

Maternal Work Schedule Autonomy and Children's Socioemotional Outcomes: Evidence from the United Kingdom.

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Executive Summary

This study tests the hypothesis that lower maternal schedule autonomy is associated with greater child socioemotional difficulties, on the grounds that limited control over working time may disrupt maternal wellbeing and household routines. Using the UK Household Longitudinal Study, the analysis links employed mothers' autonomy responses to parent-reported Strengths and Difficulties Questionnaire scores for children aged 5 to 8 across five biennial waves from 2011 to 2021 ($N \approx 3,250$). The five SDQ subscales are estimated separately using weighted pooled cross-sectional OLS with wave fixed effects and robust standard errors, controlling for household income, maternal education, child sex and maternal job-related anxiety. The results provide little support for the hypothesis. Although autonomy is sharply socioeconomically patterned, its coefficients are statistically indistinguishable from zero across all subscales once the wider control set is included. Household income shows the clearest gradient, with children in the lowest income quintile scoring around half a point higher on several difficulty subscales, scored from 0 to 10, than those in the highest. Lower maternal education and poorer maternal mental health are also associated with worse outcomes. Schedule autonomy therefore appears to operate as part of a wider job-quality and socioeconomic bundle rather than as an independent correlate of early-childhood SDQ outcomes.

AI Statement/Declaration

I acknowledge the use of generative AI in drafting and code development (R Studio) in this paper. However, the work reported here remains my own.

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1. Introduction

Children's mental health in the United Kingdom has deteriorated visibly within a single decade. NHS Digital (2018) recorded that one in eight young people aged 5 to 19 met the threshold for a probable mental disorder; by 2023 this had risen to roughly one in five young people aged 8 to 25 (NHS Digital, 2023)¹. Poorer child mental health is linked to weaker educational outcomes (Johnston et al., 2013) and to lasting disadvantage in earnings and social mobility (Goodman, Joyce and Smith, 2011). The early-childhood foundations of these trajectories are therefore a matter of clear economic interest, since the conditions that shape socioemotional outcomes in childhood may carry forward through schooling and into the adult labour market.

This rise has unfolded against a recognisable change in the UK labour market. The Taylor Review of Modern Working Practices (Taylor, 2017) drew political attention to what it termed “one-sided flexibility”, arrangements in which employers retain control over the timing and amount of work while the worker absorbs the resulting volatility. The Employment Rights Act 2025 has since responded by tightening the rules on zero-hours work and introducing new rights to predictable working patterns. Whether mothers in such roles can plan around their children's routines is therefore a live policy question, yet the UK evidence on whether maternal schedule autonomy is independently linked to children's socioemotional outcomes remains underexplored.

Recent work has examined related channels, schedule timing, economic hardship and maternal education (Zilanawala and Schenck-Fontaine, 2025; Zilanawala, 2021), but these channels overlap. Education sorts mothers into jobs with differing pay, schedule timing and schedule control, partly through human-capital and signalling mechanisms (Spence, 1973), meaning autonomy is rarely observed in isolation from the wider job-quality and socioeconomic bundle. The pathway through which autonomy may matter for children has nevertheless been studied. Low control over working hours raises work-family conflict and job-related strain (Lyness et al., 2012), which in turn disrupts the household routines and parenting quality that may shape

¹ The 2023 survey was a follow-up to the 2017 cohort, so the youngest participants had aged from 2 to 8. (NHS Digital, 2023). The original 2017 study could not collect data on mental disorders for children under 5.

children's socioemotional development. Maternal schedule autonomy is therefore best understood as an indirect influence on children's outcomes, operating through maternal wellbeing and household resources.

1.1 Hypothesis

The hypothesis examined in this study is that:

“Lower maternal work schedule autonomy is associated with greater child socioemotional difficulties.”

The null hypothesis is that there is no association between maternal schedule autonomy and children's socioemotional outcomes. The hypothesis is framed as an association rather than a causal effect, the pooled cross-sectional design used here cannot rule out reverse causality, selection into employment, and parental personality. The estimates are interpreted accordingly.

1.2 Contribution to the literature

Existing UK evidence has examined parental nonstandard schedules, work intensity, and family income and their associations with children's socioemotional outcomes, but it rarely separates mother's work timing from their control of its timing. This study contributes by placing perceived maternal schedule autonomy, rather than schedule timing alone, at the centre of a UK child-outcomes analysis.

1.3 Disposition

The remainder of this study is structured as follows. Section 2 reviews the theoretical and empirical literature. Section 3 describes the data and construction of the analytic sample. Section 4 sets out the methodology. Section 5 presents the main results, limitations, diagnostics and robustness checks. Section 6 discusses the findings, potential policy implications and avenues for future research. Section 7 concludes.

2. Literature Review

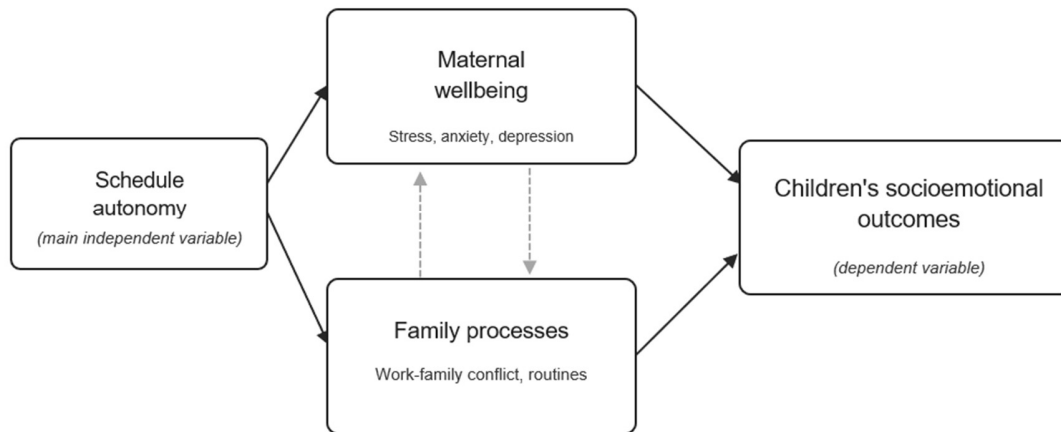
2.1 Theoretical framework

Three complementary frameworks help explain why maternal schedule autonomy may be associated with children's socioemotional outcomes. The family-stress model, developed by Conger et al. (1994), proposes that economic pressure and difficult employment conditions raise parental distress, which then interrupts family routines and parent-child interaction. Applied to this study, low schedule autonomy may operate as a form of employment strain; when mothers have limited control over when they work, they may face greater difficulty arranging childcare and managing work-family conflict. Empirically, mothers facing unpredictable hours report more stress and lower personal control (Henly and Lambert, 2014). This may increase maternal stress and reduce the temporal resources available for quality and consistent parenting.

