

Gendered Time Constraints and Public Transport Accessibility: A Multilevel Analysis of Temporal Well-Being

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Abstract

Time-use autonomy is a fundamental yet under-recognized dimension of multidimensional well-being. While public transport infrastructure is vital to daily life, conventional transit planning often operates under a gender-blind paradigm that privileges employment-centered commuting over the complex geometries of the "mobility of care." This study examines how satisfaction with public transport accessibility influences daily time-use outcomes through an intersectional and territorial lens in Spain. Utilizing a multilevel linear regression model with individuals nested within Spain's Autonomous Communities, we explore how gender interacts with socioeconomic status (educational attainment) and geographic context (rurality and regional mobility regimes) to shape individual temporal capabilities.

The empirical results reveal that while public transport acts as a unique, time-structuring infrastructure, its benefits are unevenly distributed. Gender inequalities do not emerge as a direct, universal effect of sex, but are relationally conditioned by socioeconomic position. Specifically, the time-saving benefits of baseline education are heavily eroded for women, who operate under tighter temporal constraints due to rigid schedules, public transit dependency, and a disproportionate share of unpaid caregiving. Furthermore, a marginal penalty for rural residence and systematic regional variations confirm that territorial structures act as critical filters for individual capabilities.

Keywords: Time Poverty; Mobility of Care; Multilevel Analysis; Intersections of Inequality; Public Transport; Temporal Capabilities; Spain

1. Introduction

In contemporary debates on social justice and public policy, well-being is increasingly understood as a multidimensional construct that extends far beyond monetary indicators. While income, health, education, and employment are standard pillars in welfare frameworks, the distribution, control, and autonomy over time remain structurally under-recognized. Yet, time is the foundational resource through which individuals organize their everyday lives, balancing paid employment, unpaid care, social reproduction, leisure, and rest. From a feminist economics perspective, time is not an purely individual choice but a socially structured condition heavily shaped by gender roles, labor market rigidities, household structures, and the availability of public services and infrastructure.

For decades, feminist scholars have highlighted that women's disproportionate responsibility for unpaid domestic and caregiving work creates deeply unequal time

constraints (Folbre, 2006; Bittman & Wajcman, 2000). This manifests in "time poverty"—a condition where individuals face more socially necessary tasks than the hours available to complete them, resulting in a severe drain on well-being even in the absence of monetary poverty (Rodgers, 2023).

Crucially, this time architecture is mediated by daily mobility. Transport infrastructure is not neutral; it is a primary driver of how time is spent or wasted. Traditional transport planning has long operated under a gender-blind paradigm, prioritizing radial commuting flows designed for linear, full-time employment trajectories—historically associated with male work patterns. Conversely, feminist transport studies have demonstrated that women's mobility patterns are structurally distinct, characterized by the "mobility of care" (Sánchez de Madariaga, 2013). This includes complex, multi-stop "trip chaining" (e.g., combining grocery shopping, medical appointments, and school drop-offs on the way to or from work) that is tightly bound to rigid external schedules.

When public transport systems fail to account for these care-related geometries—through low off-peak frequencies, poor intermodality, or lack of care-destination connectivity—travel time ceases to be an efficient transition. Instead, it becomes a severe temporal tax that exacerbates time poverty, heavily fragmenting women's daily routines.

While a growing body of international literature connects transport disadvantage to time poverty (Zehba et al., 2025; Tran et al., 2024), empirical assessments that capture these dynamics through an intersectional and territorial lens remain scarce, particularly in Southern Europe. This paper addresses this gap by examining how public transport accessibility shapes time-use outcomes across gender, socioeconomic status, and regional contexts in Spain.

Using a multilevel linear modeling approach where individuals are nested within Spain's 19 Autonomous Communities, this study investigates a critical paradox: why nominal spatial access or subjective satisfaction with public transport does not automatically translate into equal time-use benefits for all. Moving away from an additive view of inequality, we specifically explore how gender interacts with educational attainment and territorial characteristics (such as rurality and regional mobility regimes) to restrict or expand an individual's "temporal capability"—the genuine freedom to allocate one's daily hours without facing systemic self-sacrifice.

