 further added cultural capital variables; and Model 4 then added social capital variables. As shown in Table 2, individual background variables alone explained little variance in smartphone dependence. After these controls were entered, economic capital still contributed significant incremental explanatory power ($\Delta R^2 = .033, \Delta F = 10.438, p = .001$). By contrast, although the inclusion of cultural capital and social capital further increased the overall R^2 , the incremental effects of these two variable blocks were not statistically significant (Model 3: $\Delta R^2 = .041, p = .165$; Model 4: $\Delta R^2 = .032, p = .590$). These findings suggest that the baseline associations reported in Table 1 should be interpreted cautiously: under stricter controls, the relatively stable independent effect is mainly observed for economic capital.

4 Discussion

The baseline results suggest that children's smartphone dependence may develop through different family pathways. Stronger economic capital can lower the threshold for device access and sustained use, while cultural and social capital may embed smartphones more deeply in learning, information search, home-school coordination, and peer-related interaction. However, these pathways should not be treated as equally robust net effects. The hierarchical regression results indicate that, once individual background variables were controlled, the relatively stable incremental explanatory contribution was mainly observed for economic capital, whereas the additional effects of cultural capital and social capital were not significant at the block level. This suggests that the baseline associations for cultural and social capital may partly reflect shared variation with other family conditions or individual differences rather than equally stable independent effects. The findings therefore support a differentiated rather than uniform interpretation of children's smartphone use in family settings. At the same time, the results should be read as evidence of association rather than causation, and some relationships may be bidirectional or reactive rather than purely antecedent. For example, stronger parental learning guidance may partly reflect a family response to children's already elevated smartphone use rather than a one-way cause of it. Because the data were drawn from one public primary school in Shangrao, Jiangxi Province, the findings should be treated as context-bound rather than nationally representative. Future research should further examine school environment, peer relations, and more complete individual indicators, especially academic performance.

5 Conclusion

In this sample, smartphone dependence among upper-grade primary school students was associated not only with individual behavior but also with family educational capital. Baseline analyses showed significant positive associations between all three dimensions of family educational capital and smartphone dependence. However, after controlling for gender, grade, class-cadre experience, and only-child status, the rela-

tively stable incremental explanatory effect was mainly observed for economic capital, whereas the additional contributions of cultural capital and social capital were not statistically significant at the block level. These findings suggest that the role of family educational capital should be interpreted in a differentiated and cautious way rather than as three equally stable independent effects. Given the single-school, cross-sectional design, the findings should be interpreted with appropriate caution.

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