The family-investment model, originating with Becker and Tomes (1979), provides a complementary pathway by emphasising the resources parents invest in their children's development. Although typically applied to income and material resources, the framework also applies to time, as mothers with greater control over their schedules may be better placed to protect regular time for meals, school involvement, bedtime routines and shared activities. Low-autonomy schedules may therefore reduce not only the quantity of mother-child time, but also its predictability. Unpredictable schedules also disrupt parent's engagement with their child's school and school-based activities (Posey-Maddox and Haley-Lock, 2016).

Bronfenbrenner's (1979) *ecological systems framework* provides a broader view. The workplace constitutes an 'exosystem', a setting that shapes children's development not through direct contact, but through its influence on the proximal environments of home and parent-child interaction. Imposed hours may inadvertently erode the mother-child interactions that occur within those proximal settings, motivating an explicit focus on schedule control as distinct from schedule timing.

Figure 1. Theoretical link between schedule autonomy and children's socioemotional outcomes



Note: Arrows represent theoretical associations not causal claims. Dotted arrows represent the effects maternal wellbeing and family processes may have upon each other.

Figure 1 summarises this combined framework. Schedule autonomy is hypothesised to influence children's socioemotional outcomes indirectly, through maternal wellbeing and family processes, with the two mediating channels themselves interrelated. Together, these frameworks suggest low schedule autonomy may matter because it simultaneously increases maternal strain and constrains time-based investments in children, with risks larger where household resources are already limited.

Each framework nevertheless has limits when applied to this setting. The family-stress model was developed around acute economic shock, whereas limited schedule control is a persistent but less acute constraint, so the strength of the predicted response may differ here. The family-investment model treats parental time as broadly substitutable for material resources, which gives less weight to the predictability of that time and offers no clear prediction for a mother with ample hours at home but little control over when they fall. Bronfenbrenner's framework, meanwhile, is valuable as an organising device but broad enough that it does not generate sharp testable predictions on its own. Together, however, the three provide a coherent basis for testing

whether maternal schedule autonomy is associated with children's socioemotional outcomes once the wider bundle is held constant.

2.2 Empirical Evidence

The frameworks above identify two channels through which schedule autonomy could reach children. The family-stress channel runs through maternal strain and the energy left for parenting. The family-investment channel runs through the predictability of time-based inputs to children's development. Both sit inside the workplace exosystem. Perceived schedule autonomy itself is sparsely studied in relation to children's socioemotional outcomes, particularly with UK child-outcome data. The empirical landscape is therefore built from literature on adjacent mechanisms. Schedule timing, work intensity, economic hardship, and maternal wellbeing often co-occur in lower-paid work, which people are often sorted into by their educational attainment. The central question is whether perceived schedule autonomy carries an independent association with children's Strengths and Difficulties Questionnaire (SDQ)² outcomes once this wider job-quality bundle is held constant.

Direct evidence on the family-stress channel is most developed for workers, less so for children. Lyness et al. (2012) use hierarchical linear modelling across 21 industrialised countries and define flexibility as worker control over schedules and hours. They show that control is socially unequal, concentrated among men, the better-educated, and higher earners. Schedule control also reduces strain-based work-family conflict for women. However, the analysis focuses on worker outcomes and does not make the link to children. Henly and Lambert (2014) reinforce the strain mechanism. They show that mothers facing unpredictable hours report more stress and lower personal control. Schneider and Harknett (2021) push the channel through to children most directly, using Shift Project data on 2,613 US service-sector mothers. They find schedule unpredictability associated with higher internalising behaviour, which maps to emotional symptoms and peer problems on the SDQ subscales. They also find associations with

² A measure of children's socioemotional outcomes.

externalising behaviour, which maps to conduct problems and hyperactivity. The analysis identifies maternal wellbeing as the strongest pathway, alongside economic insecurity and reduced developmental parenting time. These mediators map onto both theoretical channels. However, the sample is US-based, sector-specific and not nationally representative. Unpredictability is also a different construct from perceived influence over start and finish times. A worker can have predictable hours she did not choose, or variable hours she did.

Evidence on the family-investment channel comes from UK income, work-intensity and hardship studies. Noonan, Burns and Violato (2018) use the Millennium Cohort Study (MCS) and find higher permanent family income associated with lower SDQ difficulties at age 11, with maternal psychological distress mediating part of the link. Permanent income captures longer-run resources better than single-year earnings. The multivariable logistic regression design cannot claim causality. Treanor and Troncoso (2022) use Growing Up in Scotland data and non-linear growth-curve models. They find unstable work intensity associated with conduct and emotional problems, with material deprivation linked to both. Zilanawala and Schenck-Fontaine (2025), also using the MCS, employ residualised change models. They regress age-five child outcomes on age-three outcomes, maternal nonstandard work, family controls and hardship. Adjusting for earlier child behaviour mitigates the concern that child temperament drives both work choices and outcomes. They find nonstandard schedules associated with higher internalising behaviour at age five, particularly when financial stress is present. The study does not observe whether mothers control their schedules and cannot control for time-varying unobservable factors. Together these papers show that economic hardship, low income and unstable work reach children through the investment channel, often in combination with strain. Yet none isolates control over hours.

Alongside income and hardship, education appears to be an important dimension of the bundle. Zilanawala (2021) uses MCS linear probability models and shows that mothers with less than GCSE-level qualifications are most likely to work nonstandard schedules across childhood. Weekend work concentrates among the least-educated. Evening work is most common among the degree-educated, potentially capturing medical professionals or general professional spillover. Wang (2023) tests this implication on US child outcomes using the Future of Families

and Child Wellbeing Study. She finds night and variable schedules associated with worse behaviour among children of mothers without a high-school qualification. However, her within-child fixed effects shrink and often lose significance, suggesting stable family characteristics absorb part of the initial gradient. Read alongside Zilanawala (2021), this is consistent with nonstandard work meaning imposed constraint at the bottom of the education distribution, where the strain channel dominates, and chosen flexibility nearer the top. The interpretation remains suggestive because neither paper observes perceived schedule control directly.