2. Literature Review and Theoretical Framework

2.1. Time Use as a Dimension of Well-Being

Time is a fundamental but often under-recognized dimension of well-being. While income, employment, health, and education are commonly included in multidimensional welfare frameworks, the distribution and control of time remain less systematically incorporated into public policy evaluation. Yet time is one of the most basic resources through which people organize paid work, unpaid care, domestic

responsibilities, mobility, rest, social relationships, and leisure. From a feminist economics perspective, time is not merely an individual resource, but a socially structured condition shaped by gender roles, labor market position, household composition, public services, and infrastructure provision.

The relevance of time for well-being has long been recognized in the literature on unpaid work, household production, and social reproduction. Feminist economists have shown that women's disproportionate responsibility for unpaid domestic and care work generates unequal time constraints, limiting their opportunities for paid employment, leisure, political participation, social life, and rest (Folbre, 2006; Bittman & Wajcman, 2000; Craig & Mullan, 2011). This unequal distribution of time has direct implications for well-being because it affects not only the quantity of available time but also the degree of autonomy individuals have over their daily schedules.

Recent scholarship has conceptualised these inequalities through the notion of "time poverty". Time poverty refers to a condition in which individuals face more socially necessary tasks than the time available to perform them, producing deprivation even when income poverty is not present. Rodgers (2023) argues that time poverty is a form of deprivation that restricts well-being, reinforces income poverty, and remains under-recognised in policy because unpaid work is not properly captured in most survey datasets. Her work also shows that women tend to experience higher rates of time poverty than men and that investments in physical and social infrastructure can reduce time burdens by decreasing the time required for unpaid household work and care (Rodgers, 2023)¹.

This insight is central to the present study. Public transport, proximity services, pedestrian infrastructure, care facilities, and local amenities do not simply affect mobility or accessibility; they reorganise the time architecture of everyday life. When transport is insufficient, unreliable, expensive, or poorly connected to care-related destinations, time burdens increase. Conversely, accessible and well-designed public transport can reduce time pressure, improve coordination between paid work and care, and support wider participation in social and economic life.

2.2. Gendered Time Use, Care and Daily Mobility

Time-use inequalities are inseparable from the gendered organisation of care. Women continue to perform a disproportionate share of unpaid domestic and caregiving work,

¹ <https://www.cambridge.org/core/journals/social-philosophy-and-policy/article/time-poverty-conceptualization-gender-differences-and-policy-solutions/06A5EFD49F494FB69B1D4830F1CAB19> "TIME POVERTY: CONCEPTUALIZATION, GENDER DIFFERENCES, AND POLICY SOLUTIONS | Social Philosophy and Policy | Cambridge Core"

even when they participate in paid employment. This produces what Bittman and Wajcman (2000) described as a gendered inequality not only in the amount of free time but also in its quality, fragmentation, and autonomy. Women's time is often more interrupted, more constrained, and more closely tied to the needs of others.

Mobility is one of the key domains through which these inequalities are expressed. Traditional transport planning has often prioritised commuting flows associated with paid employment, particularly radial journeys between residential areas and employment centres. However, feminist transport studies have demonstrated that women's mobility patterns are more likely to involve trip chaining, accompaniment of children or dependent persons, shopping, access to health services, and multiple short-distance journeys associated with household management and care (Sánchez de Madariaga, 2013; Craig & van Tienoven, 2019).

The concept of the "mobility of care", introduced by Sánchez de Madariaga (2013), is particularly useful for this paper because it allows mobility to be interpreted as part of the social organisation of care rather than merely as movement between home and work. Mobility of care includes journeys made to accompany, support, feed, educate, heal, or care for other people. These trips are often temporally constrained by school schedules, opening hours, medical appointments, work shifts, and care windows. As a result, women's mobility cannot be adequately understood through conventional commute-based models.

Recent studies confirm the relevance of this perspective. Craig and van Tienoven (2019) show that parental travel with and for children is gendered, with women undertaking a larger share of care-related travel. Kim's recent analysis of family caregivers in the United States, based on the American Time Use Survey, finds that eldercare responsibilities are associated with increased daily travel time budgets, confirming that caregiving reshapes travel behaviour and intensifies work-family conflicts (Kim, 2025).

Similarly, Smith (2025) shows that public transport policy documents still make only limited reference to care travel, despite trip chaining being a common feature of mobility of care, such as dropping children off at childcare on the way to work.

This literature supports the theoretical expectation that public transport accessibility may have different implications for women and men. For men, improved public transport may primarily reduce commuting costs or travel time. For women, however, the effects are mediated by more complex daily schedules, care responsibilities, accompaniment, safety concerns, and coordination between paid and unpaid work. Therefore, even when women report similar satisfaction with public transport access, the effective time-use benefits may be weaker if the system does not respond to the complexity of care-related mobility.

This perspective may help explain one of the central findings of the present study: gender differences do not emerge primarily as a direct effect of being female, but rather through the interaction between gender and socioeconomic position, particularly

educational attainment. This suggests that women's mobility disadvantages are structurally mediated rather than universal. Women with lower educational attainment may face more rigid working schedules, greater dependence on public transport, fewer opportunities for teleworking or flexible mobility arrangements, and higher levels of unpaid care responsibility. Consequently, even when public transport accessibility improves, the effective time-use gains may remain limited because women continue to operate under tighter temporal constraints.

This interpretation also supports the hypothesis that temporal constraints may be more relevant than spatial accessibility alone in explaining gendered time-use inequalities. The issue is not only whether transport is geographically available, but whether it enables the complex synchronization of care-related activities, paid work, accompaniment, and household management within restricted daily schedules.

2.3. Transport-Related Time Poverty

Transport is increasingly recognised as a driver of time poverty. Poor transport accessibility can increase the time required to reach employment, education, care services, health facilities, shops, and social activities. This is especially relevant for women, lower-income groups, rural residents, and people with caregiving responsibilities.

Recent work has explicitly connected gendered time poverty with mobility. A 2025 study on women's urban mobility narratives in Kochi, India, shows that time poverty disproportionately affects women because of the combined pressure of paid work, unpaid domestic responsibilities, caregiving expectations, and travel constraints. The study identifies how transport availability, access, and quality can aggravate time poverty and reduce women's quality of life, (Zehba et al. 2025). Although the geographical context differs from Spain, the theoretical contribution is highly relevant: travel time cannot be treated as a neutral component of daily schedules because it interacts with gendered responsibilities and institutional constraints.

The transport literature has also moved towards a broader understanding of travel as connected to well-being. Tran et al. (2024) argue that travel affects subjective well-being indirectly through out-of-home activities, showing that mobility matters not only because of travel itself but because it enables or restricts participation in meaningful activities. This is important for the present paper because time-use outcomes related to public transport should not be interpreted only as travel efficiency. They are linked to the capacity to participate in employment, care, education, leisure, and social relationships.

This perspective helps explain why satisfaction with public transport access may be positively associated with more favorable time-use outcomes, as suggested by the empirical results of this paper. Public transport is not simply a mobility service; it is a time-structuring infrastructure. It can reduce temporal friction, expand feasible daily activity spaces, and improve the coordination of everyday life. However, if public transport is designed around standard commuting patterns rather than care-related schedules and chained journeys, its benefits may be unevenly distributed.

The findings of this paper reinforce the idea that transport accessibility should be interpreted as a temporal capability rather than merely a spatial one. Public transport systems may improve accessibility in formal terms while still failing to reduce effective time poverty among women if schedules, frequencies, intermodality, safety conditions, and care-related destinations are not adequately integrated. This may explain why women can report similar levels of satisfaction with transport access while simultaneously experiencing lower effective time-use benefits.

In this sense, the paper suggests that time-use inequalities are not only related to travel duration itself, but also to the hidden temporal costs associated with trip chaining, waiting times, accompaniment, coordination burdens, and multitasking. These dimensions are often absent from conventional transport evaluations, which continue to privilege standard commuting patterns over the temporal organisation of social reproduction.

2.4. Education, Socioeconomic Position and Gendered Time Constraints

The present study gives particular importance to the interaction between gender and education. The preliminary results show that compulsory education is positively associated with the dependent variable, but this association is significantly weaker for women, as reflected in the negative interaction between compulsory education and being female.