2.3 Empirical Evidence Summary

The literature points consistently to job quality as a plausible influence on children's socioemotional outcomes, with strain and investment channels each receiving empirical support. Yet the socioeconomic context is rarely separable from the work conditions themselves. Household income, economic hardship and maternal education often absorb or interact with the work-related variables under study, making it difficult to separate the effect of any single aspect of job quality. Across the literature, work conditions therefore appear closely tied to the wider socioeconomic circumstances in which families are situated. Two further considerations are also common. Mother-reported SDQ outcomes are widely used and carry a known measurement bias, while the estimates produced in most studies should be read as associations rather than causal effects. These limitations do not remove the value of the evidence, but they do shape how strongly the findings can be interpreted.

Against this background, the present study accounts for household income, maternal education and maternal wellbeing when testing the autonomy association. Its contribution is to examine whether perceived schedule autonomy carries an independent association with children's SDQ subscales once the wider socioeconomic bundle is controlled for. This allows schedule autonomy to be considered separately from the broader job-quality and socioeconomic factors with which it is often linked.

3. Data

3.1 Dataset

The analysis uses the Understanding Society UK Household Longitudinal Study, a nationally representative annual household panel collected by the Institute for Social and Economic Research at the University of Essex. Data access provides five waves with valid SDQ and maternal work-autonomy items, which are pooled: waves d, f, h, j and l, providing biennial coverage from 2011-2012 to 2020-2021. The empirical strategy treats the data as pooled cross-sections rather than as a within-child panel, for reasons set out in Section 4.

3.2 Sample construction

The analytic sample is constructed in seven steps from the appended waves, as seen in Table 1. The SDQ age-window filter restricts the sample to children aged 5 to 8 (the survey-imposed administration window), then the SDQ-availability filter retains only children with a valid subscale response. The maternal-linkage filter retains only children with a resident-mother identifier, followed by the maternal-employment filter which retains only children whose mother was in employment in the relevant wave (the autonomy item is asked only of employed adults). The autonomy-availability filter requires a valid wkaut5 response; and listwise deletion removes observations missing on any preferred-model covariate. Table 1 reports observation counts at each step. Within the analytic sample, 82 children appear in more than one wave because their 5–8 age window spans two or more biennial surveys; these children are retained in the main analysis, with sensitivity assessed in Section 5.

Table 1. Sample construction.

Step	Filter applied	Observations
1	Pooled child-wave observations, waves d, f, h, j, l	≈ 25,000
2	Children aged 5 to 8 (SDQ administration window)	≈ 9,000
3	Valid SDQ response on at least one subscale	≈ 8,500
4	Linked to a resident mother	≈ 7,500

Step	Filter applied	Observations
5	Mother in employment in the wave concerned	≈ 4,500
6	Valid maternal autonomy response (wkaut5)	≈ 3,260
7	Complete on Model 9 covariates (listwise deletion)	3,254 / 3,249 / 3,245 / 3,248 / 3,251

Notes: Counts in earlier steps are rounded. Subscale variation in step 7 reflects subscale-specific item missingness on the dependent variable; ordering follows conduct, emotional, hyperactivity, peer, prosocial.

3.3 Variable construction

Dependent variable

The five SDQ subscales, conduct problems, emotional symptoms, hyperactivity, peer problems and prosocial behaviour, each range from 0 to 10 and are scored from five three-point Likert items per subscale (Goodman, Lamping and Ploubidis, 2010). Prosocial is reverse-keyed and excluded from the total because it represents a strength rather than a difficulty. Subscales are estimated separately rather than as a single total as collapsing into a total would mask how individual subscales respond to individual controls.

Independent variable: schedule autonomy

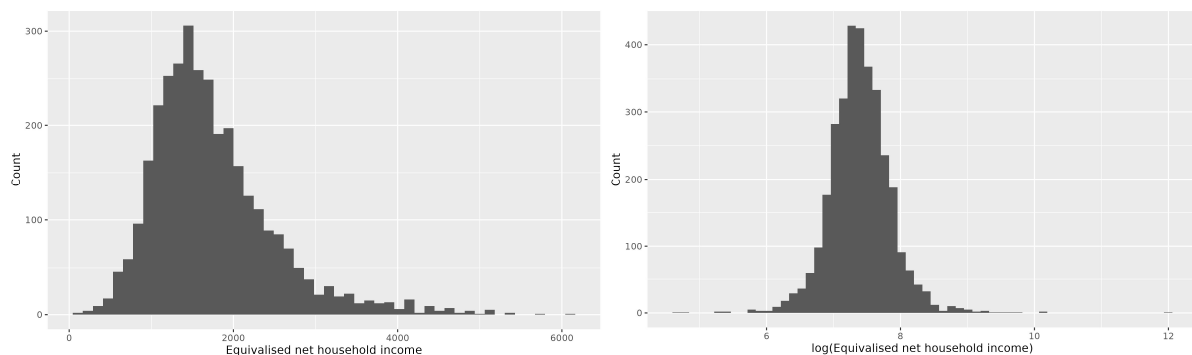
The principal explanatory variable is maternal perceived schedule autonomy, derived from wkaut5, which asks employed adults how much influence they have over their start and finish times. Responses are coded ‘A lot’, ‘Some’, ‘A little’ and ‘None’, with ‘A lot’ as the reference category. The variable is treated categorically because the spacing between response options cannot be assumed equal. A binary nonstandard-schedule indicator (constructed from wktime and wkends, see Appendix A1) captures evening, night, weekend or rotating work; this indicator was tested but excluded from the preferred specification because it was statistically indistinguishable from zero and did not materially alter the autonomy estimates.

Income

Household income, rather than mother's individual income, is used because children's living standards are shaped by the broader resources available within the household. Net monthly

disposable household income is equivalised using the modified OECD scale³ (ONS, 2015). The raw distribution is heavily right-skewed (median $\approx$ £1,500; sample maximum $\approx$ £162,000), which would heavily weight a small number of high-income observations under a linear specification. Figure 2 shows the distribution truncated at the 99th percentile alongside the log transformation, which is approximately symmetric. The preferred Model 9 enters logged income as quintile dummies (Q5 reference), allowing flexible non-linearity across the distribution; a log-income specification is reported as a robustness check in Section 5. Quintiles also support the family-investment prediction of diminishing returns to additional household resources.

Figure 2. Distribution of equivalised net household income (left: raw, winsorised at 99th percentile; right: log-transformed).