This finding suggests that gender inequalities in time-use outcomes do not operate only through gender as an isolated category, but through its intersection with socioeconomic position. Educational attainment influences labour market opportunities, income, residential location, access to private transport, bargaining power within households, and the ability to outsource or reorganise care work. Women with lower educational attainment may therefore experience compounded constraints: more limited employment flexibility, greater exposure to precarious jobs, less access to private mobility, more dependence on public transport, and fewer resources to compensate for infrastructure deficits.

This interpretation is consistent with the broader literature on time poverty, which stresses that gendered time constraints are shaped by class, income, employment status, and household responsibilities (Bardasi & Wodon, 2010; Gammage, 2010; Rodgers, 2023). It also aligns with feminist transport research showing that mobility disadvantage is not evenly distributed among women, but is intensified among those with fewer economic resources, lower education, care responsibilities, or residence in poorly connected areas.

Consequently, the theoretical framework of this paper rejects additive interpretations of inequality. The issue is not simply whether women spend more time travelling than men, but whether gender interacts with education, income, care responsibilities, and territorial context to produce unequal temporal capabilities. In this sense, time use can be understood as a capability: the real freedom to organise one's day, access essential activities, care for others without self-sacrifice, and participate in social and economic life without excessive temporal constraint.

The negative interaction between compulsory education and being female may therefore reflect a cumulative mechanism of temporal disadvantage. Lower educational attainment may reduce access to stable employment, flexible working arrangements, digital alternatives, private mobility resources, and residential locations with better transport connectivity. At the same time, women in these groups continue to assume a disproportionate share of unpaid care and domestic work. The combination of lower socioeconomic resources and care-related obligations may therefore reduce the capacity to transform transport accessibility into effective time gains and well-being improvements.

Importantly, this interpretation suggests that gender inequalities in transport-related time use should not be conceptualised as homogeneous across all women. Instead, inequalities emerge at the intersection of gender, education, territorial context, and care responsibilities. This reinforces the need for intersectional approaches to mobility and infrastructure policy.

2.5. Rurality, Territory and Transport-Related Time Use

The paper's results also point to the relevance of territorial context. Rural residence shows a marginally negative effect, which is consistent with the literature on transport disadvantage in rural and peripheral areas. Public transport systems in rural territories tend to be less frequent, less integrated, and less adapted to complex daily mobility patterns. This may increase dependence on private vehicles and reduce accessibility for people without car availability, including women, young people, older adults, migrants, and low-income households.

Territorial differences are also visible in the multilevel component of the paper. Although regional variance is relatively modest, the random intercepts suggest systematic spatial patterns across Spain's Autonomous Communities, probably reflecting differences in public transport provision, urbanisation, network integration, fare policies, service frequency, and regional mobility regimes.

The persistence of regional effects after controlling for individual characteristics suggests that transport-related time inequalities are partly embedded in territorial mobility regimes. Metropolitan regions with integrated transport systems may offer greater flexibility for chained mobility and care-related travel, potentially reducing temporal burdens. By contrast, rural or car-dependent regions may intensify time poverty, especially for women with limited educational attainment and high care responsibilities.

This finding opens an important line for future research: whether Autonomous Communities with more extensive metropolitan transport systems exhibit smaller gender gaps in transport-related time use. Exploring regional variation in network density, fare integration, transport frequency, and intermodality may help explain why similar individual characteristics produce different temporal outcomes depending on territorial context.

This finding supports a multilevel interpretation of transport-related time use. Individual characteristics such as gender, education, care responsibilities, and socioeconomic position matter, but they operate within territorial opportunity structures. A woman with care responsibilities and low educational attainment may experience very different time-use constraints depending on whether she lives in a metropolitan area with frequent integrated public transport or in a rural municipality with sparse services and car dependency.

The territorial dimension is therefore essential for policy. Gender-sensitive transport planning cannot be reduced to improving average accessibility. It must consider where people live, how services are distributed, how public transport networks are integrated, and whether mobility systems respond to the temporal organisation of care.

2.6. Gender-Sensitive Transport Planning and Time Policy

The literature increasingly suggests that transport planning must move beyond gender-blind accessibility models. Improving infrastructure provision is necessary but not sufficient if services remain organized around male-coded, employment-centred commuting patterns. Gender-sensitive transport policy requires attention to frequency, safety, affordability, proximity, off-peak travel, trip chaining, accompaniment, stroller accessibility, care destinations, and the coordination of mobility with school, health, care, and working-time schedules.

Recent research on gender-responsive mobility supports this shift. Beyazit (2023) argues that inclusive transport requires participatory planning and new regulatory and design frameworks, showing how street experiments can be used to improve women's access to public transport and urban life. Smith's 2025 review of transport policy in Toronto similarly shows that mobility of care remains only weakly integrated into transport planning, despite its importance for everyday travel behavior ([MDPI][3]).

For the present paper, this literature helps frame the main policy implication: policies focused only on expanding infrastructure may produce limited time-use benefits for women if they do not incorporate care-oriented mobility needs. Public transport accessibility must be understood not only spatially but temporally. The key question is not only whether a service exists, but whether it operates at the right times, connects the right destinations, allows chained journeys, supports accompaniment, reduces waiting times, and enables daily life to be organized without excessive time pressure.

This is why time-use analysis is crucial for feminist infrastructure policy. It makes visible the hidden temporal costs of gender-blind planning and provides a bridge between transport policy, care policy, labor policy, and well-being policy.

The results of this paper suggest that transport policy should move beyond infrastructure expansion alone and explicitly incorporate time-use and care-related dimensions into planning processes. Policies centred exclusively on increasing accessibility may generate unequal benefits if transport systems continue to be

designed around traditional commuting patterns associated with male full-time employment trajectories.

Gender-sensitive transport planning should therefore incorporate temporal variables such as service frequency outside peak commuting hours, synchronisation with school and care schedules, reduction of transfer times, accessibility for accompaniment travel, stroller-friendly infrastructure, and affordable fare structures for chained journeys. From this perspective, transport systems should be evaluated not only according to efficiency or coverage indicators, but also according to their capacity to reduce time poverty and improve the coordination of everyday life.

The findings also indicate that care-oriented mobility policies may be more effective in reducing women's time poverty than general accessibility improvements alone. This is particularly relevant for women with lower educational attainment and for populations living in rural or peripheral areas, where transport deficits interact with socioeconomic constraints and care responsibilities.

3. Results

Table 1. Multilevel linear regression model for public transport-related time-use outcomes in Spain.

Predictor	Estimate	Std. Error	t value	Sig.
(Intercept)	0.979	0.277	3.538	***
Satisfaction with access to public transport	0.025	0.012	2.105	**
P15C	0.047	0.019	2.449	**
Satisfaction with access to local infrastructure	-0.012	0.015	-0.797	
Compulsory education	0.431	0.129	3.335	***
Female	0.329	0.255	1.291	
Post-compulsory education	0.067	0.099	0.677	
Children in household	0.002	0.071	0.029	
At risk of poverty or social exclusion (AROPE)	0.009	0.008	1.214	
Rural residence	-0.116	0.070	-1.643	*
Immigrant	-0.121	0.103	-1.170	
Compulsory education × Female	-0.371	0.177	-2.091	**
Female × Post-compulsory education	0.076	0.137	0.557	
Female × AROPE	-0.012	0.009	-1.325	

We estimated a multilevel linear model with individuals nested within Spain's Autonomous Communities (19 regions), including random intercepts at the regional level to capture territorial heterogeneity in time-use outcomes related to public transport. The regional-level variance is relatively small compared to individual-level residual variance, indicating that most variation occurs at the individual scale.

Satisfaction with access to public transport is positively and significantly associated with the dependent variable ($\beta = 0.025$, $t = 2.105$, $p < 0.05$), suggesting that perceived accessibility to public transport is linked to more favorable time-use outcomes. In contrast, satisfaction with access to other local infrastructure (streets, lighting, and parks) does not show a significant effect, highlighting the specific role of public transport accessibility rather than general neighborhood conditions.

Compulsory education displays a strong positive association ($\beta = 0.431$, $p < 0.01$). However, this effect is significantly moderated by gender: the interaction between compulsory education and being female is negative ($\beta = -0.371$, $p < 0.05$), indicating that women with compulsory education benefit less from this educational level in terms of transport-related time use than men. The main effect of gender is not statistically significant, emphasizing that inequalities emerge primarily through interactions with socioeconomic status.