Controls

The control set is determined by both joint F-tests and theoretical importance for inclusion (Appendix A2). Maternal education is captured by a six-category indicator from the UKHLS derived attained-qualification variable, with Degree as the reference. Maternal job-related anxiety is measured by `jwbs1_dv`, a summed Likert anxiety scale ranging from 3 to 15 (Warr, 1990), with higher values indicating better mental health. The companion job-related depression scale (`jwbs2_dv`) was tested but is not jointly significant in the preferred specification ($F = 1.48$,

³ The modified OECD scale weights the first adult 1.0, each additional adult 0.5, and each child under 14 at 0.3.

$p = 0.224$) and is excluded. The two scales are positively correlated (Pearson 0.695) but target distinct affective dimensions, so excluding depression while retaining anxiety does not destabilise inference. Children's sex is included as a binary indicator with male as the reference. Wave indicators absorb period-level differences. A co-resident partner indicator was tested but excluded after failing the joint F-test ($F = 1.10$, $p = 0.294$) and proving no statistical difference to the autonomy coefficients, as were maternal weekly working hours, child age, region, grandparent co-residence, sibling count and the nonstandard-schedule indicator. The robustness of these decisions is verified in Section 5.

3.4 Descriptive statistics

Table 2 reports descriptive statistics by maternal autonomy category. Three patterns emerge. First, children's sex is approximately balanced across autonomy groups (the share female lies between 0.48 and 0.51 in every category). Second, the SDQ subscale means are generally higher in the 'None' category than the 'A lot' category, though not uniformly across intermediate categories, with prosocial moving in the opposing direction. Third, autonomy is socioeconomically patterned in three reinforcing ways: mean equivalised monthly income falls from £2,186 in 'A lot' to £1,644 in 'None'; the share of mothers with a degree falls from 0.49 to 0.37; and both job-related mental-health scales fall (greater anxiety/depression) from 'A lot' to 'None'.

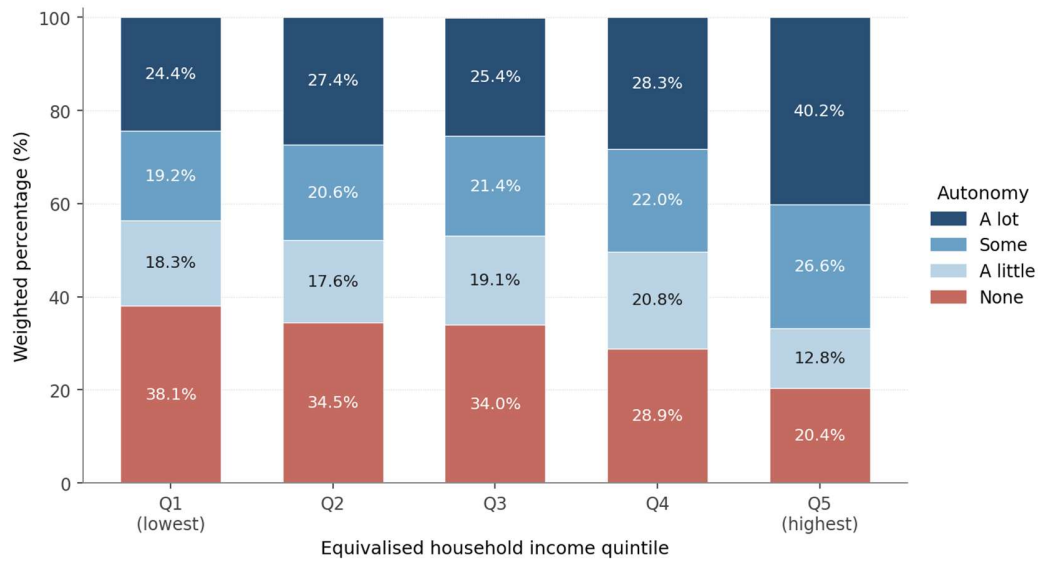
The socioeconomic patterning of autonomy is sharper still in cross-tabulation. Figure 3 plots autonomy by household income quintile: the share reporting 'None' falls from 38.1% in Q1 to 20.4% in Q5, while the share reporting 'A lot' rises from 24.4% to 40.2%. A similar gradient appears for education, where mothers who reported GCSE-level educational attainment reported 'no' autonomy 13.0% (weighted) more than mothers who reported degree-level qualifications. Schedule autonomy is therefore bundled with broader socioeconomic position rather than being a free-standing characteristic of the worker.

Table 2. Descriptive statistics by maternal work schedule autonomy.

	A lot	Some	A little	None
n	919	738	563	1,041
SDQ total difficulties: mean (standard deviation)	7.38 (5.28)	7.64 (5.32)	7.71 (5.31)	7.80 (5.67)
SDQ conduct problems	1.40 (1.41)	1.53 (1.48)	1.46 (1.47)	1.55 (1.56)
SDQ emotional symptoms	1.60 (1.91)	1.56 (1.85)	1.69 (1.92)	1.64 (1.95)
SDQ hyperactivity	3.25 (2.48)	3.43 (2.44)	3.43 (2.59)	3.47 (2.57)
SDQ peer problems	1.13 (1.51)	1.14 (1.56)	1.18 (1.54)	1.18 (1.61)
SDQ prosocial behaviour	8.61 (1.64)	8.49 (1.69)	8.57 (1.66)	8.45 (1.81)
Equivalised income £/month: mean	2,186	1,892	1,757	1,644
Log equivalised income	7.47 (0.51)	7.44 (0.46)	7.38 (0.41)	7.32 (0.42)
Job-related anxiety scale	12.08 (2.58)	11.54 (2.81)	11.69 (2.64)	11.63 (2.86)
Job-related depression scale	13.64 (2.16)	13.15 (2.57)	13.33 (2.37)	13.07 (2.70)
Female child (proportion)	0.48	0.49	0.51	0.48
Co-resident partner (proportion)	0.12	0.15	0.14	0.16
Education: Degree	0.49	0.50	0.47	0.37
Education: A-level	0.16	0.19	0.19	0.22
Education: GCSE	0.16	0.14	0.15	0.19
Nonstandard schedule (proportion)	0.39	0.33	0.38	0.38

Notes: Standard deviations in parentheses for continuous variables. Source: UKHLS pooled child-wave observations linked to employed mothers, waves d, f, h, j, l. Job-related mental-health scales are coded so higher values indicate better mental health (3 = most anxious / depressed, 15 = least anxious / depressed). Higher prosocial scores indicate better behaviour.

Figure 3. Maternal work schedule autonomy by household income quintile (weighted percentages).



Notes: Bars sum to 100% within each quintile. Source: UKHLS pooled child-wave observations, waves d, f, h, j, l.

4. Methodology

4.1 Estimator

Given work autonomy is socially patterned, the preferred specification, Model 9, is estimated separately for each of the five SDQ subscales controlling for socioeconomic factors. This aims to clarify autonomy's independent association. The empirical strategy is a weighted pooled cross-sectional ordinary least squares regression:

Equation 1:

$$SDQ_{ivs} = \alpha_s + \beta_s' Autonomy_{iv} + \gamma_s' \ln(IncomeQ_{iv}) + \theta_s ChildFemale_i + \pi_s' Education_{iv} + \lambda_s JobAnx_{iv} + \delta_{vs} + \varepsilon_{ivs}$$

where SDQ_{ivs} is the score on subscale s for child i in wave w ; $Autonomy_{iv}$ is the vector of dummies for 'Some', 'A little' and 'None' ('A lot' reference); $\ln(IncomeQ_{iv})$ is the vector of household-logged-income quintile dummies (Q5 reference); $Education_{iv}$ is the six-category

education vector (Degree reference); JobAnx_{iv} is the maternal job-related anxiety scale; δ_{vs} are wave fixed effects; and ε_{ivs} is the error term. The parameter of interest is β_s , interpreted as the association between maternal schedule autonomy and SDQ outcomes on subscale s . Coefficients are reported as point differences on 0–10 SDQ subscales. Standard errors are heteroskedasticity-robust (HC1), supported by the Breusch-Pagan and White tests reported in Section 5. Estimation is weighted using the Understanding Society cross-sectional child weight.

4.2 Why pooled cross-section, not within-child fixed effects

The cross-sectional design is preferred to a within-child longitudinal alternative for two main reasons. Firstly, the SDQ administration window of ages 5 to 8, combined with wkaut5 being captured only biennially, means most children appear in the analytic sample only once, with only 82 of approximately 3,250 children (around 2.5%) observed in more than one wave. A child fixed-effects estimator would identify the autonomy parameter from this small, non-representative subset and would discard the cross-sectional variation that the research question requires. Pooling repeated cross-sections across waves is therefore the natural design when unit-level repeat observations are too sparse for fixed-effects identification, and it follows established UKHLS practice. Aguirre, Benzeval and Murray (2024) treat SDQ at ages 5 and 8 as separate cross-sectional snapshots because longitudinal analysis is not feasible, while this study pools across all ages between 5 and 8 to maximise the available sample.

This design has costs. Household composition and unobserved family characteristics may shape both autonomy and child outcomes, and these threats are addressed in Section 5 through latest-only, sibling-count, one-child-household and region-controlled specifications. Child-clustered standard errors are not used because more than 97% of child clusters contain only one observation, making clustered inference largely uninformative.

4.3 Model build

Income enters as logged quintile dummies in Model 9. This allows non-linearity across the income distribution to be read directly from the coefficients, informative for the family-investment prediction of diminishing returns and is robust to the long right tail of the raw

distribution (Figure 2). A continuous log-income specification is reported in Section 5 and produces substantively identical conclusions for autonomy.

Controls are introduced sequentially across nine cumulative model builds. Autonomy is initially marginally significant ($p < 0.10$), however, the decisive step is the introduction of household income at Model 4, which attenuates autonomy and removes its marginal significance. No subsequent specification restores the autonomy gradient: across Models 5 to 9 the autonomy coefficients are indistinguishable from zero, while income, education, children's sex and the job-related anxiety scale each contribute statistical significance. Two interaction specifications were also tested, autonomy $\times$ income and autonomy $\times$ education (Models 7A and 7B in Appendix A3), neither providing evidence that the autonomy association varies systematically by income or education. Model 9 is therefore preferred.

The framework in Figure 1 positions maternal wellbeing as a mediator of autonomy on children's outcomes, which raises the concern that including job-related anxiety as a control might constitute a 'bad control' and bias the autonomy coefficient toward zero. The specification can still be defended. The work autonomy variable captures perceived control over start and finish times, while job-related anxiety variable measures general job-related mental state, so the two variables target related but distinct constructs. Pre-existing maternal anxiety also looks more like a confounder than a pure mediator, since it can plausibly reduce a mother's bargaining power over scheduling while independently worsening child outcomes through parenting style, meaning omission would introduce bias of its own.

The robustness specification in Section 5, which drops anxiety from the model, helps settle this empirically. If anxiety were absorbing a meaningful indirect effect, removing it should push the autonomy coefficient away from zero, but the coefficients remain statistically indistinguishable from zero on every subscale. This suggests overcontrol is unlikely to explain the null.

4.4 Identification threats

Identification threats remain, such as selection into employment and occupational sorting. The sample includes only employed mothers, and unobserved resources or preferences may shape

both mothers' access to higher-autonomy jobs and children's SDQ outcomes. Omitted variables, including parental personality and occupation, may bias the autonomy coefficient in either direction. Meanwhile, reverse causality is also possible if children's behavioural difficulties constrain maternal job choices, although this is less directly testable in the pooled cross-sectional design. Finally, because SDQ scores are mother-reported, social desirability bias⁴ may lead mothers to understate their children's behavioural problems, a concern common to all parent-report instruments in this literature, though any such attenuation would work against detecting associations and so is likely to produce conservative estimates.

An instrumental-variables (IV) approach was also considered but is not feasible here. A valid instrument must predict wkaut5 while affecting children's SDQ only through autonomy. Potential candidates such as occupation or industry fail the exclusion restriction because they may also shape income and maternal mental health, each of which independently affects child outcomes. The pooled-OLS association interpretation is therefore considered an appropriate model.

The estimates that follow are therefore interpreted as associations, not causal effects.

5. Results

Table 3 reports the preferred Model 9 specification across the five SDQ subscales. Results are interpreted in turn for autonomy, income, children's sex, education and maternal job-related anxiety.

⁴ Social desirability bias refers to respondents under-reporting traits or behaviours they perceive as undesirable.

Table 3. Model 9: SDQ subscales on autonomy, income quintiles (Q5 reference), children's sex, education and maternal job-related anxiety.