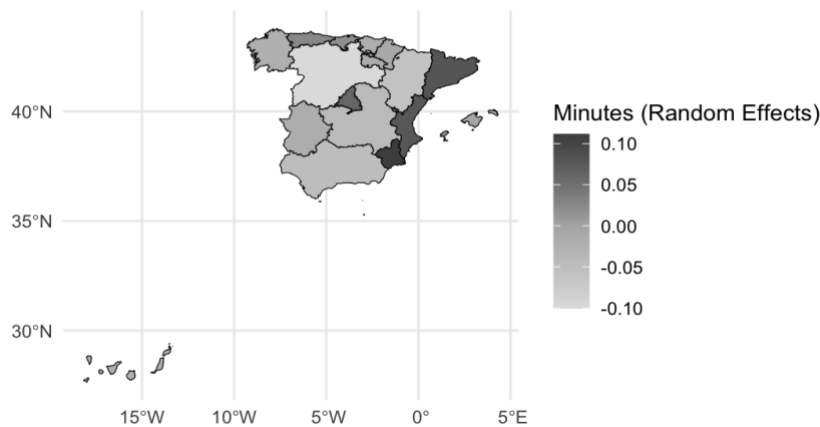
Rural residence shows a marginally negative effect ($p < 0.10$), consistent with reduced public transport provision outside urban areas in Spain. Variables capturing household composition (children), immigrant status, and risk of poverty or social exclusion (AROPE) are not statistically significant in this specification, nor are their interactions with gender.

The findings indicate that perceived access to public transport and educational attainment are key determinants of time-use outcomes, while gender inequalities operate in combination with education rather than as simple additive effects.

The absence of a statistically significant direct effect of gender should not be interpreted as evidence of gender equality in transport-related time use. On the contrary, the significant interaction between gender and compulsory education suggests that inequalities are relational and structurally conditioned. Gendered temporal disadvantage appears to emerge through the interaction between care responsibilities, socioeconomic position, and mobility opportunities rather than through gender alone as an isolated variable.

This result is theoretically important because it challenges additive interpretations of mobility inequality and supports an intersectional understanding of transport disadvantage. Women's transport-related time use cannot be fully explained by sex differences alone, but must be analysed within broader structures of labour market segmentation, care organisation, educational inequality, and territorial accessibility.

Figure 1. Territorial heterogeneity in public transport–related time use across Spanish Autonomous Communities (multilevel random intercepts).



Source: own elaboration

Figure 1 displays the estimated random intercepts (Best Linear Unbiased Predictors, BLUPs) for Spain's Autonomous Communities derived from the multilevel model, expressed in minutes relative to the national average. These random effects capture region-specific deviations after controlling for individual-level socioeconomic characteristics, accessibility perceptions, and gender interactions.

Overall, the magnitude of regional variation is modest, ranging approximately between -0.10 and $+0.10$ minutes, which is consistent with the relatively small variance of the random intercept ($\sigma^2 = 0.0108$).

Nevertheless, the map reveals a clear spatial pattern. Several eastern and northeastern regions exhibit positive deviations from the national mean, suggesting systematically higher values of the outcome variable, while parts of southern and interior Spain display negative deviations. This spatial structure likely reflects differences in public transport provision, urbanization patterns, and regional mobility regimes. Regions with large metropolitan areas and more developed public transport networks tend to show positive residuals, whereas more rural or car-dependent regions tend to fall below the national average.

Importantly, these regional effects persist even after accounting for satisfaction with access to public transport, education, gender, and household characteristics. This suggests the presence of unobserved contextual factors—such as service frequency, network integration, fare policies, or urban form—that shape daily mobility and time-use outcomes beyond individual perceptions of accessibility.

From a substantive perspective, the limited but systematic regional variation supports a multilevel interpretation of transport-related time use in Spain: while individual

socioeconomic characteristics and gendered constraints are the primary drivers, territorial context still plays a secondary but meaningful role. This finding aligns with previous research emphasizing that transport behavior emerges from the interaction between personal resources and place-based opportunity structures.

These results reinforce the relevance of combining time-use analysis with spatially sensitive transport policies. Even relatively small regional differences may translate into substantial cumulative effects on daily schedules, particularly for women and lower-educated groups, who already face constrained mobility choices.

The results are consistent with the time-use and transport literature emphasizing that mobility behaviors are embedded in broader socioeconomic structures and daily activity patterns (Schwanen, Banister & Anable, 2012; Craig & van Tienoven, 2019). The significant interaction between gender and compulsory education suggests that women with lower educational attainment may face compounded constraints, potentially reflecting greater care responsibilities, more complex trip chaining, or limited access to high-quality transport services.

The marginal rural penalty further reinforces evidence that spatial context remains a key determinant of transport-related time use, particularly in settings where public transport provision is sparse. From a policy perspective, these findings point to the need for transport planning approaches that explicitly incorporate time-use considerations and gender-sensitive design, especially for populations with lower educational attainment and in rural areas.

4. Conclusions

The empirical analysis presented in this study demonstrates that time and mobility function as foundational pillars in the configuration of multidimensional well-being, directly interacting with the structural inequalities deeply embedded within Spanish society. By employing a multilevel linear modeling approach, this paper establishes that transport-related temporal disadvantages do not impact women in a universal or homogeneous manner; rather, they are profoundly mediated by class and educational attainment. The statistical non-significance of the direct effect of gender, combined with the strongly negative and significant interaction effect between being female and holding a compulsory education baseline, challenges additive interpretations of social inequality. This finding reveals that women with lower educational attainment experience a compounding mechanism of disadvantage, wherein precarious employment, rigid work shifts, and higher public transit dependency converge with asymmetric social expectations regarding the burden of unpaid care and social reproduction. For these women, the non-negotiable nature of daily care obligations absorbs their temporal margins to such an extent that it neutralizes the theoretical time-saving benefits that an equivalent educational baseline yields for men.

Furthermore, this research confirms that public transport operates uniquely as a time-structuring infrastructure, distinguishing it from general local urban amenities—such as street lighting or parks—which exhibited no significant effect on temporal well-being. However, the observed divergence between positive subjective satisfaction with transit access and the persistence of material time constraints necessitates a paradigm shift in how accessibility is defined. Formal spatial availability is an insufficient metric if service frequencies, route geometries, and intermodality ignore the operational logic of the mobility of care. Traditional transit network design, which historically privileges radial, peak-hour commuting flows tailored to male-coded employment trajectories, systematically penalizes the fragmented trip-chaining and multiple short-distance journeys required for household management and dependency accompaniment. The hidden temporal costs associated with inefficient transfers, prolonged waiting times, and rigid scheduling constitute a systemic tax on women's time budgets, converting what is administratively categorized as equitable infrastructure coverage into a subtle mechanism that reinforces time poverty.

Finally, the multilevel component of this study proves that individual temporal capabilities are not solely determined by personal socioeconomic resources, but are fundamentally bounded by place-based opportunity structures. The marginal penalty identified for rural residence highlights the heightened vulnerability and structural isolation generated by sparse collective transit networks and service dispersion outside of major urban centers. Moreover, the regional random effects detected across Spain's Autonomous Communities confirm that individual mobility is embedded within distinct territorial mobility regimes. The positive deviations observed in northeastern and highly metropolitan regions suggest that localized institutional interventions—such as unified metropolitan transport authorities, robust off-peak service densities, and integrated fare structures—serve as crucial institutional buffers against temporal deprivation.

The policy implications derived from these findings demand an urgent integration of transport planning with care, labor, and time-use policies in Spain, moving away from evaluation metrics focused exclusively on speed and the economic efficiency of traditional commuting lines. A truly gender-sensitive and intersectional approach to mobility requires a reallocation of public investment toward expanding off-peak frequencies, synchronizing multi-modal networks to facilitate seamless trip-chaining, implementing affordable fare structures for multi-stop care journeys, and upgrading physical infrastructure to comfortably accommodate accompaniment travel. Ultimately, evaluating public transport through the lens of temporal capability makes visible the hidden costs of gender-blind infrastructure, demonstrating that genuine social equity requires transforming public transit into a service that actively alleviates time poverty and guarantees the real freedom to organize daily life, rest, and participate in social and economic spheres without facing systemic self-sacrifice.

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