	Conduct	Emotional	Hyperactivity	Peer	Prosocial
Autonomy: Some	0.000	-0.134	0.062	-0.093	-0.039
	(0.088)	(0.117)	(0.143)	(0.089)	(0.096)
Autonomy: A little	0.088	0.076	0.157	0.124	-0.197
	(0.110)	(0.139)	(0.176)	(0.140)	(0.137)
Autonomy: None	0.097	-0.082	0.109	-0.062	-0.125
	(0.085)	(0.112)	(0.133)	(0.089)	(0.093)
Income Q1 (lowest, vs Q5)	0.337***	0.525***	0.574***	0.286*	-0.072
	(0.125)	(0.147)	(0.196)	(0.154)	(0.165)
Income Q2 (vs Q5)	0.324***	0.360***	0.414**	0.300**	0.037
	(0.101)	(0.134)	(0.171)	(0.117)	(0.125)
Income Q3 (vs Q5)	0.149	0.321**	0.219	0.218**	0.093
	(0.096)	(0.136)	(0.170)	(0.106)	(0.119)
Income Q4 (vs Q5)	-0.088	0.037	0.024	0.009	0.206*
	(0.092)	(0.120)	(0.165)	(0.092)	(0.110)
Children's sex: Female	-0.177***	0.204**	-0.975***	-0.221***	0.576***
	(0.066)	(0.088)	(0.105)	(0.074)	(0.076)
Education: A-level (vs Degree)	0.097	0.196	0.522***	0.208*	0.053
	(0.097)	(0.122)	(0.153)	(0.111)	(0.108)
Education: GCSE (vs Degree)	0.233**	0.014	0.444***	0.317***	-0.239*
	(0.101)	(0.128)	(0.161)	(0.116)	(0.127)
Education: No qualification	0.341	-0.001	1.402**	0.313	-0.356
	(0.308)	(0.523)	(0.674)	(0.276)	(0.294)
Maternal job-related anxiety	-0.063***	-0.077***	-0.072***	-0.055***	0.027**
	(0.013)	(0.017)	(0.020)	(0.013)	(0.013)
Observations	3,254	3,249	3,245	3,248	3,251
R²	0.037	0.041	0.071	0.038	0.042

Notes: HCl robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Reference categories: 'A lot' for autonomy; Q5 (highest) for income; Male for child's sex; Degree for education. Higher prosocial scores indicate better behaviour. Job-related anxiety is coded so higher values denote better mental health (lower anxiety). Other higher degree and other qualification education coefficients are estimated but not displayed for conciseness. Wave fixed effects (4 dummies) included throughout.

5.1 Schedule autonomy

None of the autonomy coefficients reaches the 10 percent significance level on any of the five subscales. Point estimates are uniformly small in absolute magnitude (the largest, in absolute value, is -0.197 for 'A little' on prosocial, with a standard error of 0.137). Across the four difficulty subscales the autonomy estimates fluctuate around zero in both directions, consistent with the absence of a coherent independent association. The joint F-test on all autonomy categories returns $F = 0.50$, $p = 0.684$ (Appendix A2), confirming that autonomy adds no detectable explanatory power once the wider control set is included.

This null is informative. The descriptive evidence in Section 3 established that autonomy is heavily socioeconomically patterned. The model build documented in Section 4 explains that the autonomy gradient is sharply attenuated at the introduction of income and remains so thereafter. In this model the autonomy coefficients fall by between a third and a half on every difficulty subscale and lose their marginal significance, and no subsequent specification (Models 5-9) restores it. The interpretation is that in the initial estimator, autonomy proxies for the wider socioeconomic bundle in which low-control work is located. Once income, education, children's sex and maternal anxiety are controlled for, autonomy adds no independent explanatory power to early-childhood SDQ outcomes in this UK setting. Schedule autonomy is therefore best understood as part of a job-quality bundle alongside income and maternal wellbeing, rather than as a separable contributor to children's socioemotional outcomes.

This finding also sits cleanly alongside, rather than against, Schneider and Harknett (2021). They study schedule unpredictability, last-minute shift changes, cancelled shifts, on-call work, among US service-sector mothers, and identify maternal wellbeing as the dominant pathway. The present study tests a narrower exposure (perceived control over start and finish times) in a wider population (all employed mothers, not only service-sector workers) and finds this narrower autonomy measure does not independently shift early-childhood SDQ scores. The two findings are consistent: autonomy and unpredictability are related but distinct dimensions of schedule quality, and the operative channel for child outcomes here runs through maternal job-related anxiety rather than the autonomy item itself.

5.2 Household income

The income gradient is the most economically meaningful pattern in Table 3 and the clearest evidence of the family-investment channel. Compared with children in the highest income quintile (Q5), children in the lowest quintile (Q1) score 0.337 points higher on conduct problems, 0.525 higher on emotional symptoms, 0.574 higher on hyperactivity, and 0.286 higher on peer problems although only at the 10% significance level. Q2 shows penalties of similar magnitude across the four difficulty domains, while Q3 retains significance on emotional symptoms and peer problems. Q4 is statistically indistinguishable from Q5 on every difficulty domain. The joint F-test on the income block returns $F = 12.2$, $p = 0.0005$.

Two patterns deserve emphasis. First, the Q1 and Q2 coefficients are similar in magnitude across each difficulty subscale while Q4 collapses to zero, consistent with the family-investment prediction of diminishing returns. Second, the gradient is strongest for hyperactivity and emotional symptoms, suggesting these are the channels through which household income most clearly maps onto early-childhood SDQ scores. This aligns with Noonan, Burns and Violato's (2018) UK finding of a persistent SDQ income gradient, and with Zilanawala and Schenck-Fontaine's (2025) evidence linking economic hardship to elevated socioemotional problems.

5.3 Children's sex, education and maternal anxiety

Three further controls are statistically meaningful and reinforce the income gradient. Children's sex carries the largest individual coefficients in the model. On the 0-10 scale, girls score lower than boys on hyperactivity (-0.975 , $p < 0.01$), conduct (-0.177 , $p < 0.01$) and peer problems (-0.221 , $p < 0.01$), while scoring higher on emotional symptoms ($+0.204$, $p < 0.05$) and prosocial behaviour ($+0.576$, $p < 0.01$). This is consistent with the established UK pattern in which boys have higher conduct and hyperactivity risk while girls show relatively higher emotional symptoms (Green et al., 2005).

Maternal education is most prominent on hyperactivity. Children of A-level, GCSE and no-qualification mothers score 0.522, 0.444 and 1.402 points higher respectively than children of degree-holding mothers. The no-qualification cell is small and should be interpreted cautiously.

Education does not reach joint significance ($F = 1.60$, $p = 0.155$), but it is retained on theoretical grounds and because subscale-specific coefficients are substantively informative.

Maternal job-related anxiety is statistically significant on every subscale (conduct -0.063, emotional -0.077, hyperactivity -0.072, peer -0.055, prosocial +0.027). Because the mental health scale is reverse-keyed, better maternal mental health maps directly onto fewer SDQ difficulties. The combined picture aligns with Noonan, Burns and Violato's (2018) UK finding that maternal psychological distress accounts for a substantial share of the income-SDQ association, and with Treanor and Troncoso's (2022) Scottish evidence that work conditions matter for children through the family-stress channel.

5.4 Limitations

The Model 9 estimates represent associations, not causal effects, and several distinct sources of bias remain present.

Selection into employment. The sample includes only employed mothers. Mothers who exit work because of children's difficulties or unmanageable schedules are not observed. If these mothers disproportionately experienced low autonomy, the autonomy coefficient is biased toward zero. The size of this bias cannot be signed without external evidence on the autonomy distribution among non-employed mothers, which UKHLS does not collect.

Occupational sorting. Autonomy is partly a feature of the job, partly a feature of who selects into it. Unobserved characteristics, such as preferences, ambition, and occupation, that shape both job choice and child outcomes will load onto the autonomy coefficient even after the observable controls. The direction of this bias depends on the sign of the unobservable variable's correlation with autonomy and SDQ.

Measurement of the exposure. The wkaut5 item captures only perceived control over start and finish times. It does not measure the dimensions of schedule quality that current UK policy targets like short-notice changes, last-minute cancellations, zero-hours contracts and variable hours (Taylor, 2017). The autonomy null may therefore reflect insufficient variation in the exposure rather than absence of effect.

Survey design and attrition. UKHLS retention is high but not uniform. Miall et al. (2023) document that disadvantaged groups in particular children with unemployed parents, in deprived areas, and from ethnic-minority backgrounds are over-represented among non-respondents to the SDQ items, and that survey weights only partly correct for this. If low-autonomy, high-SDQ children are missing at higher rates, the autonomy coefficient is again biased toward zero. The cross-sectional weights used here cannot fully address this.

Social-desirability bias. The SDQ is mother-reported, which raises the possibility that mothers under-report their child's difficulties to present themselves as competent parents, or over-report their own job-related distress on wkaut5 in ways consistent with how they expect a stressed working mother to respond. If these tendencies move together, the maternal-anxiety coefficient would be overstated and the autonomy coefficient understated. Testing this would require an independent observer such as a teacher-rated SDQ, but UKHLS records only the parent rating. The most plausible direction of bias is attenuation toward zero, so the autonomy null is likely a conservative estimate.

Age window and pandemic exposure. The SDQ administration window restricts inference to ages 5-8. Effects at older ages, where adolescent mental-health differentials widen, cannot be tested with this instrument. The final wave (1, 2020–2021) overlaps the COVID-19 pandemic, during which Miall et al. (2023) document an unusual narrowing of socioeconomic inequalities in child SDQ; results are robust to dropping wave 1 but the wave fixed effect for that period should be interpreted conscious of this.

5.5 Robustness and Diagnostics

Table 4 summarises the diagnostic and robustness checks for the preferred Model 9.

Table 4. Diagnostic and robustness checks for preferred Model 9.

Check	Result	Interpretation
Multicollinearity	Adjusted GVIFs are low: autonomy 1.010; income 1.073; children's sex 1.002; education 1.019; anxiety 1.429; wave dummies 1.005.	No evidence multicollinearity destabilises inference.
Heteroskedasticity	Breusch-Pagan and White tests reject homoskedasticity across all subscales; BP $p < 0.001$ on every subscale.	HC1 robust standard errors are appropriate.
Functional form	RESET non-significant for conduct (0.309), emotional (0.325), peer (0.227), prosocial (0.647); marginal for hyperactivity (0.031), exceeding 0.10 after influence trimming.	No systematic misspecification.
Wave fixed effects	Joint F-tests: cp $p = 0.126$; es, ha, pp $p < 0.001$; ps $p = 0.010$.	Wave fixed effects retained to absorb period differences.
Influence	Cook's D maxima are 0.227, 0.177, 0.130, 0.429, 0.313 across subscales. Top-10 trimming leaves autonomy null.	Results not driven by influential observations.
Income functional form	Replacing logged quintiles with continuous log income. Log-income coefficient: cp -0.284***, es -0.340***, ha -0.401***, pp -0.257***.	Income gradient robust; autonomy null is unchanged.
Weighting	Unweighted estimates yield the same statistical conclusion for autonomy.	Cross-sectional weights do not drive the autonomy result.
Repeated observations	Latest-only sample (one observation per child) produces no material change.	Repeated child-wave observations do not drive results.
Region controls	Adding 11 Government Office Regions (GOR) dummies leaves autonomy, income and education effects substantively unchanged.	Regional differences do not explain results.
Sibling count	Adding sibling count leaves autonomy, income and children's sex effects unchanged.	Sibling composition does not explain results.
One-child per households	Restricting to one-child per household leaves the autonomy null and income gradient intact.	Household composition does not explain results.
Maternal wellbeing controls	Omitting jwbs1_dv leaves autonomy null and shifts income coefficients only marginally.	Autonomy result is not produced by over-controlling for maternal wellbeing.

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Autonomy coefficients remain statistically indistinguishable from zero across robustness specifications.

5.6 Heterogeneity

Two interaction specifications were estimated to test whether the autonomy association varies across the population: autonomy $\times$ log income (Model 7A) and autonomy $\times$ education (Model 7B). In Model 7A, none of the interaction terms reaches the 10% significance level, providing no evidence that the autonomy association varies systematically by household income. In Model 7B, only the 'Some' $\times$ A-level cell is individually significant; in the absence of a coherent pattern across cells and given the small effective cell sizes, this is not interpreted as systematic moderation. The autonomy null is therefore not concealing heterogeneity across the income or education distribution.

6. Discussion

The preferred specification indicates that the explanatory weight in early-childhood SDQ outcomes lies with socioeconomic position, children's sex and maternal wellbeing rather than with schedule autonomy per se. The autonomy coefficients are small and statistically indistinguishable from zero across all five SDQ subscales. The descriptive autonomy gradient documented in Section 3.4 is largely absorbed once the model accounts for the wider bundle of resources and constraints with which autonomy is associated. In practical terms, low schedule autonomy in this UK age window appears less important as a separable predictor of children's SDQ outcomes than the broader socioeconomic conditions in which low-autonomy work is located.

This interpretation is reinforced by the income, education and anxiety coefficients. Lower household income is associated with worse outcomes across all four difficulty subscales, with the gradient flattening between Q4 and Q5 in line with diminishing returns. Maternal education shows subscale-specific associations on hyperactivity and peer problems, channels through which maternal human capital appears to translate into the home environment. Maternal job-related anxiety enters with significant negative coefficients on every subscale: better maternal mental health is associated with fewer SDQ difficulties and more prosocial behaviour. The

configuration is consistent with the family-investment and family-stress frameworks: household resources shape children's material and developmental inputs, while socioeconomic and workplace pressure operate through maternal stress, family routines and the organisation of care. Schedule autonomy is part of this wider bundle but does not independently move SDQ scores once the bundle is controlled for.

This evidence is consistent with, rather than contradictory to, the wider scheduling literature. Schneider and Harknett (2021) find unpredictable schedules associated with US children's internalising and externalising behaviour through pathways running through economic insecurity, reduced parenting time and maternal wellbeing. Meanwhile, Treanor and Troncoso (2022) link unstable parental work intensity to UK children's conduct and emotional problems. The present findings do not imply that work schedules are irrelevant; they suggest the perceived-autonomy item adds little independent explanatory power once income, education, children's sex and maternal anxiety are controlled for.

6.1 Policy implications

These findings could help inform future policy. Maternal socioeconomic position appears far more strongly associated with children's early SDQ outcomes than perceived schedule autonomy. Although autonomy was initially marginally significant, that significance attenuated once income was controlled for, suggesting autonomy was proxying for wider socioeconomic standing. Policy attention may therefore be more productively directed at supporting socioeconomically disadvantaged mothers and their children. Example policy focus could be extended free childcare provision, targeted maternal mental-health support and measures lifting household resources at the lower end of the income distribution. The Q1 to Q5 income gradient of around half a point on the 0 to 10 SDQ subscales is several times larger than any plausible autonomy effect these estimates imply, and the maternal-anxiety result reinforces the case for treating parental mental health as a child-development input rather than purely an adult-wellbeing concern. These conclusions should be read as associations rather than causal effects given the pooled cross-sectional design, and as such, all policy suggestions treated with caution.

6.2 Future research

Future research could improve work on autonomy in multiple ways. Firstly, longitudinal designs should test whether repeated exposure to low-autonomy work compounds over time; the pooled cross-section used here estimates an association, while time-series and panel designs that follow mothers through extended autonomy histories would be better placed to identify cumulative effects. Moreover, sharper measurement of schedule insecurity is needed. The Taylor Review of 2017 highlighted late-notice shift exposure, last-minute shift cancellation and other hallmarks of one-sided flexibility, with the Employment Rights Act 2025 turning several of these into legal categories. Future UK survey instruments should measure these dimensions directly and should record whether nonstandard work is chosen or imposed. Finally, the long-term effects of the COVID-19 pandemic on maternal scheduling and child mental health remain unstudied in a UK setting, and a successor to this study using post-pandemic UKHLS waves could test whether the autonomy null is itself a feature of the pre-pandemic labour market.

7. Conclusion

This study asked whether maternal perceived work schedule autonomy is independently associated with children's socioemotional outcomes in the UK. Five biennial waves of Understanding Society from 2011 to 2021 were used, with weighted pooled regression estimated separately across the five SDQ subscales. Lower schedule autonomy is strongly socially patterned. However, it is not independently associated with any of the five subscales once household income, maternal education, child's sex and maternal job-related anxiety are controlled for.

Read against the family-stress and family-investment frameworks that motivated the analysis, the explanatory weight in this sample lies with the wider bundle these models predict. Household resources and maternal wellbeing matter; perceived control over start and finish times does not appear to do so independently here. Children in lower-income households score worse across every difficulty subscale, with similar gradients on maternal education. Poorer maternal job-

related mental health is also independently linked to worse SDQ scores. Schedule autonomy appears to proxy this bundle rather than to carry an independent association of its own. The estimates remain associations, not causal effects.

The policy implication is correspondingly cautious. Predictable scheduling rights matter for workers. However, workplace scheduling reforms alone appear unlikely, on this evidence, to materially shift early-childhood SDQ inequalities. They would likely need to be paired with measures addressing household resources, childcare constraints and maternal mental health. The autonomy variable used here is also relatively narrow, capturing only perceived control over start and finish times. Future UK research should measure the dimensions of schedule insecurity that the Taylor Review and Employment Rights Act 2025 target directly, including short-notice changes, last-minute cancellations and whether nonstandard work is chosen or imposed. Post-pandemic waves and longer age windows would also help, where cumulative exposure to low-control work may matter more than can be detected here.

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Appendix

A1. Construction of nonstandard work variable

Source variable	Responses coded as nonstandard (=1)	Codes
wktime	Evenings only; At night; Both lunchtimes and evenings; Other times of day; Rotating shifts; Varies/no usual pattern; Daytime and evenings	4–10
wkends	Yes - most/every weekend; Yes - some weekends	1–2

A2. Joint F-tests

Variable block	F-statistic	p-value	Decision
Job-related anxiety only	6.80	0.009	Significant; retained
Job-related depression only	1.48	0.224	Not significant; excluded
Income (quintiles)	12.2	0.0005	Highly significant; retained
Children's sex	6.76	0.009	Significant; retained
Education (all categories)	1.60	0.155	Retained on theoretical grounds
Partner status	1.10	0.294	Not significant; excluded
Maternal weekly working hours	2.92	0.088	Marginal; excluded due to missingness
Child age	1.10	0.293	Not significant; excluded
Nonstandard schedule	0.45	0.504	Not significant; excluded
Region	0.89	0.547	Not significant; excluded
Autonomy (all categories)	0.50	0.684	Not significant; reported as result of interest
Grandparent co-residence	0.12	0.725	Not significant; excluded

A3. Household composition and region: autonomy coefficients

Specification	Conduct	Emotional	Hyperactivity	Peer	Prosocial
Autonomy: None - main	0.080	-0.088	0.083	-0.073	-0.112
Autonomy: None - with siblings	0.084	-0.089	0.086	-0.072	-0.113
Autonomy: None - with region	0.089	-0.087	0.092	-0.068	-0.114
Autonomy: None - one-child-per-household	0.134	-0.071	0.149	-0.091	-0.144

Notes: All autonomy coefficients remain statistically indistinguishable from zero across the four specifications. Income, children's sex, education and job-related anxiety effects also remain substantively unchanged.